20th Issue

ORBIT

February 1964

The Journal of the Rutherford High Energy Laboratory

The Background to Elementary Particle Physics

Next month we hope to start a series of articles on Elementary Particle Physics. To set the scene, this article puts our work in the context of physics as a whole at the present time.

P F Smith

The Problem of a Unified Theory

The ultimate objective of physics is to discover a unified theory to cover all physical phenomena. In this article we shall summarise some of the attempts which have been and are being made to derive this theory.

At the present time we can conveniently group all phenomena under six headings :-

1. Electrodynamics : electric and magnetic forces, electromagnetic waves.....
2. Quantum effects : wave-particle dualism, wave equations and probability interpretation, uncertainty principle, zero-point energy,.....
3. Elementary particles : electrons, nucleons, unstable particles, excited states, and resonances; antiparticles; discrete values of mass, charge, spin; 'weak' and 'strong' interactions,.....
4. Special relativity : constancy of the velocity of light; equivalence of mass and energy ; velocity-dependent clock rates,.....
5. Gravitation : origin and strength of gravitational interaction; inertial and gravitational mass; general relativity; clock rates dependent on gravitational potential,.....
6. Cosmology : 'size' and 'age' of universe; apparent expansion; apparent numerical relationship between cosmic and nuclear constants,.....

THE BACKGROUND TO ELEMENTARY PARTICLE PHYSICS - cont'd

Essentially, all observations on physics can be described in terms of the phenomena summarised in this list. The problem is to find a single theory which will account for all the observations using as few basic assumptions as possible.

The First Attempts

The first serious attempts to achieve a 'unified theory' began early in the 19th century, when there existed a limited knowledge of phenomena in groups 1 and 5 only, together with some knowledge of the properties of matter in bulk. The idea was that all space was occupied by an 'aether' which could be regarded as having properties similar to those of an elastic material. It provides a medium for the transmission of electromagnetic waves and stresses in the aether would account for electric, magnetic and gravitational fields. Towards the end of the century, after the discovery of the electron, it was suggested that all matter could be electrical in origin and might consist of fluid-like vortices in the aether. These problems were analysed by most of the famous mathematicians of the 19th century but, although as a result many advances were made in mathematical technique and in the theory of elasticity, very little real progress was made towards a satisfactory theory of this hypothetical aether.

Because of this and because experiments which were designed to detect motion through the aether gave negative results, the aether concept was temporarily abandoned. Instead, physicists and mathematicians turned hopefully to Einstein's general relativity theory as a new basis from which to develop a unified theory. The viewpoint was that we should not try to visualise phenomena as mechanical processes in an absolute space and time; it is sufficient to work purely mathematically and to look for basic equations whose solutions can be used to predict physical observations. This technique was not completely new, of course, as already physicists were accustomed to using, for example, Maxwell's equations to calculate electromagnetic effects without having to worry about the nature of electrons or electric fields.

General relativity accounted for gravitational effects in terms of the geometric properties of a combined 'space-time continuum'. The theory was difficult mathematically (in fact it was incomprehensible to most people), but it was successful in calculating some observed effects. Mathematicians then tried to extend the theory to unify electrodynamics, gravitation, and cosmology. But little progress was made, mainly because of the enormous disparity between the strength of electric and gravitational forces (a factor of about 10^{40}); furthermore the carrier of positive charge had now been identified as the proton, and there was justifiable pessimism about the ability of any theory of this type to account for the large proton-electron mass ratio.

Elementary Particles

The situation became still more complicated with the discovery of the wave properties of elementary particles, giving rise to the development of quantum theory and with the discovery that there exists, in addition to the proton and the electron, a whole range of unstable particles (and antiparticles) whose interactions seem quite different in character from those due to gravitational and electromagnetic forces. About this time (1920-1950) the search for a unified theory was temporarily discontinued while theoreticians tried to simplify the chaos of new observations. Referring again to our first list, observed phenomena were regrouped into three distinct categories:

Quantum electrodynamics: a combination of groups 1, 2, and 4.

Elementary particle theory: an attempt to understand group 3 and combine it with 2.

Cosmology: an attempt to combine groups 4, 5, and 6, on the basis of general relativity.

