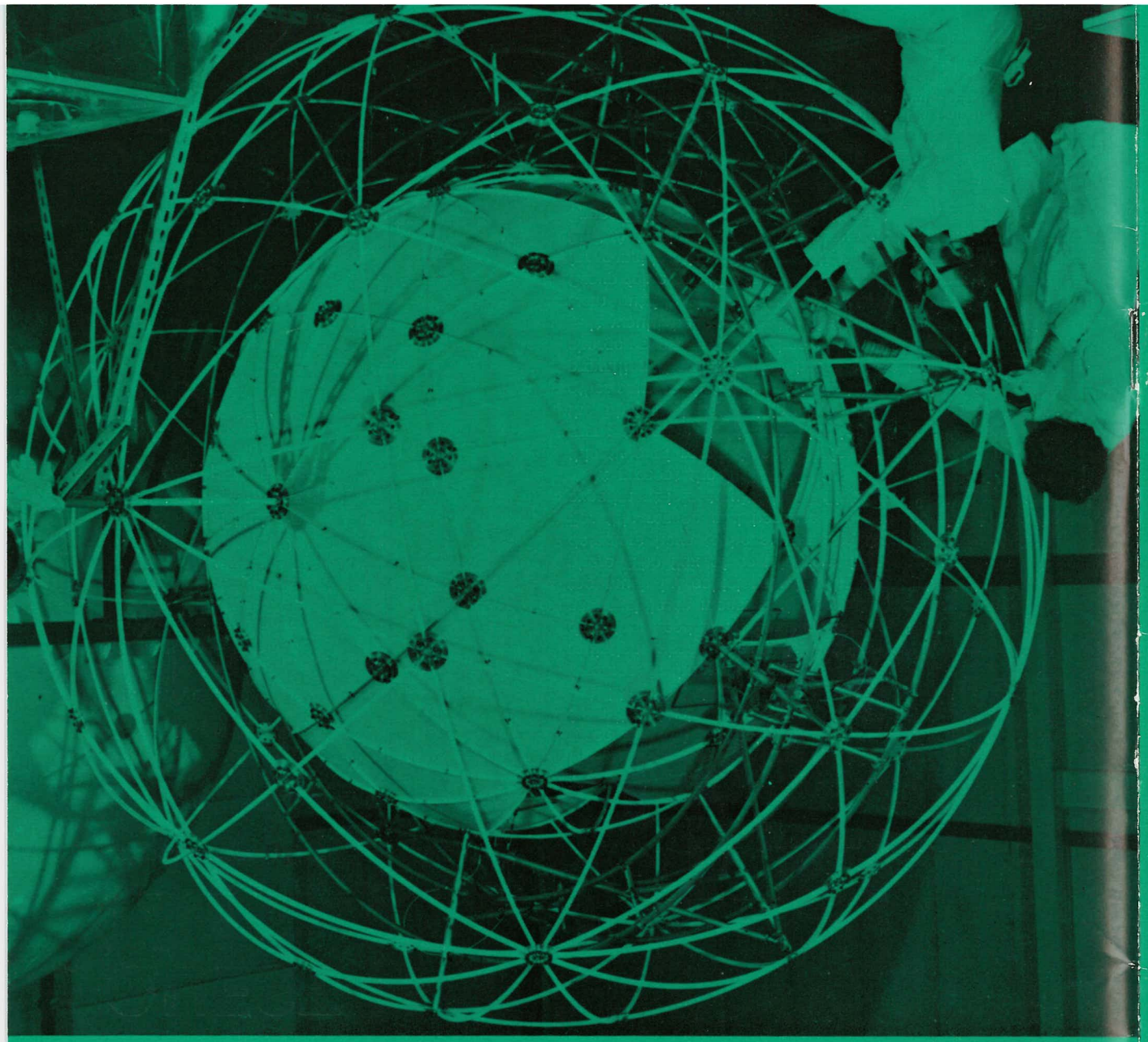


QUEST

Quest is issued four times a year by the Science Research Council for members of staff only. The Council is not necessarily associated with any individual views expressed.

QUEST

House Journal of the
Science Research Council

Vol. 6 No. 3
1973

contents

Balloon stops rays

Cover Picture: **the skeleton of a gas scintillation counter that is to be flown under a helium filled balloon 25 miles up to measure the abundances of heavy elements in primary cosmic rays.**

The equipment is being made by the British Aircraft Corporation Space Systems Division for SRC supported research carried out by Professor Peter Fowler's Group from the Physics Department of Bristol University.

Within its field Professor Fowler's Group is one of the foremost in the world. Cosmic rays are a very high energy radiation whose energy is not known. To study them, detectors need to be flown as high up in the atmosphere as possible to measure the rays before they are altered too much by collisions with the material of the atmosphere. The flux of cosmic rays is not very great so the detectors have to be exposed to them for long periods. For this reason and because the apparatus is bulky the experiment is not suitable for flight in sounding rockets.

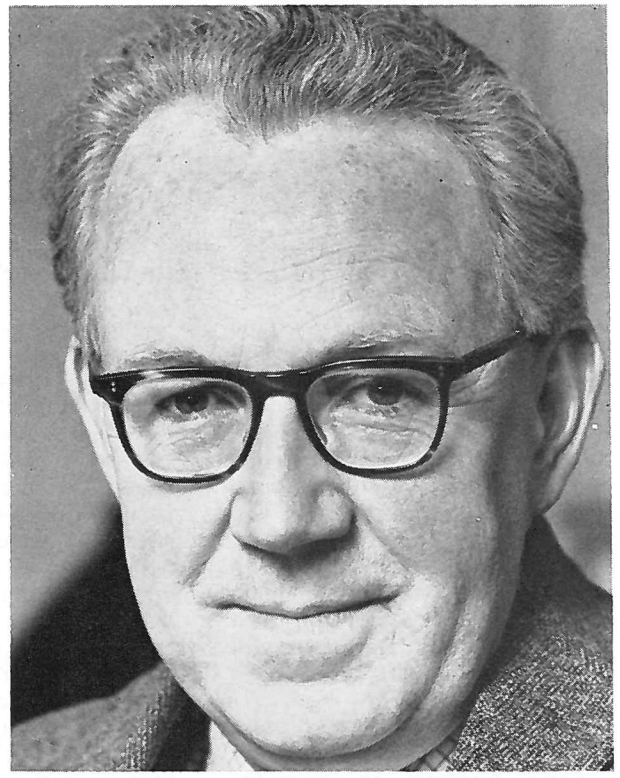
At present the balloon is the most useful vehicle for this type of research and Professor Fowler has an SRC grant to support his examination of cosmic rays with the object of determining the nature of the bodies or other sources that they originated from and the conditions prevailing there. He also has a grant to investigate the charge spectrum of very heavy cosmic ray particles.

It would be even better if the rays could be studied from outside the atmosphere, and a proposal from the Group for a satellite borne detector has been put forward for consideration. Professor Fowler is a member of the SRC Astrophysics Working Group and a member of the Space Policy and Grants Committee.

Photo by courtesy of BAC.

Published by the Science Research Council, State House, High Holborn, London W.C.1. Set in Univers and printed by Wells KPL Swindon Press, Swindon.

To the staff of SRC from Professor Edwards



It is a great honour to become Chairman of the Science Research Council. I have had several years' experience of the Committees and Boards of the Council and therefore know the excellent support which I will get from the staff.

Sir Brian has left SRC in good heart. After the reorganisation of the Government's support for research and development, SRC has had its position as the principal agency of selective scientific support of the universities confirmed, the Civil Service Department's review of its management has given SRC high praise, and a first class scientific programme is in hand and planned. But the future will have to be within a restricted budget, and there will be a number of problems to be sorted out. I am confident we can continue the standard of support that SRC has given British science in the past, and look forward to SRC achieving even more success in the future.

I have already paid flying visits to the establishments and hope to repeat them regularly so that I can become well known to you and hear your views.

Sir Brian thanks SRC staff

'I am delighted with the choice of my successor. I couldn't have wished for a better one', said Sir Brian Flowers at the SRC Annual Report Press Conference on September 26, four days before his office passed on to Professor S F Edwards FRS. Later, talking to the London Office staff about the Report, he said that he had known Professor Edwards for a long time. They had even attended the same school, although that was before they met. 'He and I and Dylan Thomas and Harry Secombe all went to Swansea Grammar School'.

About his six years with SRC, Sir Brian said 'Together I think we've done more good than harm, and that's more than can be said for many people. It's been a very stimulating experience for me and I know I shall remember it. That's more thanks to the staff of SRC than to anything I have done'.

editorial

On Saturday, August 11, at Bushey, Miss Anne Smith, Editor of *Quest*, became Mrs Anne Walls when she married Robert (Bob) Walls, a fellow Council Employee, formerly at the Radio and Space Research Station.

Bob has now gone to work at CERN as British liaison official. He is looking after administrative matters on behalf of British experimenters using the CERN facilities.

Anne will be joining him at the beginning of November. *Quest* is therefore losing an Editor and this is the last issue to appear under her name.

Since being appointed Editor in the 'Year of the Lunar Samples,' Anne has worked diligently to raise its editorial content and presentation to a level which will appeal to as many of the Council's diversified readership as possible. She has worked very happily with the editorial board of representatives from each of our establishments and, at the same time (and often in her spare time) she has studied editorial and printing techniques. She recently passed the examination of the British Association of Industrial Editors.

Now she is hoping to continue in similar employment in Geneva.

We are sure that all readers will join with the editorial board, in wishing both Anne and Bob many years of happiness and prosperity together.

The Council is now in process of appointing a successor who will, it is hoped, continue to produce a journal of comparable quality at quarterly intervals.

There may, however, be a short interval before the next issue appears and we hope that readers will bear with us while the change over takes place.

