



orbit

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Journal of the Rutherford High Energy Laboratory



Cover photograph

Dr. Pickavance, Director of the Rutherford Laboratory, outside Buckingham Palace after receiving the insignia of Commander of the British Empire from Her Majesty the Queen on 18 March.

Editorial

The Rutherford Laboratory has been under the weather this past month both literally and metaphorically. The heavy fall of snow in the first week of March (which was really inevitable since the snow fences guarding the A34 had been removed a few days earlier) took only a short time to clear. But the effects of other Acts of God, and some of man, to befall the Laboratory, are likely to be with us much longer.

At about 11.00 p.m. on the night of Sunday 21 February the serious accident to the Nimrod magnet power supply brought the accelerator and with it the already overcrowded high energy physics programme to a shuddering halt.

Great surges of power with a peak current of about 10,000 amps are needed by the Nimrod magnet ring once every two seconds, to provide the increasing magnetic field which holds the accelerating protons onto their fixed orbit. The power required is so great that it cannot be taken directly from the national grid electricity supply, otherwise the lights would dip in Abingdon every time Nimrod pulsed. The magnet power supply therefore acts as a buffer between the grid and Nimrod. It does this by storing mechanical energy in its huge rotating components and converting some of this to electrical energy to feed the magnet ring. Giving this energy to the magnet slows the rotating plant by about 4%. At the end of the Nimrod pulse, current flows back to the power supply to speed it up again. In this way, only the ohmic losses in the magnet ring need to be made up from the grid supply but even this averages some $2\frac{1}{4}$ million watts.

The power supply is a twin motor-alternator-flywheel set on one long shaft. Each rotor in the two alternators weighs 60 tons and each flywheel weighs 25 tons, so that the total mass is of the order of 170 tons, rotating at almost 1000 r.p.m.

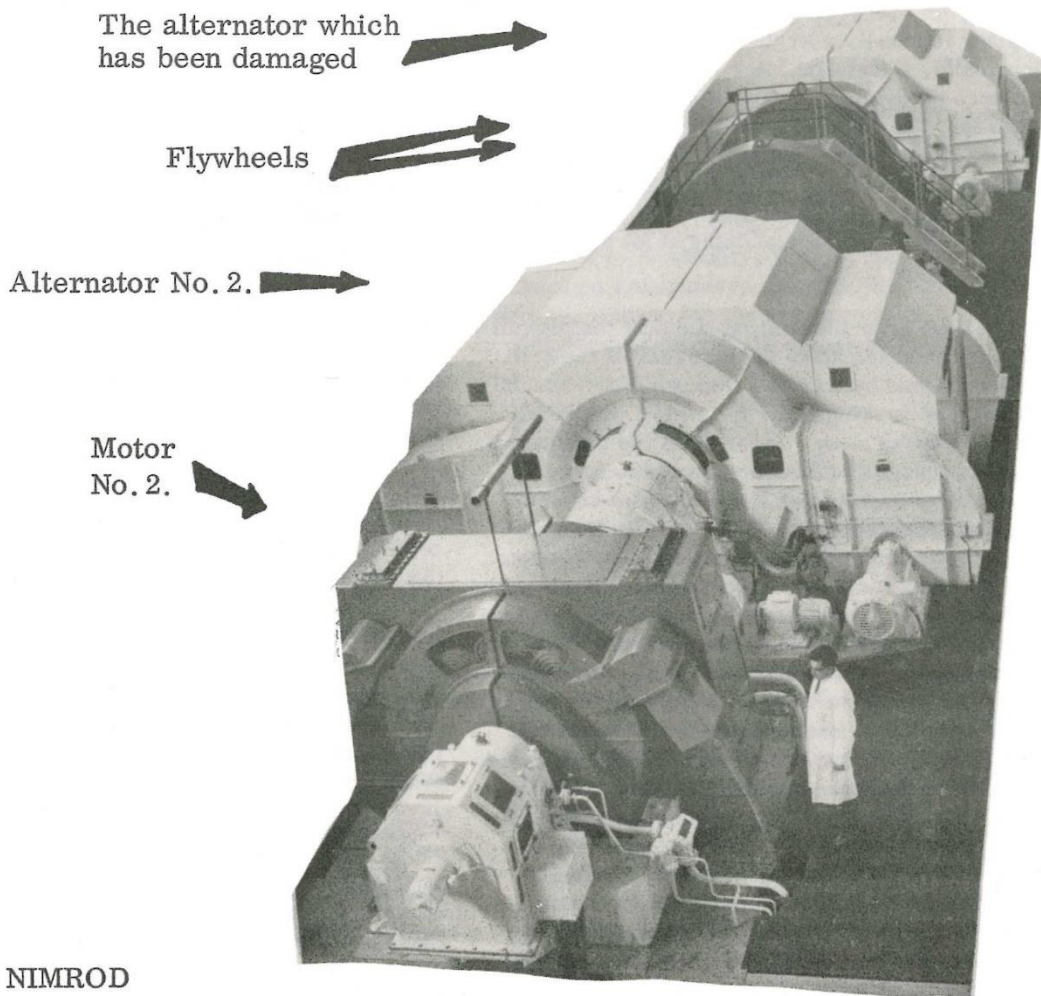
The fault occurred on the rotor in No. 1 alternator. The rotor is of "salient-pole" design, with six poles keyed into the rotor body by a dove-tail joint. Each pole consists of laminations and measures 10 feet along the length of the machine. The fracture occurred at the neck of the dove-tail joint on an end-plate and the centrifugal force made the end plate and its adjoining laminations move outwards, causing them to tear into the stator.