Considerable progress has been made with quantum electrodynamics, although it is now accepted that the continual appearance of infinite quantities in the theory means that something is wrong in detail with either quantum theory or special relativity. Much less headway has been made with elementary particle theory, partly because of the complexity of the observed phenomena but mainly because no one has produced a convincing basic idea to provide a foundation for the theory. Cosmology, of course, is severely hampered by observational difficulties and uncertainties. But now that we have a more complete experimental picture of fundamental phenomena, new attempts to produce a unified theory are being made. It is evident that all of the items on our original list can be regarded as different aspects of the behaviour of elementary particles, either as individuals or (in the case of gravitation and cosmology) in large numbers. A current viewpoint is, therefore, that by 'unified theory' we now mean a complete theory of elementary particles and their different types of interaction.

Theories of Elementary Particles

Although as yet, relatively few people are working seriously on this problem, at least three distinct approaches are being explored.

One of these approaches (by Heisenberg and others) is a more elaborate continuation of the

THE BACKGROUND TO ELEMENTARY PARTICLE PHYSICS – cont'd

attempt to describe everything as solutions of a fundamental set of differential equations. Another approach (by Chew and others) dispenses with the controversial use of space and time co-ordinates and uses only directly measured quantities such as momentum and energy; in place of the differential equations one attempts to derive a self-consistent infinite matrix governing all possible interactions. A third approach attempts first to describe elementary particles as complex structures built up of a few simpler units and then to explain the latter as excited states in a substratum, analogous to the classical aether. Various versions of this idea have been advocated by Sakata and other Japanese theorists, by a group which includes Bohm, Vigier and de Broglie, by Dirac and by several others.

There is no space here to enlarge upon these ideas except to remark that they are all in a very early stage of development, and are all hindered by excessive mathematical complexity. We must mention, however, an important argument in favour of the third approach; with the discovery of numerous 'excited states' of particles and 'resonances' in their interactions, elementary particle physics is looking increasingly like atomic and nuclear spectroscopy. Since the atom and nucleus were both eventually recognised to be complex structures of simpler particles, there seems a strong possibility that the elementary particle problem may have a solution which is in some ways similar. This idea can account qualitatively for most features of particle behaviour but there are a number of differences which prevent a direct extension of, for example, the 'shell model' of atoms and nuclei to elementary particles.

Even if this approach is successful, we cannot expect any immediate accurate predictions of particle masses and properties. The calculation of the properties of a many electron atom is still mathematically difficult, even though the fundamental wave equation for electrons is known, and we can expect that the computational problems in the elementary particle case will be very much greater. For this reason, those experiments in high energy physics which measure the details of interactions between particles are not of great value to fundamental physics in its present state; they simply demonstrate repeatedly that nucleons and mesons are very complicated things. Only when some theoretical progress has been made on the origin and structure of elementary particles will these measurements begin to have real significance.

The Future

Fundamental physics has been repeatedly successful in expressing complex systems in terms of more elementary and more microscopic concepts. Matter was analysed into elements, elements into atoms, atoms into elementary particles and now we have seen that there is a growing belief that the latter will lead us to a still more microscopic level of phenomena. This obviously raises difficulties from a philosophical viewpoint, for while we continue to think in the same manner there appears to be no limit to this process. The Japanese theorists accept this as a valid possibility but many other people believe that we must eventually give up our traditional description of events happening 'in space' in favour of some, as yet, unspecified alternative. A famous attempt to do this was that of Eddington who believed he could calculate all the pure numbers of physics (proton-electron mass ratio, fine structure constant, etc.) from an abstract symbolic theory. Although he obtained good agreement with numbers measured up to the time of his death (1944), his theory never gained acceptance and did not predict the new particles which have been observed since. At some future date we may well see a revival of ideas similar to Eddington's but for the present there is no reason to suppose that the concept of a real physical space has outlived its usefulness.

Quotations from the Address to the American National Academy of Sciences by President Kennedy on 22 October 1963.

'. . . . the vitality of a scientific community springs from its passion to answer science's most fundamental questions.'

'I know of few significant questions of public policy which can safely be confided to computers.'