ILA

Daresbury has a machine for the future in view

Some plans and possibilities for a Nuclear Structure Facility

D A Eastham

Recently there has been a good deal of discussion at Council level about the future programmes of research at Daresbury and Rutherford, and how to strike the correct balance between the use of the two high energy accelerators NINA and Nimrod and the facilities at CERN. The present programme is that NINA will cease to be available for high energy physics within the next few years, though Daresbury will continue to support research in this field at CERN.

Thus one aspect of the future role of Daresbury becomes more definite. Another aspect is the laboratory's increasing involvement in nuclear structure physics (as opposed to high energy physics). For two years a considerable amount of effort has gone into a design study for a national nuclear structure facility (NSF), incorporating a very large and advanced electrostatic accelerator.

Plans put forward

This has been accompanied by an extensive research and development programme. In January the Council gave its approval to the construction of the NSF at Daresbury, and it is hoped that final approval from the Department of Education and Science and planning permission will soon be forthcoming. The capital cost of the facility including some initial experimental equipment is about £5M and the building and commissioning is estimated to take 4½ years. During this period the staff at DNPL directly associated with the project is expected to build up to over 100.

This facility will be an accelerator of the kind known as a tandem Van de Graaff, and from its completion in 1977 it will be used by nuclear structure physicists throughout Britain, especially those in the northern universities.

Most people know that atoms have a nucleus consisting of particles called protons and neutrons, which is surrounded by a cloud of electrons. Nuclear structure physicists study the way in which protons and neutrons bind together to form nuclei. This is in contrast to high energy physicists, who study the properties of individual particles themselves.

. . . for exciting experiments

Nuclear structure physicists get their information about the nucleus by bombarding it with particles, usually the nuclei of other atoms, which have been accelerated in a particle accelerator. The problem is that nuclei are electrically charged, and so they repel one another. The electrical charge is proportional to the number of protons the nucleus contains, so the heavier the bombarding nucleus, and the heavier the target nucleus, the more energy the bombarding nucleus must be given to overcome this repulsion.

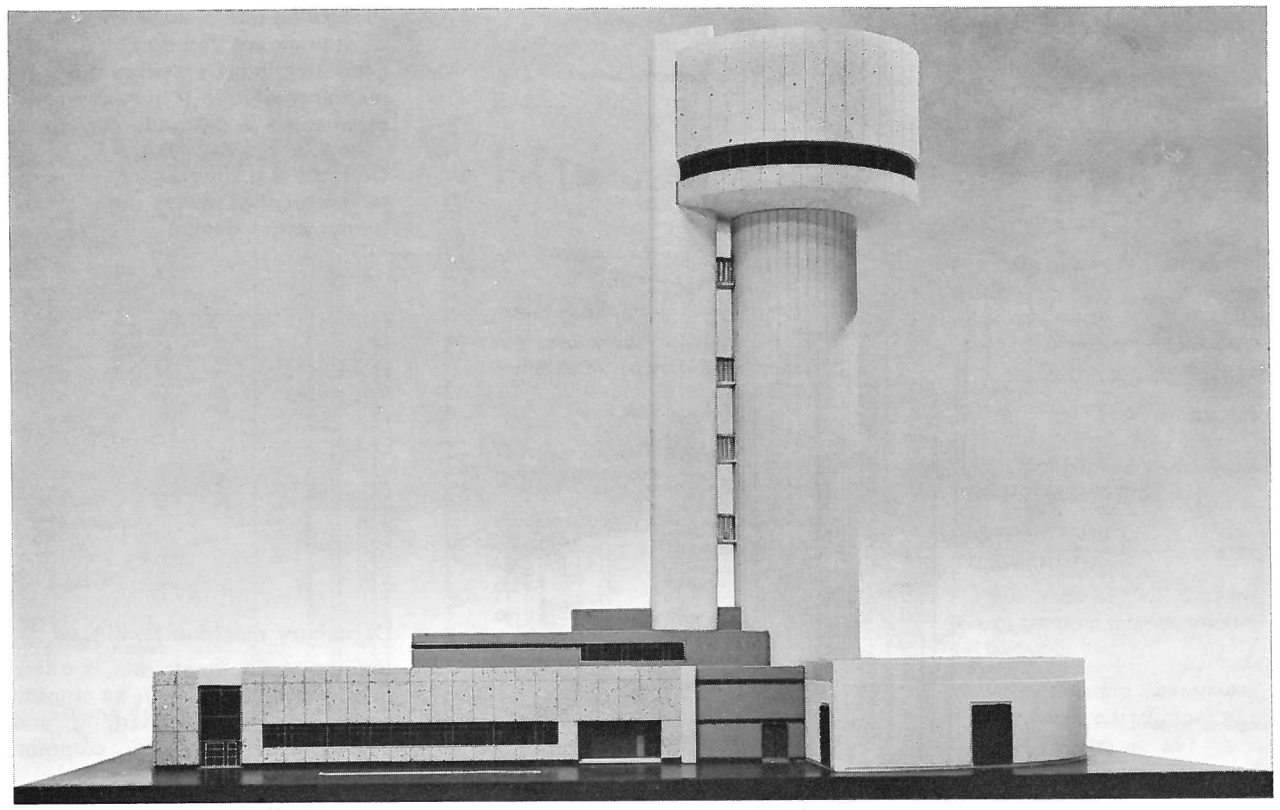
Because of this, most nuclear structure work so far has been confined to using relatively light nuclei as projectiles. For example, with an existing accelerator generating 6 MV, oxygen (atomic weight 16) can be made to interact with magnesium (atomic weight 24). The Daresbury NSF will allow a wide range of nuclei to be accelerated to much higher energies so that, for example, iodine (atomic weight 127) could bombard uranium (atomic weight 238). There is a great number of very exciting experiments which can be done with such a machine, including the search for "superheavy" elements — stable, or nearly stable, atoms much heavier than those which occur naturally.

In an accelerator, nuclei are accelerated in the form of ions. These are atoms with one or more electrons missing (positive ions), or with one or more electrons too many (negative ions). Positive ions are usually much easier to produce, and so tended to be used in earlier accelerators.

Van de Graaff accelerators are not new; they have been around almost since the beginning of nuclear physics. They consist of a terminal supported on an electrically insulating column, and an insulating tube with a vacuum inside, with one end connected to the terminal and the other to earth. The terminal is charged positively by means of an insulating "conveyor belt" which carries charge up to the terminal. Positive ions are produced from a source inside the terminal, and being repelled by the positive charge on the terminal, accelerate down the tube and can be used in experiments.

High voltage . . .

Clearly, the higher the voltage that can be maintained on the terminal, the higher the energy of the resulting ions. To enable higher voltages to be reached both the tube and the column are divided into sections of alternate metal and insulator, and a chain of resistors is used to keep each metal section at a different potential, between that of the terminal and earth. This keeps the electric field along the column and tube uniform, which means that electrical breakdown (sparking) is less likely to occur. A further increase in the terminal voltage can be obtained by enclosing the whole accelerator in a high pressure insulating gas such as nitrogen or sulphur hexafluoride.



The picture above shows a model of the proposed building to house the Nuclear Structure Facility. The tandem accelerator will be housed in the tower (230 feet/70 metres high). Experimental halls, control rooms and a service area will be in the surrounding buildings.

for a leap forward

A diagram of a simple Van de Graaff accelerator is shown in the picture on page 5.

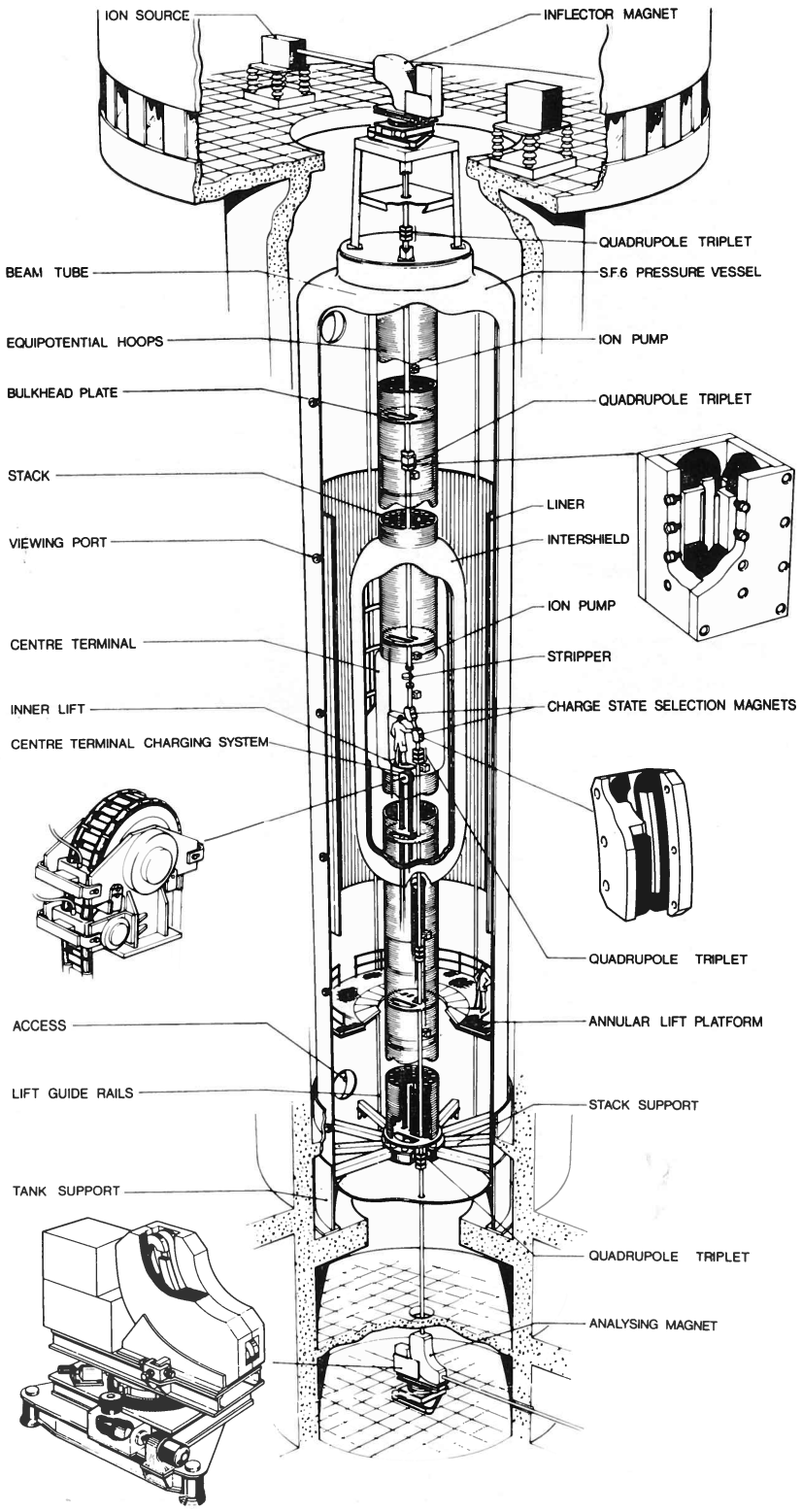
A tandem accelerator, like the one to be built at Daresbury, is one stage more complicated (see picture on page 4). It has two columns and two accelerating tubes placed end to end with the high voltage terminal in the middle. Negative ions are produced at one of the earthed ends and, being attracted by the positively-charged terminal, accelerate towards it down the tube. At the centre terminal they pass through a "stripper" (usually a gas or a thin foil), which removes some of their electrons and converts them into positive ions. They are now repelled by the terminal, and continue accelerating away from it down the second tube, for use in experiments.

