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Journal of the Rutherford High Energy Laboratory

Cover photograph

Lord Bowden, Minister of State for Science, addressing the Oxford Conference on Elementary Particles at the Inaugural Session held at the Oxford College of Technology, Headington on Sunday 19 September. The Conference will be reported in the next issue of ORBIT.

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Note: This issue of ORBIT has less pages than usual. It was hoped that leading articles would tell the story of the Heavy Liquid Bubble Chamber project but the project is not through its final commissioning stages and we need to delay the articles. Add to this pressure of work connected with the Oxford Conference and it has not proved possible to find appropriate material to fill the journal to its usual size.

Editor.

What's been happening on NIMROD

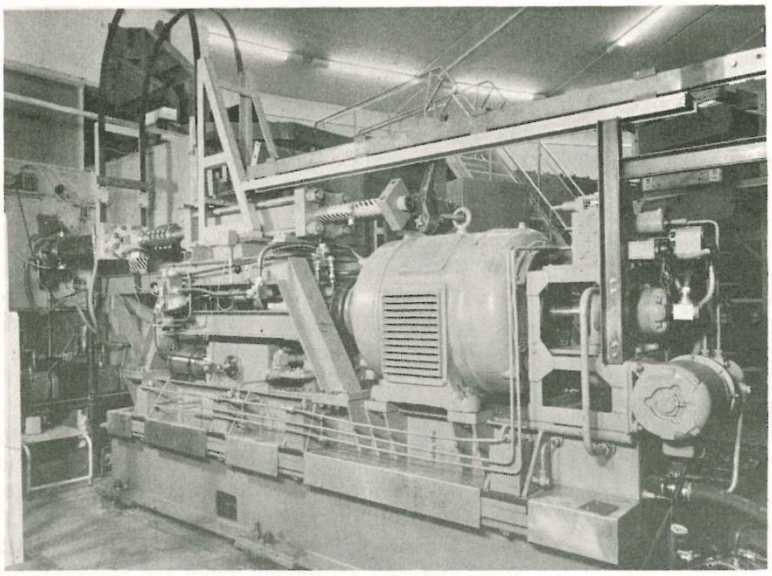
Following the mechanical accident to No. 1 rotor of the magnet power supply in February, it was hoped that it might prove possible to continue full energy (7 GeV) operation at half the normal repetition rate of the machine using the No. 2 set of the power supply. In April a similar fault to that which caused the accident, was found on a rotor end plate of the No. 2 Alternator. 7 GeV operation was ruled out for six months. Several of the high energy physics teams fled to CERN to do their experiments on the 28 GeV machine and the Laboratory had to plan what best to do with NIMROD.

Operation at 2 GeV was possible, at 11 pulses per minute, coming from the mains via a transformer and it was decided to give priority to work which would result in a better machine when the alternators were back in action. In particular this meant commisioning the extracted proton beam using 2 GeV beams. Some high energy physics was possible and this was mainly directed to setting up beam lines and experimental equipment to save time when 7 GeV beams are available again.

High Energy Physics

The P6 experiment, which is a collaboration between Queen Mary College, London/A.E.R.E. Rutherford Laboratory, took data at 2 GeV. The experiment is studying the production of nucleon isobars in proton-proton scattering over a wide range of angles at several energies. They had always hoped to do an investigation at low energy (though they never expected to get down to 2 GeV). The investigation will be carried further at higher energies when the beams are available.

The collaboration between the French and British Bubble Chamber Groups using the 80 centimeter hydrogen bubble chamber on loan from the Saclay Laboratory is hoping to take some data in the next run at 2 GeV. The chamber is currently filled with deuterium and K^- and π^- beams can be fed to the chamber. One interesting development has taken place on the chamber while NIMROD has been limited - it has proved possible to take two sets of pictures on one pulse from NIMROD. This is done by taking a beam to the chamber at the beginning of 'flat top'(when the protons in the magnet



The plunging mechanism in Straight 2. The commissioning of the mechanisms has been one of the major tasks of recent months.

ring are circulating at constant, maximum energy) cycling the bubble chamber pressure system (and also of course the lighting and camera system) very quickly (a few hundred milliseconds) and then feeding another beam to the chamber at the end of flat top. This doubles the output of bubble chamber data and is obviously a great advantage. The current limitation in the Laboratory, which would prove a stumbling block, if this two-pictures-per-pulse proved possible on the other bubble chambers, is the lack of sufficient computer facilities to cope with the increased data output. It is hoped that a new large computer will soon be authorised for the Laboratory.