'. . . . the great French Marshal Lyautey once said to his gardener, "Plant a tree tomorrow." And the gardener said, "It won't bear fruit for a hundred years." "In that case," said Lyautey, "plant it this afternoon."

That is how I feel about your work.'

The Accelerator World

Storage-ring Model at CERN

Towards the end of December, the electron storage-ring model CESAR (CERN Electron Storage and Accumulation Ring) achieved a circulating beam for the first time. Work with the model is intended to clarify the problems in the design, construction and operation of large proton storage rings such as have been proposed for use with the CERN synchrotron.

The model has a circumference of 24 metres and employs a strong focusing system of 12 bending magnets and 24 quadrupoles. Very high accuracies are needed in positioning the magnets (to 0.1 millimetre) and their power supplies are stable to 1 part in 10,000. The magnetic field in the ring is accurate to 1 part in 1,000. The vacuum pressure is 10^{-8} torr but it is hoped to improve this to below 10^{-9} torr when a faulty section has been replaced.

The energy of the injected particles, from a 2 MeV Van-de-Graff, is increased slightly on each successive pulse so that each pulse of electrons takes up a slightly different orbit in the ring. This process is known as 'stacking'. Early in 1964 the circulating current was increased to 2 mA and was stored for times up to 0.2 second.

(CERN Courier)

Berkeley Bubble Chamber

A new 25 inch hydrogen bubble chamber, which incorporates most of the latest refinements in bubble chamber technology, is being commissioned at the Lawrence Radiation Laboratory, Berkeley. It allows high precision work to be done with a very rapid operating cycle – when fully commissioned it may be capable of operating up to five times in each pulse from the 6.3 GeV Bevatron. This should significantly reduce the time needed to complete a bubble chamber experiment.

The expansion–recompression cycle does not involve the liquid hydrogen flowing in and out of the chamber but is achieved by raising and lowering the top of the chamber, which is also part of the lens system, by a sixteenth of an inch. This allows the high speeds to be achieved and reduces the turbulence which can be caused using the other technique. The complete cycle takes only 10 milliseconds.

The chamber has good thermal efficiency – the liquid hydrogen is very uniform in temperature which give tracks of more uniform density which are much clearer than usual. Individual bubbles can easily be seen and counted. The magnet for the chamber produces a field of 18,500 gauss under normal operation but it has been tested up to 23,000 gauss.

The light source is above the chamber and three stereo cameras are grouped around an efficient mechanical light absorber. When no tracks are present, the light is focused onto the absorber but when tracks are formed the light is scattered and reaches the cameras. The light is scattered through 12° to reach the lenses, whereas the usual angle is 2° to 3°. This larger angle was found to improve the photograph uniformity in depth and avoids the need for individual light sources for each camera. The optics and lighting system is considered to be about ten times more efficient than for similar chambers already in use.

(The Magnet)

Discovery of the Omega Minus

The Ω^- particle, predicted by the theory of unitary symmetry, has been identified from two bubble chamber pictures taken at Brookhaven National Laboratory, U.S.A. A beam of K^- mesons, of momentum 5 GeV/c, from the 33 GeV proton synchrotron were directed at the protons in a hydrogen bubble chamber. A small number of reactions were expected to produce a Ω^- particle and the pictures showed the following event:

$$K^- + p^+ \rightarrow \Omega^- + K_o + K^+$$

The principle of unitary symmetry was put forward by the Japanese physicist Ohnuki in 1960 and was developed by Salam and Ward at Imperial College, London. The Ω^- was predicted independently in 1961 by Gell-mann in the U.S.A. and by Ne'emen, who was then an Israeli military attache working part-time at Imperial College. It emerged as part of a pattern of elementary particles, evolving from the unitary symmetry theory, which puts the unstable particles into either one of three groups of eight particles or in one group of ten. The Ω^- completes the group of ten and gives strong support to the basic principle. The mass of the Ω^- calculated from the bubble chamber tracks is 1685 ± 12 MeV which agrees with the predicted value of 1676.