A typical existing machine will have a terminal voltage of 6 MV, and the most powerful machine under construction elsewhere (at Canberra in Australia) is expected to develop 14 MV. The Daresbury machine is designed to produce up to 30 MV on the terminal, and thus represents a great leap forward in accelerator technology. To prepare for this, an extensive programme of research and development was necessary at Daresbury. This was carried out in collaboration with universities and UKAEA Establishments. Many of the problems connected with Van de Graaff accelerators, particularly the high voltage problems, were very poorly understood before this study, and great progress has been achieved in putting the design of this kind of accelerator on a more scientific basis.

The high voltage problems have been the trickiest, but at last a design of insulating column has been produced which will withstand the voltage gradients expected in the NSF. A special method of joining the metal and insulating sections of the tube has also been evolved which will allow a far better vacuum inside the tube than in most existing Van de Graaffs.

The Laddertron

One of the most interesting developments is a new kind of charging system called the "laddertron", developed in collaboration with the University of Reading. This replaces the old continuous insulating belt with a series of metal "rungs" coupled



Picture on left: a diagram of the tandem Van de Graaf generator that Daresbury are planning to build if planning permission is granted.

On right is a simple generator that shows the fundamental design.

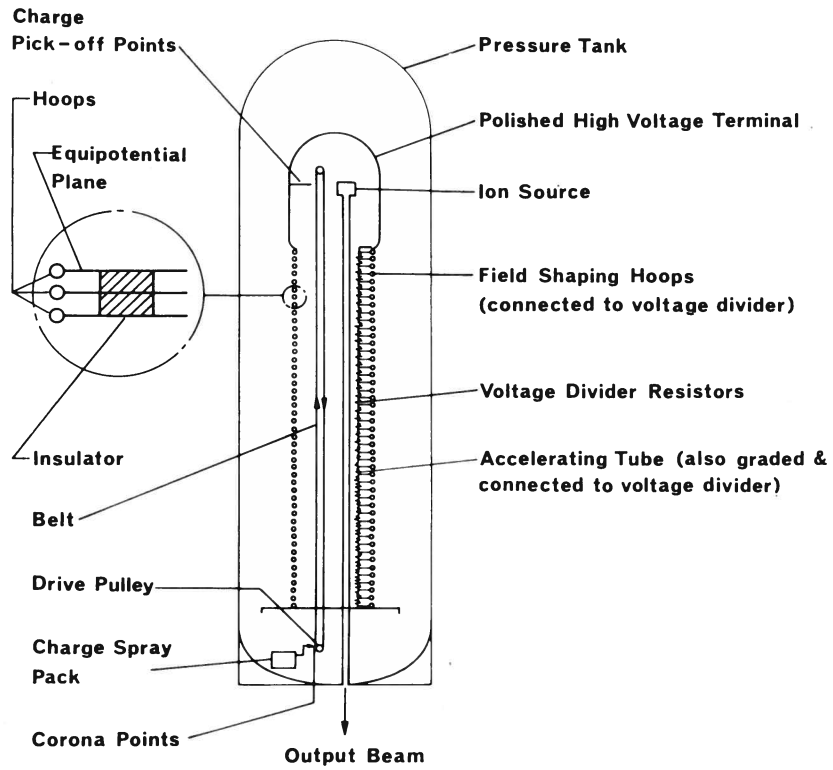
Daresbury machine continued

together with insulators. It offers many advantages such as smooth operation, uniform charging, and absence of dust (a common malady with belts).

Considerable study has also been necessary on the control of the ion beam. Because of the length of the accelerator tube and the variety of ions to be accelerated, three sets of magnetic focusing lenses have had to be included inside the machine. There is also a system of magnets within the centre terminal to make sure that, after stripping, only ions with the right number of electrons missing continue on their way. Detailed computer calculations have been made on the beam optics of the machine.

The NSF itself will be housed in a 70m (230 ft) tower see picture on page 3. A semicircular building at ground level will be used as an experimental area, with a number of different beam lines, and an adjoining three-storey building will contain the counting room, control room, and service areas. Space on the site is being reserved for possible later extensions, such as a linear accelerator or a cyclotron.

It is clear that the NSF will provide the United Kingdom with an experimental facility unique in the world.



Quest quarterly quote

'. . . I must first apologise for my delay in replying. This has been due to an abnormally high amount of work which has necessitated my absence from the office during the past few weeks.'

Letter from an LO Committee Secretary

'600 ON THE WAY IN WHITEHALL SHAKE UP

'BOFFINS SHIFT TO SWINDON

'Hundreds of Civil Servants are to set up a headquarters in Swindon.'

Swindon Evening Advertiser Report on proposed move of 388 SRC posts and 191 NERC posts to Swindon

We take a look at the sea

'Ultimately, it may well be necessary to get away from "hunting" of fish and find ways of farming the sea', says a recently published SRC Report on Marine Technology. The Report was written by a Panel set up to look into university research and training in all aspects of marine technology as it exists at present and to make recommendations for the future.

'There are many economic factors which will force man to turn more of his attention to the sea', says the Report 'and the rapid advances which mean so much to technology on land, in the air and in space can be equally productive at sea.'

'If the resources of the sea and sea-bed are to be harnessed for the benefit of mankind . . . it must be done wisely and carefully so that the ecology is not permanently damaged. The design of better equipment to operate in a marine environment clearly depends on fundamental and applied research of the highest order.'

The Report names the four main aspects of Marine Technology as: the production of off-shore oil and gas; the transport of these, and other, problem materials by sea; the fishing industry; and underwater activities, such as dredging and perhaps, later, building of well-heads on the sea floor for oil and gas sources found in deeper water.

When the Panel was set up the members knew that a number of research programmes were currently sponsored by SRC and that there were some university departments with considerable interest in and knowledge of various aspects of marine technology. But no up-to-date information existed as to the full extent of research in progress sponsored by universities, industry and other agencies.

So two questionnaires were sent out: one to gather current information and the other to collect suggestions for future research within universities. The Panel found the response to both very good indeed. The number of suggestions for new work ran to several hundreds.

Since all the projects were put forward by academics or industrialists active in marine technology, the Panel knew that it was not likely that many would be complete non-starters so far as attracting financial support was concerned, but it would clearly be impossible for SRC to support them all.

Each member of the Panel assessed the replies within a

Look at the sea continued

certain field and compiled an edited list of topics to which university research could reasonably contribute. The Panel has not recommended support of very large and complex projects that are probably not suited to a university environment. It feels that the money would be better spent on improving fundamental knowledge and widening the education of students. The lists are published as an Appendix to the Report – high priority subjects are asterisked – for the guidance of universities seeking support.

focus wider knowledge on the chosen areas

The Panel recommends that each group of research workers supported by SRC should maintain a broad interest in marine technology while becoming a focus of research activity in chosen areas. Research should preferably be tackled by multi-disciplinary groups consisting mainly of engineers – mechanical, civil and electrical – and naval architects. These would be joined by physicists, metallurgists, applied mathematicians and marine biologists as and where required.

It is possible that such a group could exist within a university department, but the Panel would prefer to see a separate Centre or Unit set up that would have staff from different departments seconded to it or would even farm out work into other departments. Since the work should also be related to economy and viability, the Panel suggests that economics and planning departments should be involved, as well as engineering and science departments.

some things to think about

About one-sixth of the present world oil production comes from underwater sources and one of the biggest maritime transport problems is how to construct tankers that will transport it safely.

The world fish catch in 1970 was 69.3M tons: about 60M tons came from the sea. This is three times as much as 20 years ago and represents about 12% of the present protein consumption of humanity. Better ships, fishing equipment and processing plant are needed to improve the UK fishing industry and the competitiveness abroad of the associated manufacturing industry. Developing countries are asking for advice over the whole range of the industry, from catching and processing to distributing, and in the construction of port and land facilities.

Eleven million tons of gravel are being dredged from the bed of the Channel and the North Sea at depths of 30-50m. More and more is needed for harbour works and land reclamation in projects such as Foulness. As we dredge deeper, new tools, power supplies and even vehicles will be needed for use under the sea. Eventually, oil and gas wells may be installed and serviced on the sea floor itself.