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THE NIMROD MAGNET POWER SUPPLY

Apart from the alternator, no other machinery was damaged and no personnel were injured. Dennis Chaney, Raymond Davidson, Daniel Cumberbirch and Tom Whittle from the Power Supplies Operations Group all entered the Alternator House to deal with the situation. This must have taken great courage as the damaged machinery was making terrifying noises and the building was filled with black acrid smoke.

It is estimated that the damage to this alternator will take about eight months to repair. Detailed investigations are underway on the nature and cause of the accident and also on the state of the rest of the rotating plant. Nimrod will begin its programme again if it is shown that it is safe to operate alternator No. 2. We can then use half the power supply and run at reduced repetition rate (9 to 12 pulses/minute) until near the end of 1965.

We have obviously suffered a major set back.

The physics potential of the accelerator will be about halved but the high energy physics teams are looking again at their experiments to see what compromises they can make to accommodate the new situation.

We had a fairly rough handling from some sections of the Press following the announcement of the accident. These papers were very selective in the use of the information supplied to them, relaying the unfavourable in detail but saying little or nothing about the considerable success of Nimrod over its year of high energy physics operation. The real gem of the week happened as follows:- Correspondent: If there is an official inquiry would the possibility of sabotage be considered? Answer: If there is an official inquiry, it is possible that the question of sabotage will be raised but the possibility of sabotage is so very remote The write up in the paper began "Sabotage is being considered" It is reporting like this that deters people from pass-

ing any information whatsoever to the Press. Ironically, a fortnight later we issued a Press Release on the K_2^O experiment (see the article on page 5). The accident made the front page in almost every paper; news of our physics work, although admittedly a difficult subject to put across, was barely mentioned. But perhaps what we are really complaining about here is human nature itself.

A few days after the Nimrod accident the prevailing apprehension about the approach of the S.R.C. was worsened by the news that one of the special benefits of working under the NIRNS was to be abruptly swept away. It concerns the payment of legal expenses and the loan scheme to help Laboratory personnel to buy their own houses. This system was set up by the Atomic Energy Authority to meet the special needs of this area and obviously we might expect them to be removed if for example these needs change or for such reasons as compatibility with the rest of the S.R.C. establishments. However, to change the system without any prior warning is to ignore the fact that housing is a big issue in peoples' lives and that they plan their lives accordingly. Our neighbours at AERE were given a year's warning of the ending of the scheme so that personnel could adjust their lives. For us, they were to be swept away overnight. The vigorous effort of Staff Side, led by Alec Spurway, managed to halt the falling axe and the abruptness of the decision has been eased a little, while the matter is investigated again in London.

Meanwhile an intra-Laboratory issue has been gradually coming to the boil. The decision to introduce an eight hour shift system instead of the prevailing twelve hour system, which has been in operation for a large proportion of the Nimrod and PLA crews, is being strongly opposed.

Let us finish on a happier note by recording the one shaft of sunlight which has appeared through the clouds. On 23 February, Lord Bridges, Chairman of the National Institute, delivered a splendid speech in the House of Lords during the second reading of the Science and Technology Bill (Hansard, 23 Feb, Columns 766-794) on the issues of conditions of service

for new entrants to our Laboratories and on the possibility of increased bureaucratic control under the S.R.C. On that occasion Lord Snow for the Government held out no hope for reversing the decision that new entrants would be on conditions equivalent to the Civil Service but promised to look at the matter again.

However, on 9 March (Hansard, 9 Mar, Columns 20-27) Lord Snow gave favourable replies on both issues. Concerning bureaucratic control - "Suitable administrative arrangements" are being made; "A much more extended series of authorising authorities . . . will not be the case"; "We (the Government) are confident that the S.R.C. will exercise precisely the same powers as the A.E.A., and in the same spirit". Concerning conditions of service - "We have therefore decided that the S.R.C. should be authorised to recruit new staff to the Rutherford Laboratory on terms which would enable them to be members of the A.E.A. pension scheme if they so choose". (It is not intended that this amendment to the Bill should apply to the Daresbury Laboratory and no doubt this will be contested further.)

Lord Bridges replied, "I should like to thank the noble Lord, Lord Snow, very warmly indeed . . . not only on my own behalf, but to say that the staffs in the National Institute for Research in Nuclear Science will be extremely grateful . . . for . . . a conclusion which I am sure is not only right on merit but will also lead to much more harmonious and easy working in the future".

Mr. Crossland, Secretary of State for Education and Science, moved the amendment in the Commons on 16 March. It was then entertaining to see him defending the Government's about-turn against Mr. Bray (Labour Member for Middlesborough West) who asked "What justification is there for setting up a nuclear establishment in a position of privilege?"

As far as the Rutherford Laboratory is concerned, a satisfactory outcome has been achieved on these issues. Let us hope that, even by the time this copy of ORBIT is circulated, a happier situation will have been reached on the other topics as well.

More addresses - "Rotherfield High Electronics Lab;" "The Brotherhood Laboratory" and, very discerningly, "The Rutherford High Tension Laboratory". Also, and we are not inventing this, a letter arrived from West Germany two weeks after the alternator accident addressed as follows:- "National Institute for Research in Nuclear Science, Crushing/Grinding Laboratory, Harwell, England".

Against the Law

A team of eight scientists from A.E.R.E., Bristol University and the Rutherford Laboratory published the results of the first part of their experiment on the two pion decay of the K_2^0 meson in "Physical Review Letters" on 8 March. The team (W Galbraith, G Manning and A E Taylor from A.E.R.E. ; B D Jones and J Malos from Bristol ; A Astbury, N H Lipman and T G Walker from the Rutherford Laboratory), used the N2 beam line on Nimrod. This article, written for the non-specialist, gives the general story of the importance of the experiment.