EDITORIAL

The series of articles on elementary particle physics, which will start in the March issue, is perhaps the most important thing that ORBIT has tried to do. The bigger part of the Laboratory's effort is concerned with the two accelerators. The PLA has been fully operational for some time, with notable success, and Nimrod, now it its final phase of commissioning, is already being used for high energy physics. We have 'crossed the watershed into nuclear physics.' ORBIT would be failing in its aim to reflect the Laboratory's activities if we didn't try to change our emphasis from accelerators and accelerator building onto nuclear physics and the techniques of nuclear physics.

But this change is not easy to make. For most people, talk of the isotopic spin of the antilambda hyperon, even if it does not induce positive hysteria, might just as well be put together by Stanley Unwin. To start with, the ideas are so remote from everyday life. It is not easy to come to terms with theories about things called 'elementary particles' when these things cannot be contacted directly by the five senses at all. This is surely why scientists at the beginning of this century were so reluctant to yield their classical theories to the advances of modern physics. Their world of classical physics, with its apples falling on heads as dictated by well defined rules, must have been very satisfying because their elegant theories described the world around them and they could literally see their laws in action. When things start happening in a millionth of a millionth of a millionth of a second, the mind that is used to dealing in intervals of five-minutes-to-tea-break finds it difficult to take in. We have to accept that we cannot carry over the rules which apply to observations in our everyday world.

A second difficulty is one which occurs whenever a new field of human knowledge is opened up – new properties, new particles are obviously given new names. A new vocabulary grows up and many people who would absorb the ideas are left behind because they cannot speak the language. There is widespread abuse of language in scientific writing but new words aren't necessarily a part of it. A lot of what is criticised as 'jargon' is really only a form of shorthand. If every time we wanted to mention the Π meson we had to say 'the quantum of the nuclear force field' that would be bad enough but even then we have used the word 'quantum', 'nuclear' and 'force field.' It would take a book to say Π meson without using the shorthand which the new words provide.

The articles should serve to familiarise people with the new language and with the new ideas. We ought to acknowledge that, though thoughts on a series of articles have been with us for some time. they were crystallised by a similar venture written by Arthur Rosenfeld in the Journal of the Laurence Radiation Laboratory. Berkeley (The Magnet).

Perhaps the established nuclear physicist will look upon our efforts with the quiet smile of Stanley Mathews watching the boys kick a ball around in the park. But Stanley Mathews is probably aware that if it wasn't for the boys kicking the ball around he would never be able to indulge his skill. We hope that more and more we will be able to persuade the nuclear physicists to write about their work in ORBIT. It is true that writing for our modest pages hardly carries the glory of a thousand words in Phys. Rev. but, when using the Laboratory as a 'service station' (to borrow a phrase from RHELIAN), ORBITmight be one way to acknowledge the pump attendants.

This point is made by Guy Vanderhaeghe, Head of Training and Education Section at CERN, writing about general information lectures in a recent issue of the CERN Courier. 'General Information lectures on important experiments or technological projects at CERN . . . . are given by some of those closely concerned with the projects. They are aimed at a non-scientific audience and intended for the whole of the staff. They provide a good opportunity to the lecturers to repay the debt they owe to all those who have helped, in one way or another, by giving their audience an understanding of the general outlines and enabling them to appreciate the importance of the various experiments.'

We are considering re-styling the ORBIT heading on the front page of the journal. We would like to retain the octant configuration of the ◎, since this is well established by now as a Laboratory symbol, and the layout should also include the issue number, the month of issue and 'The Journal of the Rutherford High Energy Laboratory.' It would be nice if we could also include 'National Institute for Research in Nuclear Science' or even 'NIRNS' somewhere but this may crowd things too much since we cannot allocate much more space than we use now. We will be pleased to receive any sketch layouts that are sent in.

Letters to the Editor

(Pseudonyms are accepted provided the authors name is known to the Editor).

Sir,

The letter from Dr. Willis does not explain why the Charter should have been written in the way it is, if the main reason for setting up the Institute was to serve the Universities. However, argument on this point would clearly be sterile. The main point I was trying to make in my previous letter was that, contrary to established myth, the Charter does not compel us to adopt a "service station" policy; and that the Institute could, if it wished, follow a very different policy. Dr. Willis would appear to agree with this view.