These are only some of the things that may benefit from support of research into marine technology.

An NP laboratory controls a telescope

'The most advanced telescope control system in the world' is how CERN describes the fully computerised system that has just been built for the European Southern Observatory (ESO). The system is the first concrete result of the ESO-CERN collaboration. ESO, based at Hamburg and the La Silla Observatory in Chile, have established a telescope design and development division at CERN, Geneva, and a laboratory* for processing the sky photographs taken by ESO's 1m photometric telescope.

Belgium, Denmark, France Germany, the Netherlands and Sweden are the member countries of ESO. Switzerland is a member of CERN but not yet of ESO. There are five telescopes at present on ESO's mountain site 600km North of Santiago on the edge of the Atacama Desert. A Danish 1.5m telescope is being built, and a 3.6m reflecting telescope is being designed at the ESO division at CERN. CERN staff have contributed their experience of designing big and delicate machinery and computer control systems for nuclear physics research. 'The system will have accuracy and flexibility of operation previously unknown in astronomical circles' claimed the CERN-ESO press release announcing the system's departure for Chile, followed by the five members of the installation team – J Van der Lans and J Van der Ven of Holland. P Stürzinger and R Zurbüchen of Switzerland, and S S Lorenson from Denmark.

The control system was developed as a prototype for the 3.6m telescope but soon proved so successful under test that ESO decided to fit it immediately to their 1m telescope.

When switched on the computer will direct the telescope to a

*The Laboratory will also be used in conjunction with SRC to produce an atlas of the Southern Sky from photographs taken with the SRC 48 inch Schmidt telescope in Australia and the ESO telescope in Chile.

NP laboratory continued

predetermined position and begin to compensate for the rotation of the Earth when the astronomer types in the sidereal time. To point it at a certain star, the astronomer will type in its co-ordinates from the star catalogue or indicate one already in the computer memory. He can feed in a complete programme of work on punched tape and leave the rest to the computer. When moving the telescope to new positions, the computer steadily builds up the speed of the drive motors to a safe maximum so that delicate components are not damaged by sudden movements, and they are slowed down in a similarly controlled way before the telescope reaches the target. This means that as little time as possible is wasted. The astronomer can set the telescope via the computer by push button operation. If he wants to offset it for a check on sky background intensity he will indicate how many steps he requires. Afterwards the computer will reset to the previous position without further instructions. The control soft-ware is installed permanently in the in-core memory which is not likely to suffer mechanical breakdown. But there are emergency switches to cut the power from the telescope. If it descends too low, for instance, a large ball in a conical container will roll out at a very precise angle of tilt to disconnect the circuit. But if necessary the astronomer can over-ride the computer and steer the telescope himself.

Because of possible supply difficulties in Chile, particularly just now, the system has been given intensive in-house tests to make sure that last-minute modifications won't be necessary. The team have also made sure of taking everything they might need with them.

SRC improves post-graduate training research

A third of SRC funds is spent on awards for universities and other centres of higher education. Of this, two-thirds goes to research grants and the rest is used for post-graduate training and education. Facts that SRC staff working away in our own research establishments may not be very aware of. What you probably do know is how much of your own, or perhaps your Establishment's, effort is concerned with providing research facilities for research workers from those centres and, less tangibly in money terms, providing a place where ideas can be freely exchanged both nationally and internationally: 'further' education indeed.

Below are some of the things mentioned about post-graduate training and education in the SRC annual report for 1972-3.

The funds given to Engineering Research and Training have doubled since 1967 in current money terms, says the SRC Annual Report and this field will continue to have special priority for two more years at least. 1,000 extra studentships have built up schools of post-graduate engineering and computing science, with preference given to specialist and vocational advanced courses rather than research training.

Professor Ford and a special Panel have just completed a study into the most useful sort of post-graduate training for engineers who do not intend to enter research or academic careers. Their findings are published in the SRC Report called 'Total Technology'. The term (coined by professor Ford) is used to denote instruction in Engineering Science combined with training in the related commercial, economic and management activities that will fit an engineer for a career in industry. The first courses and research projects in Total Technology begin at Aston, Cambridge and Strathclyde Universities in 1973. They will be carefully watched, and developed in the light of experience.

a better service

Since 1966 SRC has developed its central facilities and services for the common use of universities and SRC establishments alike. In 1966/7 only a small amount was spent but by 1972/3 the amount had reached £3.3M for new facilities like the telescopes in Australia, the Physico-Chemical Measurements Unit, the Polymer Supply and Characterisation Centre and Neutron Beam and X-Radiation Research Facilities. The SRC establishments, too, have increased their support of university research.

The SRC's four Boards – the Astronomy, Space and Radio Board, the Engineering Board, the Nuclear Physics Board and the Science Board – have a dual function. They advise the Council on the award and administration of post-graduate studentships and they also administer SRC's research support. So their knowledge of the strengths and interests of university departments gained in giving research grants can be applied to reviews of

training schemes and studentship allocations.

Membership of the Boards and their specialist committees represent academic, industrial and Government interests in post-graduate education and research. Prospective employers in industry, the scientific community and Government Departments therefore participate in SRC decisions. Training opportunities are constantly balanced with employment prospects and educational requirements so that limited resources are used to best advantage.

unemployment avoided

For example, the ratio of post-graduate awards made has not kept pace with the increase in the number of graduates between 1966 and 1972. Awards have been related to long-term national needs for highly trained manpower. As a result, serious unemployment among post-graduates has been avoided and now that the employment situation has improved, there is still no shortage of highly qualified people.

The proportion of SRC's total funds spent on post-graduate education was 12% in 1973 compared with 13% in 1966. But the drop is also partly due to the fact that maintenance grants, fees and other support grants have not increased as quickly as prices in other sectors of SRC expenditure.

The studentships for people who have been in industry or school-teaching for a few years since graduation have now been opened to graduates from other types of employment.

Business and administration games form part of a course to help graduates in their choice of career. The intellectual challenge of work in industry, commerce and Government is demonstrated in an intensive one-week course. About seven courses a year are held in different parts of the Country.

An economical way of giving research students a chance to get instruction in very specialised subjects, is how SRC describes its Vacation Courses. In 1973 Lasers and Non-Linear Optics, Magnetism and Polymer Technology were covered; next year it will be Molecular Physics, Perfect and Imperfect Crystals, Plasma Physics and Polymer Technology. SRC runs each course for three years so that it can be judged and, if successful, be taken over by universities.

SRC express a hope in the Report that the discrimination against some married women in the maintenance grants for research students will be eliminated in the next triennial review of these grants. Also that the allowance for older students will be set high enough to encourage more people to return to training after a few years in employment.

The stipend for Fellowships has now been raised to the University Lecturer scale, and should attract more people to apply. However, the standard expected of the candidates will be very high.

Giant is aimed higher for European physics

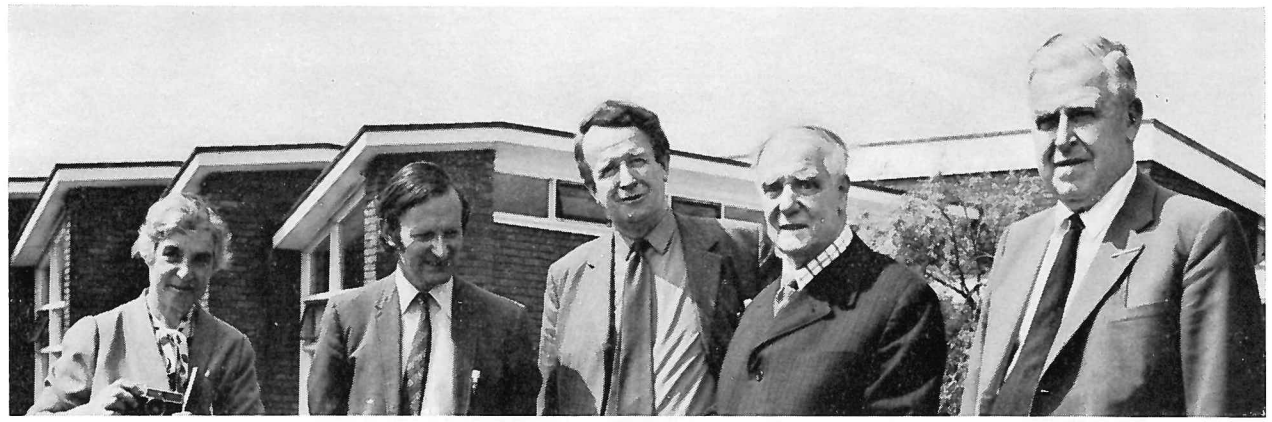
The target for CERN's giant proton synchrotron is now 400 GeV instead of the 300 GeV maximum energy envisaged when the member countries of CERN first decided to build it.

When the decision was made, the size of the synchrotron ring was fixed but the form of the eight-year building programme was left flexible so that it could be improved in the light of the latest technical developments. One of the possibilities foreseen was a pause at 200 GeV and the introduction of superconducting magnets into the main ring to make a higher energy level possible.

The decision to go to 400 GeV is based on iron-cored magnets throughout and without any pause at an intermediate energy level. Dr B J Adams, Director-General of CERN Laboratory II (the SPS Laboratory) said that although pulsed superconducting magnets had now been shown to be technically feasible, there were still unknowns, such as cost, reproducibility and manufacturing time scales that prevented them from being adopted for the main ring, where reliability is of prime importance. Nevertheless, there will be a place for them in the experimental areas.

Not only will 400 GeV be reached within the original budget but the machine will be ready for the first physics experiment during the sixth year of the programme. The decision to aim for 400 GeV was taken at the CERN Council's 50th session which coincided with the 20th anniversary of the signing of the CERN Convention.