The Southampton University Space Group came to the Laboratory in an attempt to calibrate some Cerenkov Counters destined for space satellites. They set themselves up at the end of the P3 beam line and will be coming back when we have beams again to complete their calibrations.

Other experiments have been setting up ready for 7 GeV beams. They include, K4, who are studying leptonic decay modes of positive K mesons, P3, who are looking for multipion resonances bombarding a hydrogen target with negative mesons, and K6, who are measureing the K^- - nucleon total cross-section. π2, who are looking at differential cross-sections in $\pi^{\pm}$-p elastic scattering, will be having beam for the first time in the next 2 GeV run. P3X, who are studying the decay modes on the η^0 meson, have set up their beam line and are waiting for the 1.4 metre Heavy Liquid Bubble Chamber to be commissioned to do their experiment. In Experimental Hall No. 2, the ϕ team, who are looking for the ϕ^0 meson have set up their beam line and a new beam line K7 is being installed. K7 will use the polarised proton target which is being modified. The modifications involve using a horizontal cryostat with vertical magnetic field.

The Power Supply Programme

Both rotors are being rebuilt at the manufacturers. The end plates, which caused the trouble, have been made thicker (six inches instead of five) and are now forged instead of cast. Also the profile has been modified around the highly stressed region near the neck of the dove-tail. The No. 1 stator and No. 1 motor have been repaired and brought back to the Laboratory; the No. 2 motor which was also damaged, has been repaired and tested on site.

For most of the time since the accident, the manufacturers have been working round the clock and they are scheduled to deliver the first rotor mid-October. Reassembly will take about two weeks and early in November half the power supply should be in operation again for extensive tests, mainly strain gauge measurements. It is hoped that this can go on in parallel with the installation of the second rotor which should reach the site mid-November. By December the full power supply is programmed to be in operation again; NIMROD back to 7 GeV.

The Extracted Proton Beam

In the meantime there is a shutdown. There will be one more run at 2 GeV in October, then a further shutdown prior to 7 GeV operation.

When the protons in NIMROD have been accelerated to maximum energy they can be used for experiments either by crashing them into targets raised in the magnet ring itself (taking some of the resulting spray of particles down a beam line to experimental equipment) or they can be bent out of the ring as an extracted proton beam. The EPB system in the ring has three components:- a beryllium target (situated in Octant 3) where protons passing through the block of metal lose energy and move out of the circulating beam inwards towards the centre of the ring; a quadrupole (in Straight 7) and a bending magnet (in Straight 2) which form the 'optical system' to focus and bend the protons which have passed through the target out down the beam line (P1).

Work on the EPB had been in progress for several months before the power supply accident. The plunging mechanisms, which thrust the quadrupole and the bending magnet into their required positions during the time that the protons are accelerating, were working but not very reliably. The extraction efficiency was very low (about 5%) and little was known about the state of the extracted beam.

Working at 2 GeV, conditions, particularly the fringe field of the NIMROD magnet, are different. The state of the beam is reasonably well known from diagnostic probes in the region of the quadrupole and bending magnet but not near the position Octant 3, where it leaves the ring and it is thought that the Octant 3 header vessel may be chopping off some of the beam. Nevertheless the EPB has been commissioned at 2 GeV to give an extraction efficiency of about 30% out of the ring. Only about half of this is conveyed down the P1 line to the target which feeds K4 and K6 but it is hoped this will improve with 7 GeV beams when multiple scattering in the target will be greatly reduced, improving both the extraction efficiency and the characteristics of the beam from the machine. The present spot size of the beam at the K4, K6 target down the P1 line is 20 millimetres vertical by 7.5 millimetres horizontal.

A more complex bending magnet is in use - it has bigger vertical aperture and a dozen pole face windings which can act in the same way as shims and also control the magnet gradient. This has never yet been tried at 7 GeV.