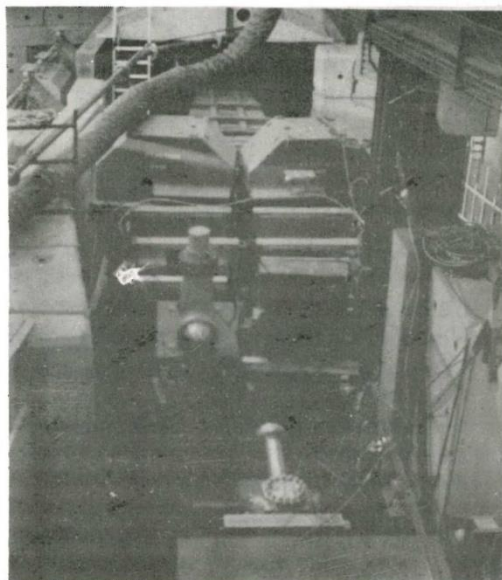
The 12th International Conference on High Energy Physics was held in August, 1964, at the Dubna Laboratory near Moscow. Among the work reported at the Conference was a result from a team of physicists from Princeton University in the U.S.A. who had used the 33 GeV proton accelerator at Brookhaven Laboratory, New York for an experiment on "elementary" particles called neutral K mesons. They announced that in 23 thousand decay events they had seen 45 of the type where the K meson known as the K_2^0 (k zero two), changes into two lighter particles called π mesons or pions. This news caused great excitement at the Conference and the "decay" $K_2^0 \rightarrow \pi^+ + \pi^-$ is now absorbing the time and energy of many theoretical and experimental physicists.

The reason for the excitement is that the decay is against the law. It violates one of the accepted laws governing elementary particle behaviour.

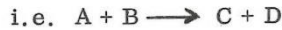
CP Invariance

Since the beginning of this century the constitution of the atom has been established as a tiny core or nucleus with a cloud of electrons around it. By now, the nucleus itself has been analysed and experiments have revealed the existence of so-called elementary particles other than the protons and neutrons which make up the nucleus. These particles are transient forms of matter created when the nucleus is subjected to bombardment by high energy particles and over a hundred separately identifiable "elementary" particles have been listed. From the mathematical formulation of the elementary particle world there arises a series of "quantum numbers", such as mass, charge, spin, parity, strangeness and when values are assigned to each of these quantum numbers, e.g. charge = +1, spin = $\frac{1}{2}$, parity = + 1, etc a particle is completely described.

The N2 beam line in its concrete shielding channel. The large vacuum tank in which the observed 'forbidden' decays occur is in the top centre of the photograph with the large bending magnets and the spark chambers on either side of it moving down the picture.



When elementary particles interact with one another they are assumed to do so in accordance with certain invariance laws involving their quantum numbers. For example, the strangeness quantum number is always conserved in interactions involving the strong force (referred to below). Thus if A undergoes a strong interaction with B to give C and D,



adding the strangeness quantum numbers on the left and the right hand side of the equation will give the same answer.

To attempt an analogy from the everyday world, let us consider that animals are our elementary particles. We associate with them a list of quantum numbers such as, mass, legs, eyes, tail If then we wish to describe a manx cat we would write down the observed quantum numbers such as legs = +4, eyes = +2, tail = 0 If two animals interact say a cat (legs = +4) and a human (legs = +2) so that their component parts are mixed we would still expect, no matter what strange objects resulted, that when the legs were counted, we would get legs = +6.

It is an "invariance" rule of this type that is broken by the two pion decay of the K_2^0 . The rule is known as CP invariance ("C" for charge and "P" for parity). It effectively means that all the known laws of physics should still apply if every particle is changed for its antiparticle (changing C) while the experiments are carried out in a mirror image world (changing P). The quantity CP was assumed to be conserved in all interactions. The K_2^0 has CP = -1 and normally decays into three pions, which also have CP = -1. The observation of the rare decay into two pions violates the law because the two pions have CP = +1.

Not Bard is it ?

CP or not CP: that is the question!
 Whether 'tis nobler in the mind to suffer,
 The slings and arrows of outrageous
 theoreticians,
 Or to take arms against a CP non-
 conservation,
 And by opposing disprove it ?

Time reversal

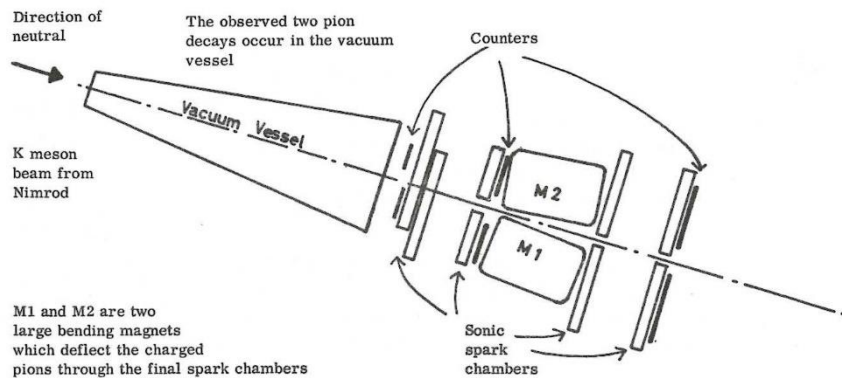
The news from America did more than shake the belief in CP invariance, it also threw doubt on time reversibility. This is because the invariance of the quantity CPT (T for time) is even dearer to the hearts of elementary particle physicists (and more essential to their theories). Even though CP may have broken down, CPT is still regarded as invariant. Therefore if CP is wrong, T is wrong, so that taking the two wrongs together will make CPT right. The breakdown of time reversibility would mean that if we could run time backwards, the same sequence of events would not happen in reverse. To return to our $A + B \rightarrow C + D$, if we could bring C and D together in the opposite way to that in which they were formed, the result would not necessarily be A and B. Another way of thinking about the meaning of time reversal breakdown is to imagine that a cine-film is taken of the interaction. Running the film backwards, in effect, need not show the same events in reverse.