In order to meet the target date, considerable effort will be demanded from European Industry as well as from the team at the Laboratory which is responsible for design and construction. The principal buildings are complete and 1,200 metres of the ring tunnel has been bored. Nearly all the main components of the machine have been ordered and the cores and windings for the first production magnets have arrived on site. Work has begun on the 380 kV high tension line between Genissiat in France and the electric sub-station at CERN, and on construction of the reservoirs and pipe-line for the cooling water supply from Lac Léman on the Swiss side of the site.



A visit from an old friend

During a visit to England in June, Professor Peter Kapitza, the renowned Soviet physicist, and his wife Anna, visited the Daresbury and Rutherford Laboratories.

In the photograph of their visit to Daresbury are (left to right) Mrs Kapitza; Professor A Ashmore, Director of Daresbury Laboratory; Mr M J Moore, OBE, Head of the Engineering Division; Professor Kapitza, FRS; and Dr David Shoenberg, FRS, Director of the Royal Society Mond Laboratory.

Professor Kapitza was particularly interested in the Laboratory's Synchrotron Radiation Facility. Fifty years ago he was at the Cavendish Laboratory, Cambridge, with Lord Rutherford, working with John Cockroft on producing magnetic fields of up to 300 kilogauss and in developing a cryogenic laboratory. He became Assistant Director of Magnetic Research in the new Mond Laboratory from 1924 to 1932 and then Director of the Laboratory. In 1935 he returned to the Soviet Union to continue his work in low temperature physics.

He then became Director of the Institute of Physics Problems of the USSR Academy of Sciences; he has been a member of the Academy Praesidium since 1961. He is editor of the Soviet Journal of Experimental and Theoretical Physics.

The work for which Professor Kapitza is best known is his discovery (in 1938) of the superfluidity of helium II (=helium at temperatures within 2.2° of absolute zero) and his studies into its behaviour and into its application to the production of machines for producing liquid air commercially. The papers he published gained the Soviet State Prize for Physics in 1941 and 1943. Another Soviet physicist, Lev Landau, went on to clarify the quantum properties of liquid helium and to gain the Nobel Prize in 1962.

In the 1950's Professor Kapitza turned his attention to the nature of ball lighting and published his hypothesis of Standing Waves. He received the Lomonosov Gold Medal (USSR) in 1959 and the Rutherford Medal of the Institute of Physics (UK) in 1966 for his work in low temperature physics. He has received similar honours from many international scientific institutions. He became a Fellow of the Royal Society in 1929.

A seven-foot crocodile (a sculpture by Eric Gill) on the wall of the Mond Laboratory recalls the days when he was one of Rutherford's team of promising young men and chose the 'animal-who-never-lets-go' to symbolise the great man. (His one-time secretary, Joy Clarke, wrote an article for *Quest* about the Cavendish, the Mond and the crocodile, *see Vol 4, 4 p.6*).

Dr David Shoenberg, FRS joined the Mond Laboratory in 1932 and has been its Director since 1947. He is Reader in Physics of Cambridge University and UNESCO Adviser on Low Temperature Physics. His publications include papers on low temperature physics and magnetism.

Guess what . . .

'The invention . . . took place in the face of four major criticisms:

1. by scientists who said it was not physically possible;
2. by technologists who said it was not technologically feasible;
3. by biologists and materials scientists who said it wasn't necessary;
4. by industrialists who said there was no market for it.'

Taken from a summary of a lecture given by Dr T Mulvey, Professor of electronic physics, University of Aston. The talk, in the Rutherford Laboratory Lecture Series, was about the remarkable development of the Electron Microscope, the disarming of its critics and the enthusiasm with which it has been adopted and applied to scientific problems in many disciplines.

J D Lawson,
Rutherford Laboratory

. . . or a shot in the dark

H J B Paxton

In 1970 a small group of British engineers and scientists took part in a unique eclipse observation by rockets, fired from the NASA launch site at Wallops Island, Virginia, USA. It was unique because, for the first time since rocket-fired experiments began, an eclipse of the sun (on March 7 1970) came close enough to an established rocket range for the larger, high altitude, sounding rockets to be used to observe it.

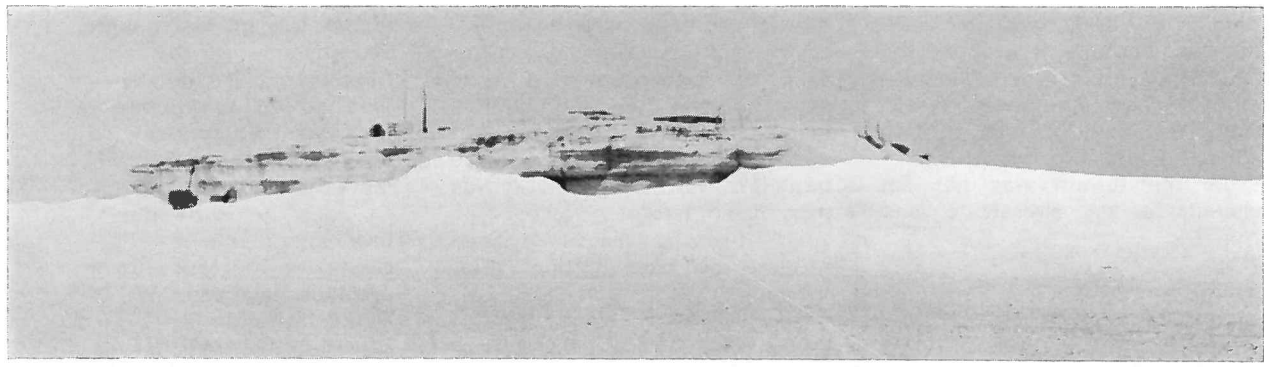
It was far from an easy task. The sun-pointing system that keeps the rocket on course had to operate after the sun 'went out'; the launch time had to be right to within a second or so in order that the all important 'second contact' of the moon's disc was observed. The film on which the photographic records were made had to be sealed into watertight containers so that they could be dropped by parachute into the Atlantic ocean and recovered by US Navy frogmen who would transfer them to a helicopter for safe delivery into the hands of the experimenters. All in all what the grant committees would call a 'high risk' experiment.

But it worked, excellent results were obtained and the undamaged payload and the rest of the data obtained was brought safely home to give valuable information on the ultra-violet regions of the sun's spectra as seen in the moon's shadow. Later, it was proudly demonstrated to Her Majesty the Queen Mother at a Royal Society Soirée. And there we thought, the matter ended. But the solar physicists thought differently.

The 1973 'Eclipse of the Century' (see previous *Quest* p.12) did not pass close to an established rocket range. So NASA commissioned a team of experts to examine the predicted track of the moon's shadow over the earth, to establish whether it would be possible to launch an Aerobee rocket from a temporary launch site. The track of the shadow stretched from South America to the eastern coast of Africa, 10,000 miles in all. In the centre, the 160 mile wide shadow passed over the Cape Verde Islands off the West Coast of Africa, over beautiful Lake Rudolf in Kenya and over the cool beaches of Somalia on the East African coast. I suppose it was inevitable that the site chosen as most suitable for the launch would be in a desert!

a remarkable spot

Mauritania, the chosen spot, is nearly all desert and therefore sparsely populated; but if you intend to pitch a ton or so of metal a hundred miles into the



' . . . the lone and level sands stretch far away'
In the picture is the 'Remarkable Table' chosen as the rocket launching site for the Astrophysics Division's eclipse experiment. Opposite is the motif designed by the author that was displayed on RSRS equipment during the Eclipse campaign.

air and drop it back to Mother Earth it is sensible to keep possible human targets to a minimum.

The Republic of Mauritania was formerly a part of French West Africa. The port of Nouadhibou, near the northern border with Spanish Sahara, handles the iron ore from a large mine inland. The coastal waters are some of the richest in the world and fishing vessels from as far away as Russia and Japan are regular visitors. The people are very friendly although their patience can be tried by a Pidgin-French-speaking Englishman negotiating for a pint of eau mineral.

The site chosen for the launch was an outcrop of sandstone just outside Nouadhibou. Once used as a fortification, the Remarkable Table (as it is known locally) has a cavern beneath, which was formerly the ammunition store, and a small building on the surface which was probably used as offices and living accommodation. Whoever was responsible for the layout must have been endowed with 'second sight'; he could not have done better if he had known that it would later be used for rocket launching.

I arrived ten days before the launch, with Steve Lillington and Allan Ridgeley, all from the Astrophysics Research Division of RSRS. The American launch team from Kitt Peak National Observatory had transformed the 'Table'. With the rocket launcher and its power supplies on top and the control room in the cavern below, the place looked like any established launching site. Radio theodolites were mounted on the old gun emplacements and aerial arrays erected to give communication links not only with the aircraft and recovery teams down range but direct to the eastern seaboard of the United States. The American crew members were regularly 'patched' into the US 'phone system by radio 'hams' in the States so that they could talk to their wives and families.

wind, sweat and beers

Arranging working accommodation for the experimenters was not so easy. The wind off the desert is nothing short of vicious, it blows at about 30 knots most of the time and whips up the dust and light sand to about 6 ft above the surface, forcing it into all apertures, human and otherwise. By contrast the calm periods, mostly at night, are hot and sticky and dew forms which soaks anything left outdoors. In order to prepare the complex scientific payload and load it with film, then unload it after recovery, we had to make a room light-tight and sealed against the sand and the dew and, in consequence, any fresh air or cooling draughts.

This room proved to be a fair imitation of the infamous Black Hole of Calcutta. It takes about three hours to load a hundred film cassettes and it took at least another hour to seal the payload so that it could lie safely in the desert for a day or two until recovered. Three very weary experimenters emerged from 'The Hole' at 3 am the morning before the flight, thankful that our American colleagues had been sensible enough to provide cooled beer for just such an occasion.