The plunging mechanisms have absorbed a great deal of time and energy to commission them into an acceptable state.

A mechanism can be required to thrust about a ton of magnet into position in about a fifth of a second once every two seconds. Electrical supplies and water cooling supplies have to be carried to the magnet on 'flying leads', and the hydraulically operated ram has to pass through a vacuum seal into the high vacuum region of NIMROD.

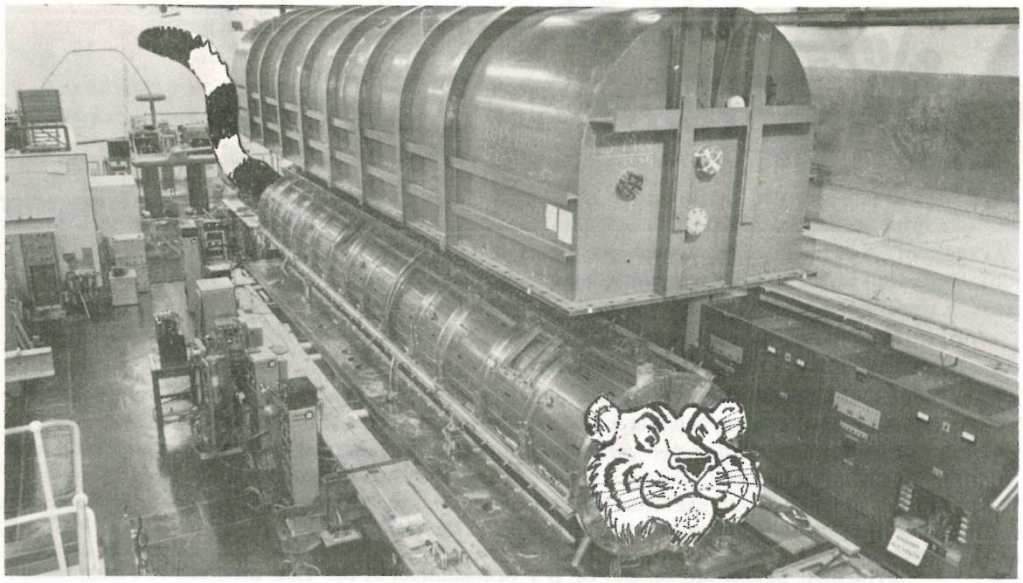
Mechanically, components arriving from the manufacturers had to be put right in the Laboratory workshops. Electrically, the control system has been greatly improved. The mechanisms in the Magnet Hall have not been plunging at their maximum repetition rate but the spare mechanism in the R2 workshop has been in operation at about one stroke every two seconds. In the R2 workshop a new labarinth type of vacuum seal has been developed and it is now at a stage where it could be introduced on the machine. The present type of lip seal has surface speed limitations and may get too hot under the most strenuous conditions that may be required. A rearrangement of the whole plunging mechanism system, which would greatly improve the speed at which it could be handled, is under consideration. This could prove important when levels of radioactivity go up.

Both the engineering and the physics sides of the commissioning of the EPB have taken much longer than was ever anticipated. If it were not for the increased time available to EPB commissioning by virtue of the power supply accident, it is doubtful if it would have been ready for use by the end of this year.

General

Much machine physics work, directed towards improving the performance and reliability of NIMROD, has been in progress. The usefulness of this work can best be seen for the proportion of scheduled time which has actually been used. This has now moved for several runs into the 90%'s as opposed to near 70%'s in the last 7 GeV runs. (A 2 GeV accelerated beam intensity of over 3×10^{12} has been recorded.) Some of this improvement is no doubt due to lower energy and lower repetition rate but the machine components generally have been improved to function much more reliably.

On the injector, two high voltage sets are available in the E.H.T. area. Control systems on these sets have given trouble in the past and it is now possible to change from one set to another in about an hour if trouble occurs during a run. Towards the end of March, a 46 milliamp beam



I'VE GOT A TIGER IN MY TANK!

A 46 milliamp beam was accelerated through the injector linac tank at the end of March.

(100 microseconds pulse length) was accelerated to 15 MeV in the linac from 80 milliamp in. 32 milliamp, 400 microsecond beams can be reliably accelerated as they are within the power handling capacity of the linac tank power system with the r.f. power level stabiliser in action.