Fifth Force

In view of these disastrous effects on prevailing ideas, attempts have been made to find a way out of the apparent CP violation. One way out was via an imaginative suggestion that a hitherto unidentified force was affecting the experiment. This idea came independently from a group of theoreticians, J Bernstein, N Cabibbo and T D Lee, at present working at CERN, the accelerator centre in Geneva, and from two British scientists, J S Bell (CERN) and J K Perring (A. E. R. E.), temporarily working at Stanford in the U. S. A.

Four types of force are known to operate in our universe. They are called strong, electromagnetic, weak and gravitational. Strong forces operate to bind the nucleus together. Electromagnetic forces act between charged particles. Weak forces control the decay of particles such as the K_2^0 , and gravitational forces are the familiar cause of the apple landing on Newton's head. To give an indication of scale, the "weak" force is a hundred million, million, million, million times stronger than the gravitational force.

The possibility of a new force, the "fifth force", was suggested as an agency changing the K_2^0 into a related type of neutral K meson, the K_1^0 , which can decay into two pions without violating the CP rule. Thus the observed decay into two pions would not come from the K_2^0 but from the K_1^0 into



which the K_2^0 had been changed by the fifth force, and CP would be preserved. The force would be on a galactic scale and would achieve the transformation of the K_2^0 by its property of acting differently on particles and antiparticles. The strength of the fifth force would be about ten thousand million times weaker than the gravitational force. This fifth force is easily tested since it should vary as the square of the energy of the K meson; doubling the energy of the K_2^0 should then result in four times the number of two pion decays.

The recent results

The American team are busy amplifying their initial startling results and meanwhile two teams (one at CERN in addition to the team at the Rutherford Laboratory) have published preliminary results from their own experiments on this topic. The CERN and Rutherford Laboratory results are in agreement; they confirm the apparent CP violation and they reject the possibility of a fifth force.

The RHEL team use a beam of neutral K mesons produced when the 7 GeV proton beam from NIMROD, collides with a copper target. The K meson beam enters a vacuum tank and some of the decays into two pions in the tank can be detected and identified by the use of

counters, spark chambers and magnets.

From 80,000 pulses of particles from NIMROD, 54 observations were made which fitted the K_2^0 decay into two pions. If the fifth force had existed, six times this number of decays should have been seen, comparing the energy of the K mesons from NIMROD with those used in the American experiment. The conclusion is that a fifth force of the form suggested does not exist.

With this result behind them, the team will take their investigation further when Nimrod is in operation again, by using a range of energies within their own experiment to try to discover whether there is a previously unknown particle with virtually the same mass as the K_2^0 which is producing the two pions. This would be another possible way out of CP violation but it is thought to be rather unlikely.

Ominously, it begins to look as if the theoretical physicists will have to accept that an event has been found in nature which goes against the law. In the light of the new knowledge, many arduous hours of reorganising their mathematics and their thinking about the basic laws controlling the behaviour of matter, seem to be in store.

THE Accelerator WORLD

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

"One second-hand but fully functioning atom-smasher for only \$100,000".

Under this heading the University of Chicago advertised their bargain offer of the 100 MeV betatron. This 200 ton electron accelerator cost \$450,000 to build and would cost \$1,000,000 to duplicate now. It had been used by such famous scientists as Dr. Enrico Fermi but it was superseded by a higher energy synchrocyclotron and put up for sale in 1959.

There are no takers. The machine has been dismantled and bits and pieces have gone to a variety of other laboratories.

The South African Atomic Energy Board reports that a 3 MeV Van de Graaff machine supplied by H.V.E.C. in 1962 is now fully operational at Pelindaba. A 5.5 MeV Van de Graaff, at the S.A. Southern Universities Nuclear Institute, and a 16 MeV cyclotron, at the Council for Scientific and Industrial Research, are already in operation. The new accelerator provides a more stable beam, of higher intensity, than the other two machines.

The Board also has a high flux research reactor to provide a wide range of neutron energies under construction at Pelindaba. These facilities will be available to South African Universities for pure research.

QUOTES

Engineers face realities, whereas, scientists practise a kind of escapism, earning an easy living by flying off at a tangent as soon as they come up against a really difficult problem. The engineer must pursue his objective relentlessly to a logical conclusion, on a limited budget and in a limited time.

It is not particularly brilliant to spend a great deal of time and money chasing useless knowledge under the pretext that some day it might be useful. On the other hand, it takes a brilliant man, an engineer, to design and make a new engine which is more powerful, quieter, cheaper and better looking than previous engines.

H R Heap, Group Editor "Engineering News" in a letter to "The Chartered Mechanical Engineer" March, 1965.

But in different sectors of science the period from discovery to fruition differs widely. The lady of the old story of Benjamin Franklin was right to ask about the use of his new discovery and he was right to emphasize the time-scale to maturity. You will remember that the lady, on being shown the demonstration of a new effect in pure science, asked: 'But Professor Franklin, what's the use of it?', and Franklin replied: 'Madam, what is the use of a new-born baby?'

Professor Powell
'The Role of Pure Science
in European Civilisation'
Speech at CERN, 10 October 1964.