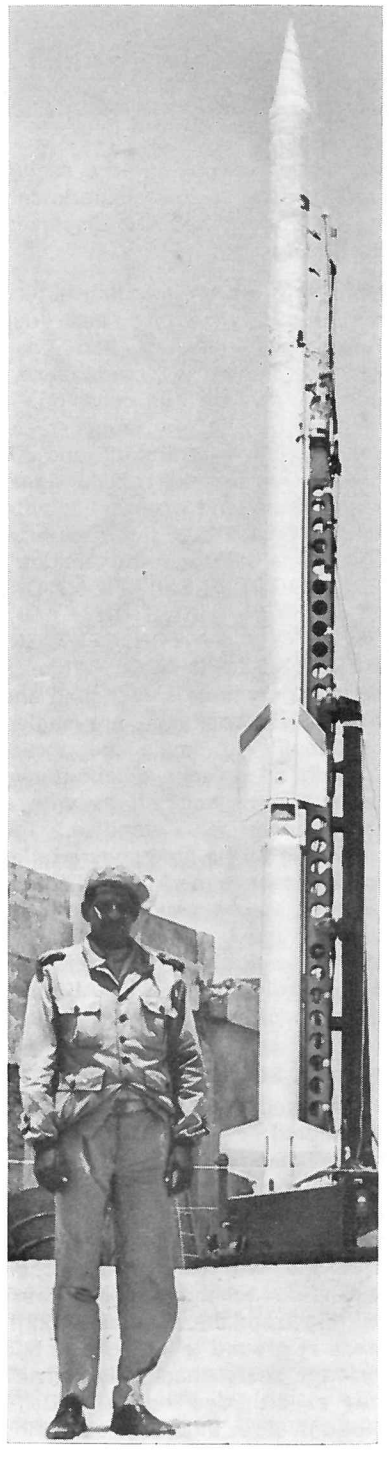
The rocket was launched at 10.34 on the morning of June 30, within 0.4 seconds of the ideal launch time, and we watched with bated breath as the real-time data came back over the telemetry link. BOOST SEPARATION? OK. SUSTAINER IGNITION? OK. SUSTAINER SWITCH OFF? OK. DESPIN? DESPIN? . . . . When a sounding rocket is launched the fins at the back end are angled sufficiently to cause the rocket to spin on its axis at about two revolutions a second; as with a rifle bullet this stabilises the projectile in the atmosphere holding it closer to the ideal trajectory and it makes recovery of the payload much easier by limiting the dispersion circle. We had no signal indicating despin! All other operations appeared to be correct.

sick of search: we got it

The recovery went ahead as scheduled; a 'fix' from the two radio theodolites, one at the launch site and one down range near the predicted impact point, gave the approximate landing area and two search planes soon locked-on to the beacon transmitting from the payload. Conditions at ground level were so bad that the search had to be carried out at altitudes below 500 ft. Not only does this make searching

Shot in the dark continued difficult, because it reduces the field of view, but it gets bumpy – all of the observers were very air-sick. The payload was spotted about 9 hours after the launch.

As the terrain was not flat enough for the aircraft to land nearby, a ground party was guided in on the following day. Over very difficult country it took seven hours to travel the 60 miles there and back to the nearest airstrip where the payload was transferred to the aircraft. It was then flown back to Nouadhibou where it reached the eager hands of the British party 33 hours after the launch.



The payload was virtually undamaged and the film cassettes were removed without difficulty, even though it did mean another three-hour stint in 'The Hole'. Packed in a special low-temperature carrying case, the films were taken back to ARD Culham for processing.

Sadly, the telemetry signals proved to have been correct. The payload had failed to despin and in that condition the stabilising system was unable to point the payload at the eclipsed sun. So the instruments had looked fruitlessly into deep space. The films did not contain the neat round images of the solar corona we had seen in the 1970 photographs, they were completely blank.

High risk it was judged to be and so it proved; there are a great many components in a 'simple' sounding rocket, any one of which can spell disaster if it fails in flight. The inevitable post-firing investigations will do everything possible to discover the offending part or system and correct it, so as to cut the risk rate next time. If there is a next time? The National Science Foundation of America is already calling for experimenters for the 1974 eclipse – off the southern tip of Australia!

Picture left: an Arab guard keeps watch over the Aerobee rocket. The pay load (on top) is wrapped with thermal insulation against the intense heat of the sun.
On right: the teams who flew experiments in Concorde 001 (see previous issue of Quest). Dr J E Hall from RSRS, the British Project Manager, is 4th from the right.

Joe Paxton (the author of the article) is a Group Leader (PTO I) with the Astrophysics Research Division of RSRS.

Fame

Organisation and Methods hit the Ministry of Transport towards the end of the last war, when two HEOs were given a room together and told to start inspections. Their impact was rather slow in being noticed. After the war a Chief Executive Officer in the Ministry's Finance Division was moved to send a contribution anonymously to the house journal run by the Social and Athletic Club, which illustrated the current opinion of O and M.

This purported to be a Report by O and M on a symphony orchestra. In the report the investigator observed, among other things, that duplication occurred among the instruments; that at times the instruments played the same notes, while at other times some instruments did not play at all! The conclusion, as will have been guessed, was a recommendation for a drastic reduction in the size and content of the orchestra.

Over the following five years, this gem was poached by over twenty journals in the UK and overseas, one doubtless lifting from the other, with never a word about the source. Indeed, few in the Ministry knew the identity of the author, a modest man, who duly retired unacknowledged. If his small article is still going the rounds, its origin may be of interest.

AGAW

Living experiment

An experimenter looks at life abroad – in Switzerland

G T J Arnison

'What is it like working at CERN?' many people ask of the few who go there. Having just spent 3 years at CERN working on the PP experiment with the Queen Mary College – Rutherford Laboratory Group, here are a few of my own impressions that may answer some of the questions.

When the group decided to go to CERN, the two aspects that loomed largest for my family were the trauma of packing up our home in the UK and the excitement, or even holiday feeling, associated with going to Switzerland. It so happened that neither of these amounted to anything after a few weeks in Geneva. Packing up the house was exhausting but not impossible, and the holiday atmosphere soon wore off for my wife and myself – though not for our three children – when the complications of settling in a new country began to take effect. The town itself is very pleasant and the shopping facilities – though expensive – are excellent. The encircling, suburban, high-rise apartment-blocks are beginning to obscure the view of the local mountains – the Selève and Jura Range.

CERN is to the North-West near the suburb (village?) of Meyrin. Many visitors to CERN stay in Meyrin, so it is well known to the world-wide high-energy physics community. The international airport is beween Meyrin and Geneva and the large number of aircraft that use it make it sound like Heathrow – those who live near there will know what I mean!

fireworks and festivals

The Genevois are a cosmopolitan lot and the few genuine Swiss still living there must feel smothered by the foreign influences. Nevertheless, the two traditional carnivals of the town are still held every year (a great tourist atraction), with firework displays on the lake in August and ceremonial marches for the 'Escalade' in December. Each Commune (Cantons are divided into Communes) celebrates the founding of the Confédération Helvétique on August 1 with an al fresco ceremony. Amid fireworks, speeches and bonfires, everyone eats, drinks and makes merry. The Escalade on December 11 commemorates an unsuccessful attempt by the army of the Dukes of Savoy to scale the town walls by night in 1602.

'Cultural ' activities in the town range from Grand Opera to strip-shows; there are several museums, all of them local enterprises. There are a surprising number of swimming pools in and around the town and they provide an opportunity for the family to spend a day away from the confining atmosphere of an apartment-block.

Apartment life is not as glamorous as portrayed by the Hollywood script writers. It is satisfactory for those who are tired of mowing lawns and weeding flowerbeds, but families with small children are at a disadvantage without a garden. Children were banned from the grassy slopes around our apartment

block. Obviously the Regie (who administered the block) were proud of their grass and didn't approve of children. And we found on closer examination that the 'grass' was mostly weeds! There are some discomforts which are expected, like getting stuck in the lift. What one doesn't expect is the use of a washing machine once a week (or even once a fortnight) if you are used to having daily access). Each block has one machine to be shared by up to 20 families. So if one has a large family this presents quite a problem. There are local laundromats but few people are prepared to carry dirty washing that far, and only families who know of the problems think of bringing a machine from home as part of their 'personal' luggage.

'One type of salad plant looked just like a wallflower to me.'

Most families manage to lock themselves out of their flat at least once; only one external door and no access to a kitchen window (say) prevents the usual easy solution when the front door slams shut behind you.

The housewife experiences the greatest change in the way of life. The husband working at CERN continues as if he were still in Britain; the differences are usually to his advantage. But, for his wife, the *daily* shopping (we had no deep-freeze and only a small refrigerator) becomes an adventure into the delights and mysteries (and expense) of the Continental 'cuisine'. Some of the Continental vegetables require research before one can attempt to use them. One type of salad plant looked just like a wallflower to me. The reversal of the names of chicory and endive did not help! The diet changes completely; no more egg and bacon breakfasts. Fresh bread every day – it goes stale within hours of buying it. You forget about butter and you save up for a proverbial Sunday joint. (NB these were expensive in comparison to Britain when we first went there, but times are changing).

Speaking in French to people at CERN was at first embarrassing, especially in front of contemporaries. But CERN has an efficient language school which offers tuition at all levels in French and German (during working hours) that many people take advantage of. Though English is one of the official languages of CERN, the technicians and storemen seem only to speak in French; their second language is usually German. The difference between the CERN Laboratory and the British ones strikes you most when you return. Arriving at a UK lab after 6 pm you find the corridors and offices empty; no restaurant in which to find someone to talk to and/or have a beer with. It is just as if there had been a holocaust that wiped the staff out. The difference is probably because the CERN staff belong to a car orientated society (everyone can afford a car of some sort), so they don't have to run for buses and they can stagger their departure times. There is never a traffic thrombosis like the one we see on the A34 at Chilton every evening.