Targetting techniques have been improved. There is now much better control of noise spill; fast spill has been achieved (enabling the bubble chamber to do its two pictures per pulse) and beam sharing on flat top is now possible.

There has also been extensive installation and modification work on the beam lines in the two Experimental Halls, especially in connection with the EPB.

Some essential and a lot of useful work has been achieved. The ability to continue operation at 2 GeV meant a great deal and reduced the scale of the set back that the Laboratory suffered with the breakdown of NIMROD. The time has been pretty fully used and when 7 GeV beams are with us again, NIMROD should be a much more efficient machine.

Extracts from "The Guardian" Editorial on the report "Recruitment to the Civil Service"

'There must be something wrong with an organisation, the Civil Service, which admits to a pressing need for more specialists but which debars them, as a matter of policy, from the highest positions. The Administrative Class of the Civil Service is inexpert in the many specialised disciplines of modern government, and proud of it. As Lord Bridges has emphasised, in his recent and frightening book about the Treasury ("The Treasury," Allen and Unwin, 30s), the tradition lingers that a good administrator must be an amateur at everything. The tradition that only non-specialists can run great departments lingers too.

'The idea that a worn-out scientist, can, as an afterthought, come in as an administrator, one must reject. (quoting from the report)

'It is the existence of the Administrative Class, with its clannish little ways, which helps to starve British government of the expert brains it ought always to be seeking.

What are you suggesting?

A suggestion was recently dropped into the box concerning the up-dating of R1 First Aid and Fire Instructions which listed a Fire Warden who left the Laboratory 18 months previously and a 'qualified first aid holder' who left 15 months previously.

The suggestion was assessed with the comment that the signs were being replaced and, 'This has taken longer than was anticipated'.

THE Accelerator WORLD

News and views
from the world of
high energy physics,
accelerators,
and computers.

Neutrino Experiment

One of the gaps in current knowledge of the 'weak' nuclear force is that the 'carrier' of this force - the intermediate boson - has never been identified. Both Brookhaven and CERN have searched for it in their neutrino experiments without success. Other experimental teams are taking their equipment deep underground to filter out the neutrino flux from cosmic rays for investigation.

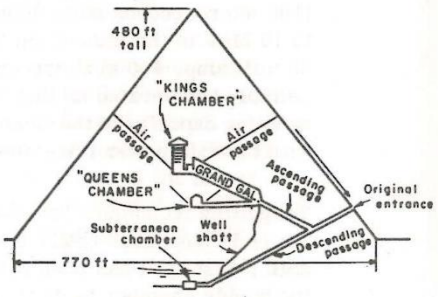
One such team - a British (Durham University), Indian, Japanese collaboration - set up their equipment 8,000 feet below ground in the gold mines at Kolar in India. At the International Conference on Cosmic Rays held at Imperial College, London in the second week of September, the team reported that they had detected cosmic ray neutrinos, the first time this has been done, and also that they had an unusual particle track photograph which it has been suggested may be the first sign of a boson.

Professor M G K Menon and Dr B V Sreekanthan of the Tata Institute of Fundamental Research, Bombay, India are speaking at the Oxford Conference about their experiment and we may be able to tell a fuller story in the next issue.

The Two Cultures

Some Egyptologists believe that the mighty pyramids of Egypt have kept their secrets to themselves for 4,500 years. They contend that the Egyptian monarchs ingeniously planned the vast structures that became their tombs, to mislead predators in future generations into believing that the tombs had already been sacked. This deception theory could mean that the most exciting of the passageways and chambers remain to be discovered.

Several of the now known upper chambers did in fact escape detection for thousands of years and the vast structures are still largely unexplored. This seems unbelievable until one takes in the colossal scale of the pyramids. Napoleon once pointed out that there is enough stone in the Great Pyramid to build a wall three metres high and one metre thick entirely surrounding France.