"The propaganda on behalf of activity which is essentially scientific investigation is a game (talent, time and money) but to solve problems, whose main Prestige and, related to it, drive offer to society in exchange for

"The Mohole Scandal"
Jeremy R. Ravat, Guardian 2

The Rutherford Laboratory Library are engaged on a recall exercise for books which have been out on loan for long periods. Accompanying their recall of H. Cotton "Electrical Technology" which had been out for over two years was a note, "We wish to bring the book up-to-date as Faraday and Kirchoff have made some wonderful new discoveries

Letters to the Editor

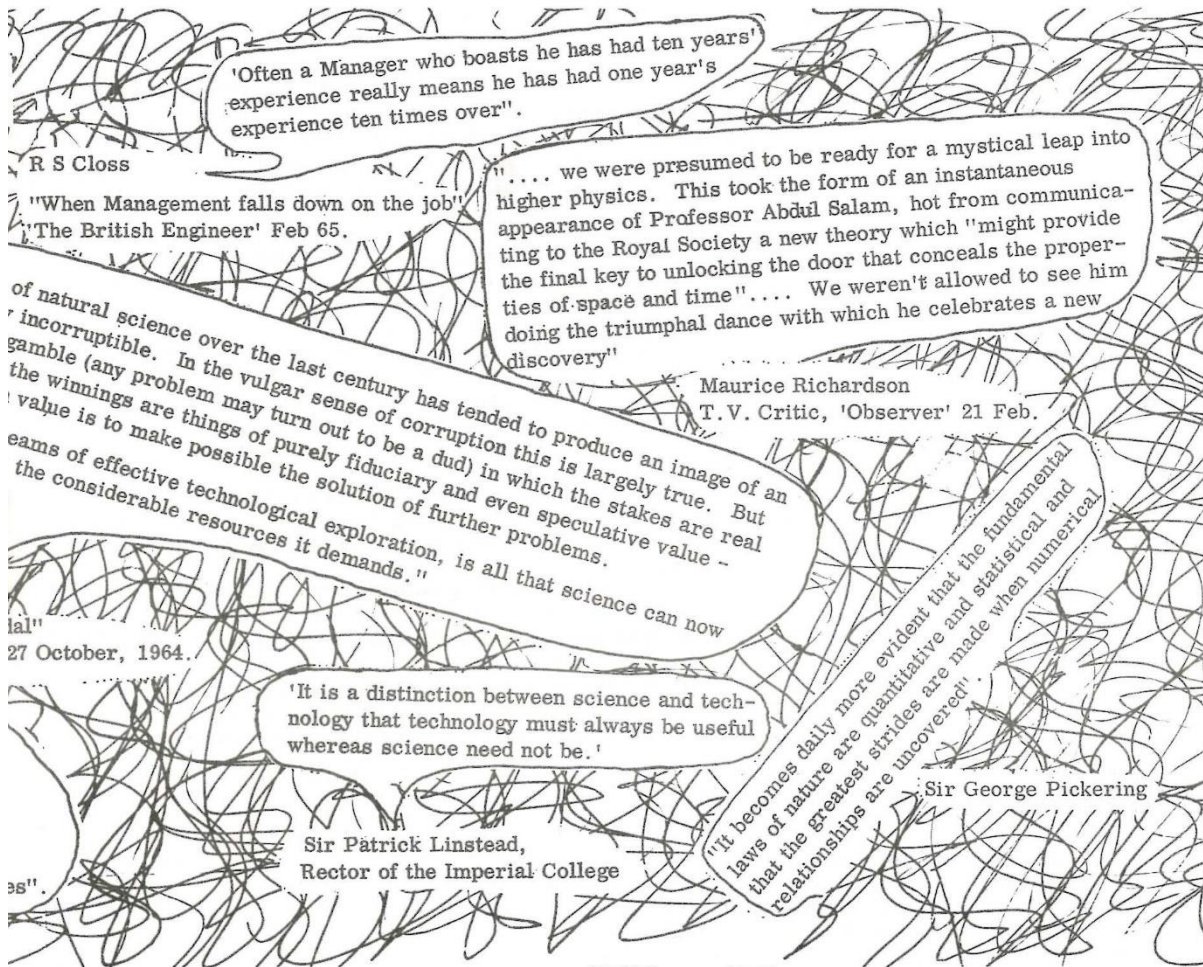
(Pseudonyms are accepted provided the author's name is known to the Editor.)



Sir,

I have just heard that Lord Snow has informed the House of Lords that the Government will propose an amendment to the Science and Technology Bill to permit future recruits to S.R.C. establishments now under N.I.R.N.S. to obtain N.I.R.N.S. conditions of service. I would like to offer my congratulations to all those who have helped to persuade the Government to adopt this course, and particularly to Alec Spurway and his Staff Side colleagues. Without their determination and resourcefulness this might never have been achieved.

T.R. Walsh



Sir,

It is a pity that your journal seems so willing to join with those who sacrifice good taste with alacrity in their desire to achieve popularity and success.

After reading the parody on the 23rd Psalm I am tempted to assume that your slogan must be "not so much a journal, more a nasty smear".

However, with so much to admire in the February issue I prefer to think that the publication of this "poem" was an isolated error and that to some extent can be excused in the turmoil of S.R.C. developments, alternators and other excitements.

There is, however, much at stake just now and I would like to remind you that the price of reputation is eternal vigilance - or in the modern idiom - watch it!

E. G. Higgins

The 'poem' was intended for amusement only. We apologise to anyone who found it in any way offensive.

Ed.

SRC Members

The Science Research Council comes into being on 1 April 1965 and the National Institute for Research in Nuclear Science is disbanded. The membership of the Council was announced by Mr. Anthony Crosland, Secretary of State for Education and Science, on 4 February.