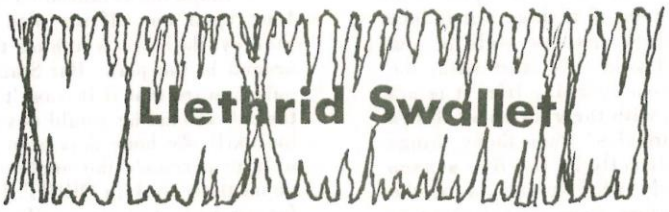
RHELIAN

EDITOR : B. Southworth,
National Institute for Research
in Nuclear Science,
Room 2.2, Building R1,
Rutherford High Energy Laboratory,
Chilton, Didcot, Berks.

Sir,

It occurred to me when reading the letter from anti-nut-case (ESAC-TUN), that anti-NIMROD is DORMIN. DORMIN would, no doubt, accelerate anti-protons (notorps) but the name has extra-ordinary overtones of lethargy and sleepiness (dormant, dormitory, etc . . .). It is reassuring to think that NIMROD is the very opposite of this.

TIN



On 10 February, the Llethrid Swallet in Glamorganshire made the headlines in the national press when Howard Butler, a potholer from Aberdare, was seriously injured while he was down the caves photographing stalactite and stalagmite formations. He was trapped for nearly 26 hours before being rescued by the Loughor Miners Rescue Team and the South Wales Caving Club.

The main cave was penetrated in 1954 by seven members of the Hereford Caving Club. The leader of this team was George Lack, of Electrical Services, who has told this story of the discovery . . . . . .

The configuration of caves and tunnels known as the Llethrid Swallet was found by the South Wales Caving Club. (A swallet is an underground stream or the potholes formed by a stream). When we decided to investigate this particular pothole in the summer of 1954, the entrance, which is about two and a half feet wide, was completely flooded by the stream following a very heavy rainfall. The first thing we had to do was to divert the stream into a smaller cave which was already known, so that the level of the water dropped enough to allow us through.

We started off by following the course of the stream. The water was waist high, the bed of the stream sloped down very steeply and footholds were difficult to find. The noise was deafening and the terrific rush of water made the going treacherous. After about 150 yards it was obviously impossible to go any further without danger and we branched off through a small opening 18 inches in diameter, crawling on our stomachs, dragging our packs behind us for some 100 yards.

This passage opened out and there was enough headroom to stand comfortably. Several openings branched off and one in particular had very smooth sides, suggesting that it was the main course of a stream in days gone by. This was the one we followed and after about 50 yards we met the original stream again. Another opening across the stream had us back crawling on our knees until it broke into a great cave.

The first impact of the cave was tremendous. It was very large, bigger than the Magnet Room for example, and as we cast our lamps around they lit up thousands of stalactites covering the whole roof of the cave. It was a beautiful sight. In the centre, a huge stalagmite stood 10 feet high and about 3 feet in diameter and around the walls were brittle curtains of "straws", very thin sticks of calcite 40 feet long. A layer of silt lay on the ground and it was awe inspiring to walk forward disturbing this silt which had probably lain still for centuries and to cast our lights into this great cave which had never been seen before.

We were soaking wet, aching and exhausted but the excitement of this discovery made it all worth-while.

In the world-wide war against crime, there are men and women trained to sink their identities in the international underworld. They work alone, in darkness and in shadow, unrecognised by friend and enemy alike, the operators of the almost legendary .....INJECTOR GROUP.

We present

The Case of the Vanishing Protons

She leaned back and closed her eyes and as I moved to her my Multitone suddenly started to bleep. Two short, one long – 'most immediate' – the most urgent signal in the Service. Something was up. Cursing, I left her in the haystack, sprinted across to the Ferrari and accelerated viciously away. Thirteen minutes later I was in L's office

"There you are 007/11/11. What kept you? The usual thing by the look of it."

I said nothing but I knew L was worried.

"A top priority job broke half an hour ago. The PM's taking a personal interest in it. You've heard of the Nimrod Injector? Good. There's serious trouble down there. We know the Russians are working on similar lines and it's vital that We Get There First. You're to treat this as a National Emergency. I can't give you much detail, but if I mention Trafalgar and the Battle of Britain that should be enough."

"What's the trouble, Sir?"

"We're feeding protons into the Injector as usual but they're not coming out at the other end."