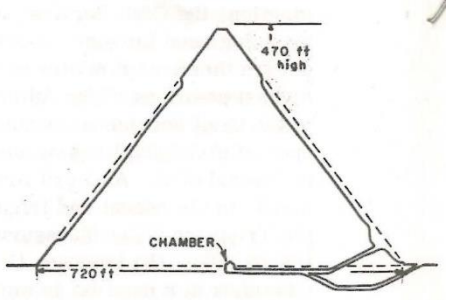


Cheop's pyramid, showing chambers which escaped detection for 3,500 years.

Currently circulating among a number of Egyptian archeologists and physicist is a plan put forward by Luis Alvarez of the Berkeley Laboratory, himself a keen Egyptologist as well as a celebrated physicist, to 'X-ray' the pyramids by spark chamber analysis of cosmic rays. The cosmic ray muons will lose energy as they pass through matter in proportion to the density of the matter. The idea is that voids (chambers?) in the structure of the pyramids will show up as peaks in the spark chamber data. Alvarez is confident that if the chambers exist they can be detected and positioned to within a few yards. Tunnelers could then penetrate directly to the possible chamber.

To overcome the problem of muon scattering, an iron absorber would be used to 'harden' the beam and the detection would be by the newly developed nickle-wire magnetostrictive read-out type of chamber. It is thought that several months, round the clock observation per pyramid would be needed. The total cost of the project is estimated at 170,000 dollars, which is low compared with many archeological investigations. It seems a most elegant example of human curiosity and knowledge crossing the boundry between the two cultures.

(Information from "The Magnet")



Chephren's pyramid showing its suspiciously solid structure.

B.A. Presidential Address

Extracts from the Presidential Address to the British Association for the Advancement of Science, given by Sir Cyril Hinshelwood on 1 September at the meeting in Cambridge :-

'What would be quite useless would be any kind of Draconian edict that all scientific work must henceforth be devoted to demonstrable practical ends. There could be no surer way of rendering the future completely barren, since nearly all great technological advances depend upon discoveries so unexpected as to be unplanable.'

'Young people .... still feel, no doubt, that their ultimate success and influence will be limited by the old slogan of the administrator who proclaimed that the scientists must always be on tap and never on top'.

'If we wish to plan research, we can only do so by assembling a community of people with varied and mutually complementary talents, operating with strategic flexibility, and in an atmosphere of curiosity in which the members know and understand what the others are talking about and respect their leaders. We shall forget at our cost that an honoured place in such a community be found for the dedicated thinker'.

'The questions which still remain the most absorbing, are the oldest of all ; the nature of the cosmos, the nature of matter, the nature of life.

..... the great accelerating machines of modern laboratories provide, at fantastic sounding cost, energies which transcend many millions of times those met in ordinary chemistry. In this strange world of energy affluence and violence, a bewildering collection of new particles appear. Some are heavy, some light, some are stable, some transient. They appear and dissolve, one type generates another. As discovery followed discovery it appeared that chaos and complexity were the rule of the subatomic microcosm. But at length some degree of order is beginning to emerge, though it is order of a rather peculiar kind.

The particles differ in mass and in charge ; they differ in lifetime and in the intensity with which they appear to act upon one another. Powerful forces exist which are neither electrical nor gravitational. The bizarre appearances and disappearances of these entities prove to be governed by rules according to which various measurable quantities must maintain fixed relations, the so-called conservation laws. A system of numerical labelling of the possible modes of this particular existence proves feasible, and it leads to the definition of abstract quantities known as 'isotopic spin' and 'hypercharge'. Observed values of these can be plotted one against the other on charts, and it now appears that the known particles (or particulate states) yield diagrams with striking elements of geometrical symmetry. This discovery indicated clearly an underlying law, and in 1964 a gap, a missing point, in one of these diagrams led to the finding of a hitherto unknown particle with even odder properties than usual (the omega minus particle). Within the last few months there have been reported indications not merely of a particle but of a new group of particles. What it all means is far from clear, but if we are here glimpsing a fundamental law of nature it is certainly one which would have appealed to Pythagorus, for geometry and number are indeed coming into their own. The theories about these matters are now being made still more powerful by the introduction of considerations based upon relativity.'

..... men of science ..... are not perturbed by the limitation of their possible understanding. There seems at any rate to be no forseeable terminus to their own adventure. If the canvas on which they represent the world is bounded, it still has plenty of room on it to paint magnificent pictures which inspire the enquiring mind, delight those who have the sense of wonder, and, if the natural perversity of man does not frustrate the effort, show the way to benefit humanity for many centuries.'