'. . . skiing practically from one's doorstep.'

There are many visitors working full-time at CERN. Their industriousness and sense of urgency influence the pattern of work for the regular staff, because the visitors come for a fixed period to do one experiment on a machine, and then go. The timetables for the particle accelerators are carefully arranged to accommodate the maximum number of experiments. With such tight schedules everything becomes urgent and everyone is prepared to work all the hours that God sends. Wives protest at being deserted and the children want to know who that strange man is who keeps turning up to sleep! While back at home friends and relations seem to think you are on holiday all the time while abroad – it is difficult to convince that you work just as before.

But when you do get time off there is skiing, practically from one's doorstep, and easy access to the rest of Europe. During our stay we became expert at working out exchange rates and the effects of 'floating' currency. The allowances and salary sent out varied from month to month, depending on the state of the Pound on the day it was exchanged. During the three years the pound dropped from SF10.30 to SF6.90; meanwhile the cost of living did not stand still. The allowances are adjusted from time to time to compensate: but not one's salary!

The return to Britain brought a few surprises, the biggest being the meteoric increase in the price of houses. Food prices had risen more than we expected (especially for meat) and the coinage was different. Surprisingly, the TV set worked when switched on – but who were these long-haired TV announcers? And who were Michael Parkinson and Terry Wogan? The news, however, had hardly changed in good old strike-ridden Britain!

Geoff Arnison is an SSO in the Astbury Group at the Rutherford Laboratory. His particular work is on the $\bar{P}P$ experiment which is a collaboration between Queen Mary College - Rutherford - Daresbury - Liverpool.

Of his article he says he could have said much more about Switzerland – about schools, hospitals, skiing, Continental holidays – to name a few, had *Quest* allowed more space*. He also realises that his own experience may not be representative of what other people find living in Geneva because, as in UK, people and living conditions come in all sorts and sizes.

(*We'll ask you again, Geoff! Ed.)

Places to eat

'Part of the secret of success in life is to eat what you like and let the food fight it out inside'

Mark Twain

If you come to London often you will know that it is full of places where you can eat. But do you know where to get the most for your money, where the surroundings are most attractive, and where they don't serve chips with anything?

If you don't know all the answers and you happen to find yourself at State House at work or just up for a meeting or for a family pilgrimage to Daddy's (or Mummy's) London Office, we hope you will find the following Guide to Good Eating by Bon Nosheur useful. We are assured that all the places mentioned have been tried during the lunch hour and are within a hiccup or a short stagger of State House and Holborn Underground.

This is the first of a series. The prices quoted from menus are correct at the time of going to press. We have not included the State House Staff Restaurant (in the basement) but that is handy enough for you to try a very quick luncheon any day from 12 to 2.30.

The daily menu can be found beside the notice boards on each floor of State House.

The series will include recommended places nearer the LO Annexe (and the Oxford/Regent Street shopping area) and some of the best places to go when one visits an outstation. If any reader knows an eating-out house worth mentioning, please will you send a note of its characteristics and prices to Bon Nosheur, Quest, London Office (room 1526, ext 255).

Italian Style

Cosmobar, Cosmo Place, WC 2.
(5 min. walk from LO)

Small, inexpensive, Italian restaurant. The downstairs room has an atmosphere of Chianti bottles and low-powered lights. Fairly busy but fairly quick service. The menu is modest, Anglicized Italian: Beware of being given spaghetti with chips and cauliflower!

Lunch for one
Special of the Day
– Chicken Escaloppe with Pasta
Cassata Siciliana
Coffee Expresso
Tip
Total cost: 70p

Room to sit down

The Ship Inn, Little Turnstile.
(5 min. walk from LO)

This is round the back of Holborn Tube Station. Round the corner and up the stairs to the dining-room which is all oak panels and high settles. Order food and drinks at the bar as you enter the room. The food is adequate, but the main advantage is a quiet room for people who want to talk shop over lunch.

Lunch for one
Toad in the hole
Ice cream
Coffee
Half pint of best bitter
Tip
Total cost: 60p

A Pint and a Wad

The Lamb, Lambs Conduit Street.
(5 min. walk from LO)

Recommended. Noted world-wide for its carefully restored Edwardian interior including swivelling glass windows to prevent the barman from identifying the customers in the saloon bar. An interesting collection of old theatrical photographs. Young beer. Very crowded after 1 pm (difficult to find room to sit down). A small open-air courtyard at the back. Sandwiches and cold food and some hot dishes are served from a corner of the bar. Baked potatoes in winter.

Lunch for one
Slice of pork pie and vegetable salad
Pint of best bitter
Total cost: 43p

Sandwiches and the Fire Brigade Band

Tea Gardens, Lincoln's Inn Fields.
(2 min. walk via Great Turnstile)

Cheap and busy but beware of pigeons. The players on the tennis-courts can be seen from the Tea Gardens and, in summer, a band plays twice a week. This is a good place on a warm, not too sunny day. There is no shelter if it rains and in hot weather it gets crowded. Join the right hand queue for tea or coffee only and the left one for food. It is open until evening for those with time to spare for afternoon tea or tea and tennis.

Lunch for one
One round toasted bacon sandwich.
Cake
Cup of tea
Total cost: 22p
(All prices quoted are approximate.)

A Bit more Posh

The Bunghole, High Holborn.
(1 min. walk from LO)

Up-market wine lodge in the Victorian style. You are encouraged to book a table, and this is certainly necessary after 1 pm. There is a private booth (in the window!) which can be reserved for a small party. Best when you are not footing the bill. SRC Directors can be found in various parts during the latter part of the lunch hour. Ham off-the-bone and salad, followed by strawberries and cream is typical of the fairly limited menu. It is usual to order wine by the bottle if there are enough in the party.

Lunch for one
Cold meat and salad
Glass of wine
Coffee
Tip
Total cost: £1.15

Bon Nosheur *likes to describe himself as tall, stooping a little, distinguished, with greying hair and neatly-trimmed military moustache and as one of SRC's best-known gourmets. He is well known – and some times feared – he tells us, in every haute cuisine in Holborn.*

Unfortunately, following some advice he gave to the proprietor of a local 'taverna', he explains, advice that was kindly meant but perhaps misunderstood, he has had to flee the district and bury himself in agricultural affairs. There he awaits in trepidation the arrival of the proprietor, his brothers, his uncles, his sisters, his aunts and – dare we write it – Th G*df*th*r.*

His new abode bears the coat of arms shown below that he kindly explains for the benefit of Quest *readers as 'Quarterly in the First and Fourth Three Sheep in Extremis (for hill farming), in the Second a Cow Rampant (for dairy research) and in the Third a Harp Quiescent (for higher things in HQ Admin).'*

nutcracker 13

Quandary for Capers

One hot, oppressive summer afternoon, when Simon Capers, dynamic Secretary of the Artificial Intelligence Committee was taking his customary siesta at his desk, he was brutally awakened by his door being wrenched from its hinges. There before him stood a robot, humanoid except that it had only one powerful arm, which ended in a number of tentacle-like fingers, and in place of a mouth a cathode ray tube on to which the following message flashed: 'My master demands that his grant of £****7 be increased immediately by a factor of *4. That will make it £*00,000 exactly. You will obey!'

(For reasons which will become obvious, Simon is unable to recall the figures represented by stars.)

Simon leapt to his feet. 'Begone thou metal fiend', he cried, but was felled by an immense blow from the monster's arm. But as he collapsed, he managed to gasp out the words 'by Sir James Lighthill I adjure thee'. There was a loud report and the robot too collapsed to the floor.

When Simon recovered from his concussion, how many fingers did he find at the end of that metal arm.

Send answers to Quest. *First correct answer opened gets £1 book token. No prizes for guessing the Secretary's name.*

Crossword solution
maxim 3
The winner of the £1 book token was John Barrow, ROE.

Across

1. Soporific
9. Pal (paROIE)
12. Slur
14. Rid
15. Hole
17. Neater
18. Siesta
19. RSRS
21. Fees
22. Lo
23. Thug
24. Torr
25. NE (LOne)
26. Eludicate
31. ACL
32. Lunar
34. RGO
37. Safe
38. Mien
39. Murder
40. Freaks
43. Anode
44. Earsa (ReHEarsaL)
45. Never
46. Titrate
47. Sherry
48. Nested

Down

2. Ose (ARoUse)
3. Plastic
4. Out
5. Irregularity
6. Fisticuff
7. Idiot
8. Chef
9. Poser
10. Alter
11. DNPL
13. Result
16. Easue (ReaSsuReS)
19. ROE
20. RHEL
25. Normans
27. Inerate (DiNner-PLate)
28. Dam
29. Arais
30. Tke (tACkLe)
31. ARU
33. Ensued
35. Grove
36. Odder
37. Seer
41. Errs
42. Kate
44. Ein (ReGiOn)

A different view of Orion

This unfamiliar view of a familiar constellation, Orion, is a copy of a photograph taken by Dr Paul Murdin of the RGO. It was taken through a filter which only passes light with a very restricted range of colour in the red part of the spectrum where hot hydrogen gas radiates strongly. The approximately elliptical nebula which almost surrounds Orion is called Barnard's Loop, and it is at the edge of a bubble blown in the interstellar medium by the gas pressure and radiation pressure caused by the bright hot stars in the 'Belt' and 'Sword' regions of Orion. The two hour exposure was secured at Herstmonceux by Dr Murdin who claims that the wide-angle cine camera lens of aperture 1 cm which he used is the world's smallest astronomical telescope. The f/1.2 lens has a coverage of 60° extending from the Hyades star cluster (upper right) to the star Sirius (lower left). The filter which was used was a 40Å wide interference filter centred on the H α Balmer emission line of hydrogen.

timetable of 1973-74 training courses

The Central Training Section runs courses for all grades of staff from clerical officer to principal scientific officer, and equivalent grades. Brief descriptions of the courses and future dates are given below; those marked * are residential. Managers who are considering the courses for their staff can get further information from local training officers or Central Training Section, London Office.