It hit me in a flash.

"They're being lost somewhere in between I'd say, Sir."

"Good thinking 007/11/11. But we have to know exactly where. That's your job. Before you go I want to change your equipment. I know you like working with that old piece of wire with crock clips but from now on you use this Tektronix probe and shoulder holster. Now get on with it."

I stopped in L's outer office and put on the holster.

"Suzie, sometimes L's really uncanny. How did he know I'd been with a girl?"

"You still have bits of hay stuck in your hair, James. You'd better get moving, your contact is waiting in the Magnet Hall – and James – take care of yourself."

She kissed me hard.

I didn't want to be too conspicious so I drove the red Ferrari up onto the Mound, broke open an escape hatch with a sledge hammer and climbed down the steel ladder. At the bottom I looked out carefully into the Magnet Room – it seemed to be deserted. I walked slowly towards the Injector, every nerve taut, and then I saw her. She was tall, blonde and wearing a white lab. coat which didn't hide a thing.

I tried my identification.

"Have you a light?"

"There's no smoking I'm afraid."

"Using hydrogen?"

"At the moment, yes."

Thank God, I thought as she led me to a narrow opening between some huge concrete blocks. Inhaling a devastating perfume, I introduced myself.

"007/11/11, James Bund - James to you."

"36/22/36."

"May I call you 36?"

"Alright, but don't let it give you ideas and take that hat off, you fool! Only Engineers wear hats and Savile Row suits – you're supposed to be a new Scientific Assistant. Didn't they brief you?"

I put my hat on top of the shield wall.

"There wasn't time for ----"

She silenced me with an elegantly manicured finger on my lips. I bit it and froze. A group of men went past the wall. They didn't see us.

"That was the search party. They're checking that there's nobody inside before they run the Machine."

"Attention, attention, this is a final warning----"

The amplified voice blared out from a nearby loudspeaker and my nerves jangled.

"They're just about to try the Accelerator 007/11/11."

"The name's James – and we should be getting out of here!"

"No! Don't you see, this is our chance to find out what's wrong. Look!"

I looked through a hole in the shield wall. There were some large metal ducts for the air conditioning. A panel had swung open and a dark figure was climbing out.

"Moriaty! What's he up to 36?"

"He's pushed in a hand operated beam stop. The Control Room won't know about it. It stops the protons just before they go into the Injector.

THE CASE OF THE VANISHING PROTONS - cont'd

When he hears someone coming to investigate he pulls it out again and vanishes."

"The cunning devil !"

I crawled out and made my way down the opposite side of the Injector. Just as I was easing into a good position a Dewar flask smashed behind me. Moriaty whirled. I went for a fast draw with the probe but the lead was too short. I'd failed. 36 was walking towards us and there was a queer smile on her lips.

"You were working for Moriaty all along ! You smashed that flask deliberately !"

Of course that was it ! How had she known so much about the beam stop - and letting me use her Christian name like that - that should have warned me ! I cursed Moriaty and myself for a fool.

"Zis is ze end for you Bund. I just pull out zis beam stop, so, and ze machine works. They are hafing a long machine run zis time. You vill be irradiated for sree days. Ve never cared about ze accelerator anyhow - it vas you ve vanted. You haf lost."

A shower of sparks exploded in the back of my head as 36 hit me with an earthing stick.

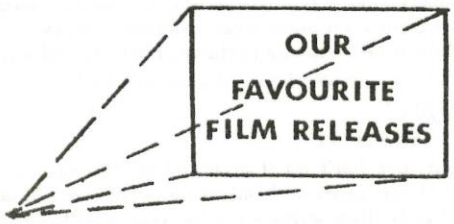
When I came round I was in a hospital bed. L was bending over me.

"Not a bad job that 007/11/11. Moriaty escaped but we got the girl - he left her inside the machine with you - she was no further use to him !"

"The swine !"

"Don't get excited, she wasn't hurt and neither were you, apart from a tap on the head. Leaving your hat on the shield wall as a signal to the search party was good but smashing the interlock on that escape hatch to stop the machine operating - why, it was almost brilliant."

There are one thousand stories in the Rutherford Laboratory.
This has been one of them.