'The scientist has a responsibility not to make the decision when scientific matters affecting all of society are involved'. Professor Dr. Barry Commoner, Washington University, USA.

Outside Hours

Small Things Bright and Beautiful

Jack Wheeler

We live in an age of small gardens and, in order to cultivate as wide a range of plants as possible in a restricted area, I find that an alpine garden admirably fills the bill. A much greater variety of form and colour and a longer floral display is provided in a relatively small area filled with alpine plants than by the traditional herbacious border, which requires more space than can be provided by the average gardens to ensure an effective display.

Having started in a small way with an equally small space given over to alpines, I found my interest in these intriguing, tiny plants increasing. My rock garden grew larger and larger the vegetable garden, diminished alarmingly.

One sees many bad examples of rock garden construction - a mound of soil stuck with broken pieces of concrete, precariously balanced in place, providing a very convenient home for slugs and other pests that emerge at night to prey on the plants, (as if they weren't handicapped sufficiently already by their unfortunate environment). I aimed at as natural an effect as possible in a garden surrounded by houses, not building too high, a couple of feet at the most. A long low border can be very effective, a few large rocks judiciously positioned are more picturesque than a surfeit of small ones dotted along its length.

Much valuable know-how was acquired by visiting some of the larger alpine gardens in public parks and country houses and the amount of literature on the subject is vast, enabling one to learn a great deal about the origin and the likes and dislikes of the plants one wishes to grow.

I soon learnt that the rock garden need not consist of a few plants of aubretia and alyssum growing more leggy and straggling as the years go by. There are many hundreds of garden-worthy subjects available, coming from most of the mountain ranges of the world, plants demanding the minimum of attention, yet always anxious to rush into bloom, giving a wealth of colour if their few needs are met. I have wild plants from Greece, New Zealand, Russia, North Africa, India, China and the Americas, to name but a few places, growing side by side.

Their main requirement is good drainage, not too rich a growing medium, and sunshine. It is no good trying to grow them in that damp shady corner where nothing will flourish. They must be open to the elements, as the majority are perfectly hardy and will take any weather our uncertain British climate can provide.

The small bulbs find a very congenial home in the alpine garden, as they can be left undisturbed to increase as they will. My favourite is the wild crocus and I have gradually built up as large a collection as I can, natives of Spain, Italy, France, Palestine, Greece and Persia. These open their star-like flowers in the first sunny days of February and March, and, planted in clumps dotted around, they provide great splashes of brilliant colour for many weeks.

Spring is the most colourful time, but with careful selection the floral display can be extended until summer begins to give place to autumn, when the wild cyclamen and autumn crocus start into bloom, as if anxious to make the most of the remaining mild weather.

My collection of plants now exceeds four hundred, some collected, many given to me by other alpine gardeners and quite a few grown from seed, for there are a great many beautiful alpines which cannot be obtained commercially. Then seed must be obtained, often collected in the wild by botanical expeditions, and carefully planted with the hope that it will germinate and eventually provide yet another interesting addition to the collection. New plants are still being discovered and if they prove worthy of cultivation they sooner or later come into the hands of the many interested alpine gardeners, so that there is always something to look forward to, plants that have yet to bloom for the first time. Sometimes there is disappointment, then out the plants must go, to make room for something better.

This form of gardening has a larger following today than ever before, requiring neither large areas, deep pockets nor abundant leisure, and still giving all the pleasure a hobby should.

The author

and his garden

In the foreground the tiny flower of raoulia, a sheep plant from New Zealand (so called because from a distance they resemble a flock of sheep) is in full bloom.