Sir Harry Melville, who has been secretary to the DSIR since 1956, is chairman and the other members are as follows :-
Lord Halsbury, formerly managing director of the NRDC, chairman of the Science Museum Advisory Council ;
Dr A Caress, director of research at ICI ;
Dr D G Christopherson, formerly professor at Imperial College, London, vice chancellor of Durham University ;
Dr S C Curran, a former chief scientist at AWRE, vice-chancellor of University of Strathclyde, Glasgow ;
Professor G C Drew, professor of psychology at University College London ;
Professor M R Gavin, professor of electronic engineering at University College of North Wales ;
Professor Sir Ewart Jones, professor of chemistry at Oxford University ;
Professor Sir Bernard Lovell, professor of radio astronomy at Manchester University ;
Professor K Mather, professor of genetics at Birmingham University, vice-chancellor elect of Southampton University ;
Professor C F Powell, professor of physics at Bristol University ;
Professor J E Smith, professor of zoology at Queen Mary College, London, director elect of the Marine Laboratory at Plymouth.

U Twelve Twiddle

On 20 January Professor Abdus Salam, Professor of Theoretical Physics at Imperial College London, propounded a more comprehensive theory of elementary particles than any previously developed. He was addressing a small gathering of theoretical physicists at the University of Miami and was so excited while delivering the theory that he filled two large blackboards twelve times over in forty-five minutes. The chairman, Dr. J.R. Oppenheimer had to appeal to him to slow down.

The reason for his enthusiasm is that the new theory $\tilde{U}(12)$, or U-twelve-twiddle, brings together in the same mathematics the successful unitary symmetry theory, $SU(3)$, which predicted the famous Ω^- particle, and the requirements of the special theory of relativity. $SU(3)$ involved the properties of isotopic spin and hypercharge in its ordering of elementary particles into groups. A later development, $SU(6)$ (from Radicati (Italy) and Gursey (Turkey) working at Brookhaven, and independently from Sakita (Japan) at Argonne) included particle spin and ordered the particles into super-multiplets of 35 and 56. $\tilde{U}(12)$ absorbs the previous theories and takes account for the first time of the enormous speeds experienced by elementary particles where relativistic effects must be operating.

Work on the theory was done at I.C.L. and finished at the International Atomic Energy Agency's theoretical physics institute in Trieste. Professor Salam's collaborators were Dr. J. Strathdee and Dr. R. Delbourgo. It was Dr. Delbourgo who resolved a frustrating period, when the required answers seemed very near but would not fall into place, by finding a simple mistake - a plus sign instead of a minus. Work is now underway on the predictions of $\tilde{U}(12)$. It is regarded as a more intellectually satisfying theory than any previously developed, since it takes into its mathematics more of the features of the world of elementary particles.



Professor Abdus Salam

The Fate of One-Eyed Pete

In spite of all the safety drives,
The country still is losing lives,
And men get injured every day
Because the rules they wont obey
Before YOU find that it's too late
Take note of how Pete met his fate.



"Goggles must be worn", it said,
In one inch letters bold and red.
But Pete this notice disregarded,
Leaving face and eyes unguarded.
The grindstone broke and burst as under,
They now call Pete, 'The One-Eyed Wonder'.

Pete was falling through the air,
To break his bones he knew not where,
Or land maybe upon his head
And spend a long long time in bed.
He said much later, "I've just felt,
I should have worn a safety belt".



As he was strolling round the site,
A hammer from aloft took flight.
From quite a height and with great force,
It landed on his head, of course.
Instead of round, his head is flat,
He wished he'd worn his safety hat.



One day, Pete lifted from a truck
A heavy drum, but poor Pete's luck -
The large drum slipped; he moved too late,
His toes now number only eight.
A pity two he had to lose
'Cos he forgot his safety shoes.



A warning notice, White on Red -
"Danger, Hydrogen" it said,
"No smoking, sparks or naked flames".
Said Pete, "I think they're playing games".
He filled his pipe and struck a light,
And flew in pieces round the site.



The moral of this little rhyme
Is 'Always think of things in time'.
So please, don't hesitate to ask,
Before you start a dodgy task.
Just watch your step and use your head
'Cos brother you're a long time dead.



RIFI

(R1 Faces Inquiry on Financial Incident)

Slim, 'the Meson', Jackson walks down a back street in Abingdon and knocks three times on the back door of a decrepit garage. After scrutiny, he is admitted and makes his way to a room where a small group of men are seated round a table. A fat man at one end of the table looks annoyed.

"You're late Meson. Where have you been - you know I don't tolerate people who are late for meetings! We have a job to organise and we're all busy men. Let's start gentlemen."

"Hold it Boss! I'm sorry I'm late but I've been out to that Rutherford Lab. place at Chilton and I'd like to propose a change in our schedule for phase five. I think I've come up with a handy little job that we could fit in without too much reorganisation."

"Change the schedule! This had better be good Meson for your sake."

Slim throws a piece of paper onto the table. The Boss takes his cigar out of his mouth and reads.

"Rutherford Laboratory Notice No. 151 Lunch Time Banking Facilities Every Wednesday Lloyds Bank Ltd. will offer cheque cashing facilities in the Cash Office, Building R20, from 12.15 p.m. to 1.45 p.m."

"Get it Boss? They can't cash cheques without cash and this tells us where the cash will be and exactly what time to get it."

"Yes, yes, Meson, we can all see that! I have two comments on this proposal. First how much are we likely to get? Anything less than ten grand isn't worth our attention, in my view. As you know I've nothing against payroll jobs - in fact I have some proposals of my own for a major operation at Fords or one of the B.M.C. factories. Now there's a payroll for you! But this obscure scientific place, it doesn't seem promising to me. The second thing is"

"Boss, Boss what about - um- da- da, how like we get da stuff away like er- da-da, get-away wid da wire?"

"Exactly Mangler! Sometimes you show signs of actual intelligence. As Mangler has so eloquently expressed it, the main difficulty with this proposal is a smooth getaway. These places have high security fences and no doubt

the Cash Office is in the middle of the site - too far for tunnelling?"