A selection from suggestions sent in -

Daresbury Management : 'How the West was Won'

Finance and Accounts Dept. : 'The Beggar's Opera'

Top Floor of R1 : 'High Society'

Particles emerging from a 'stripper' : 'Naked as Nature Intended'

Senior Staff in conversation : 'A Funny Thing Happened on the Way to the Forum'

A transatlantic flight by Boeing 707 is available to IPCS members for £60 return fare. The outward flight is on Tuesday 14 July, returning Tuesday 4 August.

Information and application forms from W.F. Bailey, I.P.C.S., 3/7 Northumberland Street, W.C.2.

A 7 GeV machine
Appears on the British scene
Producing protons in their scores
To probe for Nature's hidden laws.

Now Universities can barter
In strict accordance with the Charter (?)
To have machine time allocated
For vital studies long frustrated.

No longer will they have the irk
To carry out their basic work
Of lengthy journeys continental
For beams of matter elemental.

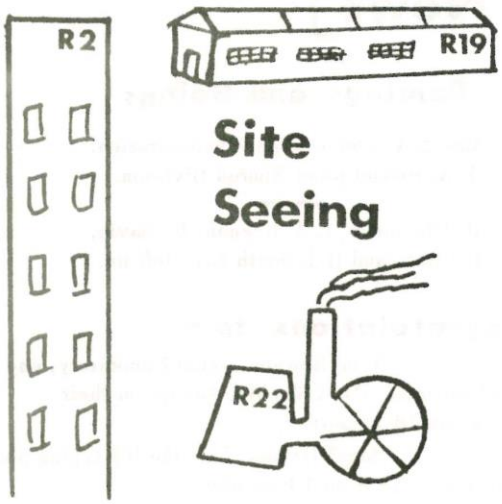
For Nimrod now can give them beams
Of things to match their wildest dreams
Producing every kind of meson
For which they haven't found a reason.

On Nimrod's beam lines at their leisure
All kinds of esoteric things they'll measure
From what comes out and what went in
They'll find the charge and isospin.

They'll search wherever lies a clue
On $\overline{\Pi}$ or Ξ or μ or ν
They even may find out what goes on
When theory postulates a boson

With such resources in our hands
Without recourse to other lands
Our HEP is filled with hope
And only doubters say with Pope.

Know then thyself, presume not tracks to scan
The proper study of mankind is man.



Thanks to the mild weather the various building programmes around the site have kept close to their schedules. Within the next few months, several of the major buildings will be ready for occupation and the temporary accommodation can be swept away. With any luck, by the time of the Nimrod Opening Ceremony at the end of April, the Rutherford High Energy Laboratory should look a worthy part of this 'green and pleasant land.'

The Atlas Laboratory

Construction of the Atlas Laboratory building began in October 1962 and was due for completion about December 1963. However within a few months, the programme was held back by the very severe winter of 1962-63. It has been quite an achievement to recover the programme date to within two months so that now the Laboratory Staff, who have been housed mainly in Building R 25, are beginning to move to their accommodation on the Atlas site.

The Atlas computer itself has already been in operation at the manufacturers, Ferranti's in Manchester, and installation in the Laboratory will be substantially complete about the end of May. By this time, the staff will have grown to some 50 people and, in addition, the Laboratory will have space for about 30 university visitors.

The Lecture Theatre

A race has developed between the Lecture Theatre and the R 2 'Skyscraper'. Both are expected to be completed for 'handover' by the end of February and they should be ready for occupation a few weeks later.

Building of the Lecture Theatre began in January 1963. It will have a seating capacity of 200, which can be increased slightly when needed, and the first big test of its facilities will be in mid-April when a High Energy Physics Symposium is planned.

The R 2 'Skyscraper'

Only the modest aspirations of an Englishman could lead to the five storey extension to Building R 2 being nicknamed a skyscraper but the laboratory and office accommodation it will provide has been needed for a long time. Construction began in January 1962 and is now almost complete. It will provide for 100 staff, mainly in offices. There is some laboratory space and the three storey leg of the building contains quite extensive workshop areas.

This extension is intended primarily to house the Nimrod engineering groups but will also accommodate some members of experimental teams.

Etc . . . . .