When Rutherford was President of the Royal Society, he listened to a discourse by a young biologist, and then made this remark: 'Before I call upon anyone to discuss this paper there is one remark that I should like to make to you, Sir. I believe I am considered a fairly intelligent man, but I have listened to you for half an hour, and I have not the faintest idea of what you've done. Would you mind getting up again and telling us in five minutes what you've done, why you did it, and what result you got ? And in recounting the episode afterwards, Rutherford said: 'You know he looked at me rather curiously, but he did get up, and he did tell us, and it was very interesting. This anecdote seems an appropriate lead into -

Popular Lecture Series

The provisional programme for the 'Popular Lecture Series announced in the last issue of ORBIT, is given below. Each lecture will also be announced at the appropriate time in the Laboratory Bulletin. As the title implies, this series is meant for anyone at the Laboratory who is interested in the experiments that have been completed on Nimrod. The Lectures will be held at 3.30 p.m. in the Lecture Theatre.

6 October (Introductory Lecture) "The Techniques and Basic Ideas of High Energy Physics" - I M BLAIR (AERE).

20 October (π1 Experiment) "Pion-Proton Elastic Scattering and Polarisation Measurements" - J J THREASHER (RHEL).

3 November (π2 Experiment) "Pion-Proton Elastic Scattering Measurements near 2 GeV" - F F HEYMANN (UCL)

17 November (π3 Experiment) "Charge Exchange Scattering Measurements with Negative Pions" - N MIDDLEMAS (Oxford University).

1 December (K2 Experiment) "A Search for the Decay of the ω^0 Meson into an Electron-Positron Pair" - A NEWTH (Imperial College).

15 December (P2 Experiment) "Proton-Proton Small Angle Scattering Measurements" - W CHAPMAN (QMC)

12 January 1966 (P4 Experiment) "Proton-Proton and Proton-Neutron Total Cross-Section Measurements" - D V BUGG (RHEL)

26 January (N1 Experiment) "Neutron-Proton Charge Exchange Scattering Measurements" - N H LIPMAN (RHEL)

9 February (N2 Experiment) "A Search for the Decay of the K_2^0 Meson into a Charged Pion Pair" - G MANNING (AERE)

Orbiting Around

Editor: H F Norris
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Mr. Didcot at the Cholsey Show with his show exhibits and some of the trophies that he won.

There's no business like SHOW BUSINESS

George Didcot of the Nimrod Vacuum and Radiation Section has been hitting the Headlines in the Press recently.

George lives in Aston Tirrold and must surely be one of the best amateur gardeners in Southern England, if not the best. He has been a keen gardener for many years and has been exhibiting at various shows since 1946. This, however, is his best season with results that are really staggering. The vegetables he grows are outstanding, for instance, 8 shows - 8 first prizes for onions, but he also collects awards for flowers and fruit. George has about 40 pole of garden under cultivation with nothing magical about the nature of the soil, in fact some of it is quite stoney with a lot of clay underneath.

His wife is also a very keen gardener and gives him a lot of help, "She will soon be washing all the pots again". Mention has been made of the outstanding vegetables George grows, his successes however are not confined to these, for example, at the Royal Oxford Show he was awarded the Silver Medal for the best dish of fruit, in this case peaches. This was from a tree grown out of doors, from which he removed 300 fruit earlier, leaving 200 to develop for show purposes.

Since the 31st July he has exhibited at the following shows:- Ramsbury, Grove, Cholsey and Moulsford, Reading, Watlington, Bucks County, the Royal Oxford and Wallingford, the last two on the same day.

In these eight shows alone he has collected 77 firsts, numerous others, nine cups, one silver medal, one shield, and two blue ribands. At Reading, one of the cups was for the "Best Collection of Six Vegetables", the judges comments for this entry being "Near Perfect". At the time of writing, he still has three shows to come, with, one feels, the almost certain addition of further awards to his already quite remarkable collection. Orbiting Around congratulates George on his achievements and wishes him every success in his final three shows. Now, where did I put those seed catalogues.

The Call of Industry

Charlie Bradshaw of the P.L.A. Engineering Group is leaving at the end of September to take up an appointment with the I.C.I. Petro-Chemical and Polymer Laboratory at Runcorn as Assistant Group Head of the Engineering Group.

His job will be to organise and run an Engineering Services Group for the Runcorn Laboratory, and to provide general laboratory services, engineering support for laboratory experiments, development of material fabrication and outside manufacture.

This will mean the setting up of instrumentation, electrical and electronic sections as well as a drawing office, and, in case he has some spare time, he will be in charge of the auto-clave annexe.