Mangler beams a happy, broken tooth smile at this high praise and looks in triumph at Slim.

"That's one of the advantages of this job Boss - this Rutherford place is an open site. All they have is a four foot high fence - we could jump over it! And that's not all. The cash office is a prefabricated wooden hut - we could get in with a fretsaw! There's no security check at the gate - if you have a yellow sticker on your car nobody takes any notice of you. Now I think there will be ten grand there for the taking. If we time the job right that is. You see these scientists have been given a pay rise back dated a year, so if we time the operation right we can take advantage of the fat pay cheques."

"Yes, but you still haven't solved the getaway problem. How far is it from the Cash Office to the main gate?"

"About a quarter of a mile Boss".

"Say Boss, if I toon up the noo Galaxie I guess we could make that gate in ten seconds."

"Too slow Yank. We must assume some rudimentary warning system and if that gate is closed on your way out it could be very embarrassing. This is a small job - it isn't worth a high risk."

Mangler erupts.

"Boss, boss we could da-da, put some like steel girders on a truck line an'-da I could drive right through dat fence - wham, bang - like!"

"Your earlier mental efforts have overtaxed your tiny brain Mangler. What you propose is far too crude. But the problem intrigues me. Here is a possible solution."

Ten minutes of lucid exposition leave the team breathless with admiration. Slim speaks for them all.

"So simple! It's genius Boss."

"Not bad Meson. It's an old trick but it should work. Now Mangler can get the fork lift truck and furniture van, Yank can deal with the modifications to the Cash Office, and I leave the detailed planning to you Meson. Meeting adjourned gentlemen."

NATIONAL INSTITUTE FOR RESEARCH IN NUCLEAR SCIENCERUTHERFORD LABORATORY NOTICE NO. 151Lunch Time Banking Facilities at the Rutherford Laboratory

Every Wednesday, starting on the 10th February, Lloyds Bank Ltd., Harwell Branch, will offer cheque cashing facilities etc. in the Cash Office, Building R.20, from 12.15 p.m. to 1.45 p.m.

For the next few days the team take up position on the Ridgeway and keep the Rutherford Laboratory under close surveillance through powerful binoculars.

"Say Meson this is great! They have furniture vans in there every day - ours won't register. But what the heck do they do with all that furniture?"

"You don't know these people, Yank. Furniture is very important to them - it's a major activity shifting it about - every time a man gets promoted he gets a new set of furniture. But what about the modifications to the Cash Office?"

"No problem. I built some of these Terrapin huts once and the inside walls are fibre board with tape stuck over the joints. I'm gonna get some of that tape for the walls. I'll go in there tomorrow with the miniature colour camera and photograph the lino - we'll match it up exactly. Then there's the electrical wiring, but I guess we can cut that and reconnect with plugs and sockets. Just one thing bothers me. We go in and do all this work to set the job up and no guy comes along and asks us what the hell we think we're doing?"

"It's a risk Yank, but not so big as you might think. In these Government establishments the left hand never knows what the right hand is doing. Each Division assumes that the work is for some other Division and liason between them is so bad that nobody finds out what's really going on. Look at that building number R25 for instance. Right alongside is a new Terrapin just being finished. I'll bet not more than six people in the whole place know what that's really for. If any questions are asked we just say that Admin. have asked for the jobs to be done."

The following week-end the team drive in through the Main Gate and enter the Cash Office with a skeleton key. Yank gets out his powerful electric band saw and makes a cut through the walls, ceiling and floor of the Office. Mangler climbs on the roof and covers the outside with a strip of roofing felt. Slim covers the cut in the walls with the jointing tape and lays the carefully matched lino over the cut in the floor. At the same time Yank cuts all the electrical service cables and joins them up again with plugs and sockets. After two hours work they drive out with a friendly wave to the gate keeper.

On the last Wednesday of the month at 12.10, a large furniture van driven by Yank draws up outside building R20. Nearby a powerful fork-lift truck, driven by Mangler, is trundling about. At 12.45, Slim enters the Cash Office to cash a cheque and transmits a radio signal to Mangler who is wearing earphones under his balaclava helmet. The fork-lift advances and lifts the Cash Office off the ground, reversing swiftly into the furniture van. As the doors of the van close, gas is released from special cylinders and everyone inside collapses except Slim and Mangler who have quickly put on gas masks.

Five hours later the Cash Office is found abandoned up a side road in East Hendred with everything intact except £10,000 in used notes.

Three weeks later, on a beach in the south of France, Mangler releases his bikinied blonde and turns to Slim with a baffled expression.

"Slim-da-er- Why do day call you like -er-dat funny name, like -er- 'Meson'? Why do day call you Meson?"

"It's my real name - my father was a high energy physicist."

Orbiting Around

Editor: H F Norris
Building R20, Ext. 484.

Table Tennis

About nine weeks ago a few people from R. 25 used some scrap wood to make a table tennis table for a lunchtime game. The number of people using the table soon rose to ten, at that time all from R25. Sixpence a week goes to the cost of a net, bats and balls, and ny now people from R1 and R9 have been invited to join in. The numbers are growing too high to be accomodated on the one table for the short time it is possible to use it, and the materials to make another table are badly needed. Another big stumbling block at present is finding room to put the tables up during the lunchtime. A space in R25 is barely adequate for the one table in use and the management has been approached to learn whether there is usable space anywhere on the site.

Two friendly matches have been played - one at Purley and one at Faringdon. We lost the first and won the second. Two other games, one at the A.E.R.E. Club against a side made up of Rutherford Laboratory personnel who have played for A.E.R.E. this season, are being planned. We hope that by next winter we will be able to invite teams to play here at the Laboratory.