As this new accommodation is occupied, another major reshuffling of personnel will take place but most people can reasonably expect to find their permanent resting place when the wave of moves is over.

At last it will be possible to dispose of some of the 'temporary' accommodation which has been in use for years. In particular, the wooden hut, Building R 19, which has been a blot on the forecourt area between R 1 and R 25, will be removed. And the area of the site referred to as 'the Chivers desolated ground' in a Letter to the Editor some time ago, can now be made fertile again. A systematic demolition or removal of all those huts, sheds and caravans, which seem an indispensable part of the builder's craft, is already underway.

Once the area is clear, the 'Grounds Staff' from A.E.R.E. led by Mr. Burge will invade the site and, to the utter amazement of all those who struggle without avail over a few square yards of vegetable patch, will, overnight, produce lawns, flower beds and shrubs in full bloom.

GET WITH ITAGE

THE RECENT SHORT OUTAGE OF BUILDING R 25 CAUSED LITTLE INCONVENIENCE AS THE MAJORITY OF STAFF WERE TAKING PART IN AN OUTMUSTERAGE TO THE A 34. THE SWITCH ONAGE PRECEDED THE INMUSTERAGE THE FOLLOWING MORNING.

Personnel News

Suggestion Awards

At the fifteenth meeting of the Rutherford Laboratory Suggestion Awards Committee held on Thursday, 13 February, suggestions up to and including Suggestion No.240 were considered. Two of the highest awards made to date were allocated:

£32 to J.Medley and R.Sandford for their proposed modifications to the graphite screening on the inner vacuum vessel of Nimrod. This suggestion has now been successfully implemented.

£20 to D.Baker and A.Hudson for their improved method of assembly of the aluminium spark chamber frames which has resulted in an appreciable saving of time and expense.

Other awards were made as follows:

£7 to C.Gascoigne whose suggestion for a rotary vacuum chuck has now been successfully adopted.

£5 to D.Laws for his suggestion to improve the the safety of the spiral staircase emergency exit of Building R 25.

£2 to A.D.Wood for his suggestion regarding a dangerous projection on the stairway to the Experimental Area.

£2 to M.D.Somerville who recommended an improved system of indicating the location of Fire Fighting equipment in the Laboratory.

£2 to D.J.Pugh who suggested improvements to the methods used to locate obscure leaks in vacuum equipment.

Encouragement Awards of £1 were made to:
J.G.Kerr and C.G.Bonfield.

D.G.J. ROSE.

Comings and Goings

Mrs. S.A. Fones joins Administration.
E.A. Friend joins Nimrod Division.

D. Dickinson, C.J. Reenan, R. Mavin, D. Rich, and D.J. Smith have left us.

Congratulations to -

Anne Rowson, Atlas Laboratory, and Dave Carpenter, PLA Machine Group, on their marriage on 18 January.

Hazel Davies, from the R 1 typing pool, on her engagement on 1 February.

A sum of money was found in Lab.3, R 1 on the 26 January.
Will the owner please contact Mr. Jenkins, R.20.

The latest series of addresses reaching the Lab.:-

'Rutherford Laboratory, High Everegg, Chilton.'

'Rutherford High Energy Laboratory, Cheltenham, Dudicote.'

'Rupherford Oborety. Harwell.'

'Pilkington Laboratories, Harwell.'

'Rutherford Hide Energy Laboratory.'

And finally, ...'National Institute for Resistence in Nuclear Science.'

'His office, comfortable but shabby, is typical of an engineer, with desk and chair, a drawing board and stool, a wall of shelves filled with text-books and reports. The dull red carpet has been patched under the chair. The walls are hung with photographs and paintings – the airship R 9 flying over the Forth Bridge ....'

Tom Margerson
Portrait Gallery on Barnes Wallis
Sunday Times, 19 January.

EXTRACT FROM A E R E STORES BULLETIN.....	SEEN ON RUTHERFORD LABORATORY PAPERWORK...
SECTION 2-4 HOUSEHOLD AND DOMESTIC STORES 2-4/0161 TEAPOTS : CANCELLED - INSUFFICIENT DEMAND.	'NOTICE TO GROUP LEADERS. PLEASE CIRCULATE WITHIN YOUR GROUP .....'