		Scheduled Dates	
		1973	1974
***Induction Course** *for all new staff*	The course gives information on the formation and organisation of SRC and its work in the various scientific fields, and on conditions of service and staff associations.	October 16-17 18-19 December 11-12 13-14	April 2-3 4-5 June 11-12 13-14
Course A *for clerical officers with at least one year's experience in the grade.*	The course covers basic statistics, estimates and accounts, basic organisation and methods, communications and effective writing.	November 20-23	February 26 – March 1
Course I *for scientific officers, executive officers, and equivalent grades, under age 28.*	The course looks at communications, work-team relationships, basic managerial responsibilities, O & M, networking for projects and decision analysis.		Part I January 14-18 Part II March 25-29
***Course II** *for senior scientific officers, executive/higher executive officers, and equivalent grades, over age 28.*	The course explores delegation, motivation, leadership, planning and forecasting techniques, staff reporting and interviewing.		March 11-15 May 6-10
***Course III** *for principal scientific officers, senior executive officers and equivalent grades.*	The course will consider the analytical and sociological approaches to management.		February 4-8 April 22-26

Remember ! If you wish to undertake an external course of serious study, you may be eligible for a training concession. Ask your local Training Officer for details.

Before you decide to stay up all night at the thin end of a telescope, you want an assurance from the weatherman that the skies will be clear and unobscured. So observers at RGO get the latest news by Telex direct from the Met – like this:

```
RGO HERMONCEUX

TO
   ROYAL GREENWICH OBSRVATORY TELEX 87451

FM: LONON WEATHER CENTRE

19/6/73

NIGHT TIME OBSERVING PROSPECTS
==========5========5==5=55=5=

OBSERVING PROSPECTS ARE EXLECTED TO IMPROLE DURING THE PER
                                                        OD,

THE OVERCAST WEATHER WITH OUTBREAKS OF RAN WLL GRADUALLY CTEAR

TATER IN THE EVENING.

AFTER MIDN
          GHT IT WILL BE DRY WITH CLEAR PERIODS AND ONLY SRATTERED
PATCHY CLOUD.


TOD 191555 WES


WEATHER LONDON
RGO HERMONCEUX ·M
```

THE WHETHER FOUR CASTE AS IT WERE RESEIVED

BETTER TAKE A MAC LADS JUST IN CASE.

Saved from wpb by Victor Hill Head Messenger, RGO.

Angela flies and gets £25

Angela Killick (pictured above) received £25 from the Civil Service Further Education and Day Release Prize Fund for using her spare time to obtain a private pilot's licence – she wrote about it in *Quest*. The prize fund was set up to encourage people to use their leisure time constructively.

The prizes were presented by Mr Vic Feather, then TUC General Secretary, who spoke to the gathering of prize winners and guests about the importance of further education schemes, particularly for those people who left school early.

Angela's name was put forward by the LO Training Section who are also pleased with the results obtained by two LO staff who received training assistance. Chris Rimmer of NP Division gained an honours degree in Geology after a four-year evening course at Birkbeck College. Nick Shirley in E & O Division gained distinctions in both years of his HNC Business Studies exams after a three-year day release course.

Pictures above:
Top: Mr H M Smith of the Royal Greenwich Observatory at Buckingham Palace after his investiture. With him are his son, Flight Lieutenant D A Smith, his wife and his daughter, Miss Corinne Smith (SRN, SCM).

Below: Dr J A Saxton, Director of RSRS, saying Au Revoir to Dr H G Hopkins on his retirement after 38 years' service with the Station. They first met as undergraduates at Imperial College.

MSc

Mr G A Harding, Deputy Director of the South African Astronomical Observatory, received an honorary MSc degree at the University of Cape Town on 29 June 1973.

newsfront

New Chairman for Research Councils Advisory Board

Professor Frederick Henry Stewart, Regius Professor of Geology at the University of Edinburgh, succeeds Sir Frederick Dainton as Chairman of the Advisory Board for the Research Councils. The appointment is for 4 years from October 1 1973.

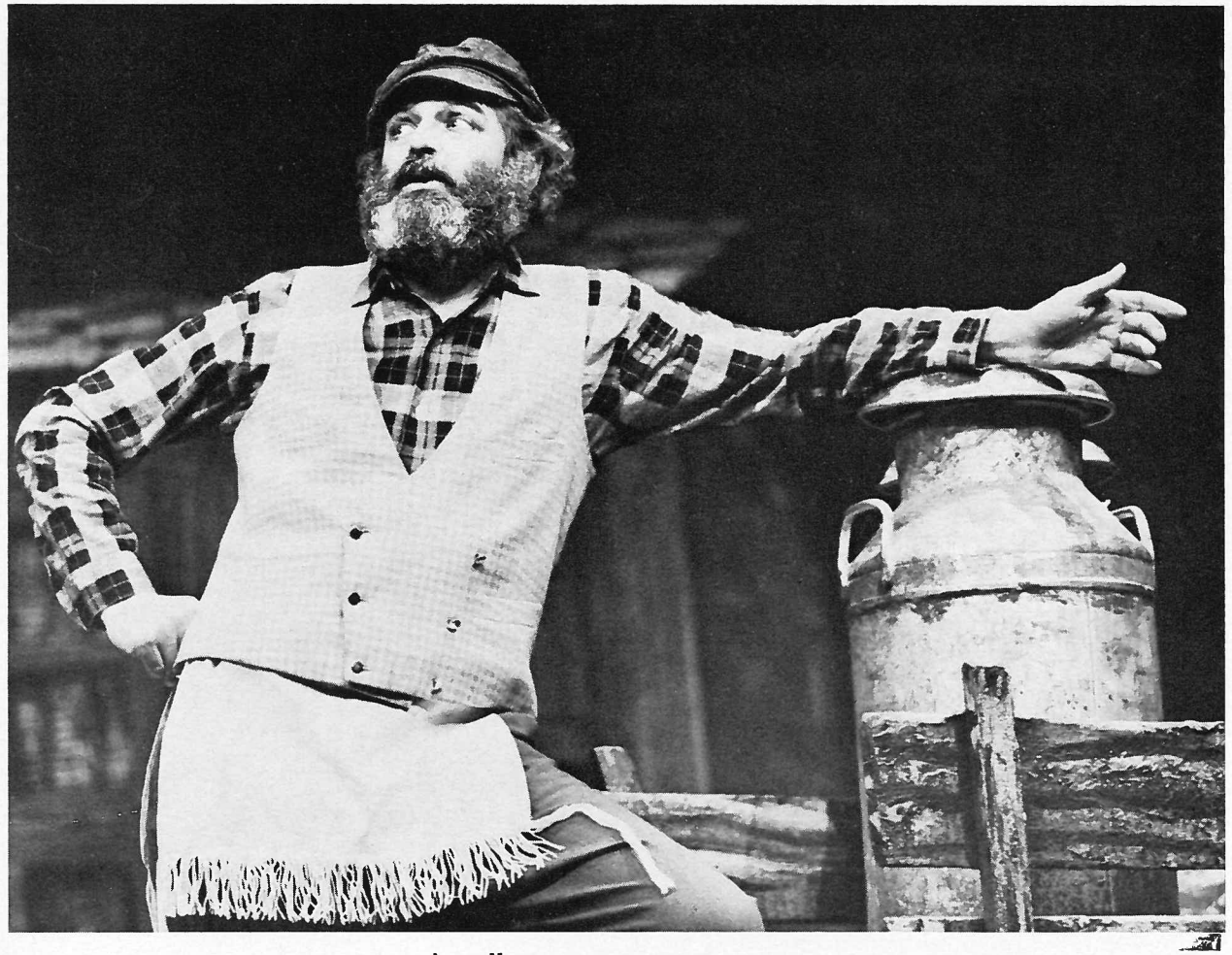
Professor Stewart became Chairman of the Natural Environment Research Council in October 1971 and, in that capacity, a member of the Advisory Board. He is succeeded as Chairman of NERC by Sir Peter Kent.

Sir Frederick Dainton is now Chairman of the University Grants Committee.

The chairmanship of the Advisory Board for the Research Councils is a part-time appointment. The Board was set up last year to advise the Secretary of State for Education and Science on her responsibilities for Civil Science with particular reference to the Research Council system, its articulation with the universities and Government departments, the support of post-graduate students and the proper balance between international and national scientific activities.

The Board also advises the Secretary of State on the allocation of the Science Budget among the Research Councils and other bodies, taking into account funds paid to them by customer departments and the purposes to which such funds are devoted. Its other job is to promote close liaison between the Research Councils and the users of their research.

Profssor Stewart has held posts in the research department of ICI and at Durham University. He has been Regius Professor of Geology at Edinburgh since 1956 and was Dean of the Science Faculty in 1966-68 and a member of the University Court in 1969-70. He was a member of the Council for Scientific Policy before he became Chairman of NERC.



Leading man

John Price, a Principal Scientific Officer in London Office. It's not his normal working suit but the beard is real! In fact he grew the beard to sing the part of Topol in 'Fiddler on the Roof' for the local operatic society in East Grinstead earlier this year. Since then we have been watching with interest for outward signs of his next audition and wondering how he will face the decision to go clean-shaven again. Meanwhile does anyone need a Topol? John says he's open to offers.

. . . . and Farewell

So I say farewell with my warm thanks to all you contributors and readers – to contributors both for writing and for adapting to editorial demands and to readers for your interest.

I hope you will be as great an asset to my successor and that many more people will make a concrete contribution – even if it's only good advice!

Goodbye and thank you.

Anne Walls.