A committee has been formed and the members are Terry Crago as Chairman, Keith Sinclair as Secretary and Denys Hutchings as Treasurer. Anyone interested in playing table tennis is invited to forward their name to Keith Sinclair who will then have an indication of the extent of interest in the Laboratory to present in any discussion about providing facilities. D. A. H.

Darts

Two teams, both from R18, were entered in the A.E.R.E. six-a-side knock out competition on 12 March. The 'A' Team, Eric Kirby (Captain), Bill Almond, Bob Green, Bert McGrath, Mick Hecken and Brian Prior were eliminated in the first round but the 'B' Team, Ernie Boyers (Captain), Frank Wright, Les Patton, Bernard Keen, Jim Lawler and Jim Knight struggled through to the second round before being eliminated.

The Annual Darts Competition for teams of four will be starting in April. If you wish to enter a team please contact Bernard Keen, R18 as soon as possible.

Record Programmes

Programmes will be held every Tuesday in April
at 12.30 p. m. in the Lecture Theatre.

- 6 April: Sibelius, "Symphony No. 2"
(All the Sibelius symphonies will be
played over the next seven months)
- 13 April: Easter Programme
Bach, "St. John Passion" Opening Chorus
Handel, Easter music from "Messiah"
- 20 April: Rimsky Korsakov, "Scheherezade"
- 27 April: Jazz Piano
Music from Jelly Roll Morton
James P. Johnson and Errol Garner

Exchange with Russia

In May, 1961 the U.K. Atomic Energy Authority signed a collaboration agreement with the Soviet Committee for the Utilisation of Atomic Energy. Stemming from this agreement, arrangements have been made for the exchange of scientists, working in the same field, for periods of six months.

The first exchanges were announced on 8 March. Mr D A Suchkov from the Institute of Theoretical and Experimental Physics in Moscow arrived at the Rutherford Laboratory in March and will work on spark chamber investigations. Dr P J Duke (photograph) left the Laboratory at the end of March to work on elementary particle physics at the Institute. Phil Duke's wife has gone with him to Moscow.

A similar exchange took place between Mr V V Chechkin of the Physico-Technical Institute at Kharkov and Dr G Rowlands from the Culham Laboratory.

To America

When Ted Harrison said "We've got a chance to go to America for a year, do we go?", his family voted, "We go!" Together with his wife and two children left in the S.S. United States on 20 March.

Ted has been awarded a Senior Associateship by the National Academy of Sciences in Washington and will take up his appointment at the Goddard Space Flight Center, Greenbelt, Maryland, Washington.

Asked what he was going to do at Goddard, Ted said "I shall work on gravitational collapse, and also pursue a particular line in cosmology which I think looks promising".

Harold Wroe, from Nimrod General Physics Group, leaves for America on 1 April. He will spend a year at the Brookhaven National Laboratory, Long Island New York as a member of the 33 GeV Proton Synchrotron Group. Harold will be engaged on ion source work similar to the work he has been doing at the Rutherford Laboratory.

Harold's wife and two boys are going with him. He will be missed by ORBIT in particular, since he has been the source of most of our humorous fiction stories. However, we now hope for a regular "Letter from America".



Blood Donors

The next Blood Donor Session will be held on Monday, 12 April in the Main Conference Room, Building R1. Intending donors should contact Mrs M Roberts, Admin. Office, Building R12, Ext. 441.



Comings and Goings

S A Brook, T Rennie, Miss A Morris and L R Tombs join Central Engineering; A Groves and A Reynolds join PLA Engineering.

P J S Ritchie, A Smith and E W Sims join Nimrod HEP Engineering; J R Forret, W F E Axton, M E Weavers and C Welch join Nimrod Machine Engineering.

R Burton and P O Carolan join Bubble Chamber Group; Miss S M Hitchman joins Personnel Group.

M J Barton has returned from unpaid leave and is attached to Nimrod General Physics.

The following people have joined us as College-based Dip. Tech. students:

D J Browning joins HEP Counters Group; D B Field joins Nimrod Beams Physics Group; T N Jones joins HEP Bubble Chamber and Emulsion Group; P Webster joins Nimrod Machine Engineering Group.

M E Sproul, D H Carpenter, L R Fell, J B Long, R O'Toole, E J Honey and H L Talbot have left us.

Congratulations to

Alec Spurway, High Magnetic Fields Group, and his wife Doreen, on the birth of a son, John William, on 5 February.

Vic Cloke, Nimrod Machine Engineering Group, and his wife Maureen on the birth of a daughter, Alison, on 16 February.

Malcolm Mitchell, Theoretical Studies Group, and his wife Jean, on the birth of a daughter, Susan Alice, on 23 February.

Gill Belton, Atlas Laboratory, on her marriage to John Keats of A.E.R.E. on 27 February.

Pam House, Administration P.L.A., on her marriage to Alan Brener of Research Reactor Group, A.E.R.E., on 27 February.

Andy Jackson, Atlas Laboratory, on his marriage to Miss Yoland Lovegrove on 6 March.

Nick Blowers, Electrical Services, and his wife Vera on the birth of a son, Clive, on 9 March.

Jo Hughes, Atlas Laboratory, and John Turner, Nimrod Beam Physics Group, on their marriage on 13 March.

Suggestion Awards

At the twenty-fourth meeting of the Rutherford Laboratory Suggestion Awards Committee held on 16 February, the following awards were made:

£2 Interim Award to D A Hutchings for his proposed pole piece removal equipment for use on the Nimrod magnets. This proposal is being investigated further.

£1 10s 0d to R J Homer and A W O'Dell, whose suggestion brought attention to a minor safety hazard in the Nimrod tunnel 3B.

Encouragement awards of £1 were made to M Kershaw and C Wallis.

B Briscoe, Secretary.