The Runcorn Laboratory has been in operation for about two years and has a staff of approximately 300. Research is divided between four Scientific Groups, polymers, physics, chemistry and structure analysis. The new engineering services group will be the last to be formed.

Charlie came to the Rutherford Laboratory in September 1959, from the British Iron and Steel Research Association where he was engaged on industrial research in the physical and mechanical engineering field.

He feels that the new job will give him full opportunity to use all the experience he has acquired over the years, both at the Rutherford Laboratory and at B.I.S.R.A.

Both Charlie and his wife have regrets at leaving good friends, but as both of them come from the North, they are looking forward to the move. We wish Charlie every success in his new post, which as he says himself is a challenge, but a challenge which he is accepting with enthusiasm.

A Different Call

Bill Mathews of the Nimrod Machine Physics Group who has been at the Rutherford Laboratory for nearly three years, leaves on 1 October to enter the religious life when he joins the Jesuits. We wish Bill every success in his new life.

Research into Comfort

Making homes more comfortable to live in, is the future work of Derek Whiteside. Derek, who for the past six years has worked in the Theoretical Studies Group, left on 10 September to take up a new appointment.

He is joining the Building Research Station at Garston, Watford, where he will be investigating the thermal properties of buildings.

This is a subject which has only recently begun to receive the attention it deserves. Too long have the inhabitants of this country been content to pile on the fuel while losing a large percentage of the resulting heat through inadequate insulation of their houses. Thermal insulation has been of great interest to Derek for a long time, as his colleagues have fully appreciated - many a heated argument has developed over a cup of coffee.

He has mixed feelings and regrets at leaving the Rutherford Laboratory, but is looking forward to using a lot of knowledge acquired on computing, in a new field of research. Our best wishes go to Derek and his wife Christine in this new venture.

Comings and Goings

C J S Damerell and G Aylmer join Counter Group (visiting); Dr J R Smith, Mrs G W Stuart and R F Pegler join HEP Bubble Chamber Research Group; I R Mills joins Atlas Operations Group.

D Bath and K W Bellinger join Nimrod Machine Engineering Group; Dr K Ramavataram joins PLA Nuclear Physics Group; D W Sayers joins Applied Physics Bubble Chamber Group; J W Scott joins Central Engineering Group.

Mrs S Clark, Miss N K M Atkin, Mrs M A Cocker, Britton, W H Wallace and D G Yates join General Administration.

L H C Crowther, J Hainen, R J Youthed, P W Wright, L G Hunt, D Boulter, B W Cummins, F J Dickinson, J Lennon, C J Underwood, A G Daw, A C MacWilliam, A Rouse and A T J Whittle have left us.

Congratulations to-

John Gardner, Theoretical Studies Group on his engagement to Patricia Pope at the end of July.

Martin Wilson, Nimrod Machine Physics Group. and his wife Sylvia, on the birth of a son, Timothy, on 6 August.

Jack Sparrow, Theoretical Studies Group, and his wife Mary on the birth of a daughter, Rachel Mary, on 19 August.

Trevor Mason, Nimrod Machine Physics Group. and his wife Joan, on the birth of a daughter, Helen Margaret, on 22 August.

Hilda and Doug New on the birth of a daughter, Maria. on 23 August, (Hilda, who recently left us, worked in the P.L.A. Admin. Office for about five years.)

Brian Day, Electrostatic Generator Group. on his marriage to Doreen Withey of Culham Laboratory on 11 September.

Peter Denny, Theoretical Studies Group, on his engagement to Judith Jones on 15 September.

Record Programmes

The weekly lunch-time record programmes will begin again on Tuesday 5 October at 12.30 p.m. in the Lecture Theatre. The programmes chosen for October are as follows:-

5 October - Sibelius, Symphony No. 1.

12 October - British Traditional Jazz (Chris Barber/Humphrey Littleton)

17 October - Organ Music (Organ recital by Ralph Downes and organ and percussion music)

26 October - Ballet Music (Les Sylvides and Coppelia)

As mentioned in the Laboratory Bulletin the Record Society would like to hear from anyone willing to present the occasional record from their own library. Please contact Brian Southworth Building R20, Ext. 6286 for further information.

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