Bulletin
of the Rutherford and Appleton Laboratories 26 Jan.1981 No.2

Slough Ionospheric Observatory

50th Anniversary

On Sunday 11 January 1931 the first measurement in a regular programme of Ionospheric soundings was made at the Slough Ionospheric Observatory.

Fifty years later, to the hour, at 12 noon, a small group of scientists gathered at Ditton Park to mark - with due ceremony - the anniversary of this event by observing the noon run of the Slough Ionosonde.

The guest list at this 'family reunion' of team members past and present, read like a page of Ionospheric history. Great names of the past, (happily still very much of the present) Sir Granville Beynon, Mr J A Ratcliffe, Dr W R Piggott and Mr A F Wilkins were included. Men who with Sir Edward Appleton had pioneered the study of the Ionosphere.

Sir Granville Beynon, Mr J A Ratcliffe, Dr W R Piggott and Mr A F Wilkins watching Mr K Feldmisser demonstrating the present day Ionosonde. R5169/3

Early Work

In his '50th Birthday' address to a packed audience of Ditton Park staff, Sir Granville spoke with pride and warmth of the early days of the Observatory. Vividly, he described the excitement, enthusiasm, dedication and pure fun of doing science in those days.

The aims of this early work at the then Radio Research Station were purely scientific, but the experiments were to prove of incalculable benefit in leading to the development of radar in the years before the second world war.

Ditton Park, Sir Granville reminded us, had always played its part in international projects. Ionospheric apparatus for the 2nd International Polar Year 1932-33 had been built at the Laboratory and later operated at Tromsø and Simavik. It had also taken part in the International Geophysical Year 1957-58 by manning stations in Singapore, Inverness the Falklands and Antarctica.

and Those Involved

The personalities themselves were no less interesting than the study, and he mentioned three who could, he thought, lay claim to some immortality. Wallace Brown; a remarkable and endearing man, never to be forgotten. No scientist he was a radio operator of flair and brilliance. One of Ditton Park's greatest assets, he could produce creature comforts out of thin air, Roy Piggott; a man of genius and generosity; respected by the Ionospheric fraternity world wide, and, of course, the Father of the Lab, Sir Edward Appleton, absolutely dedicated, urbane and of much wit.

The Years Ahead

'Our record is a proud one', Sir Granville said 'The Station has been fortunate in its leadership. Naturally we are sad that our pioneering days have gone by, but Radio as an experimental tool should not be underestimated today. The Geophysics and Radio Division will continue to flourish at Chilton'.

The Ionosonde will remain at Ditton Park, where the observations started fifty years ago will continue to be made. Now carried out using sophisticated radio equipment, the hourly results are used (together with similar measurements from a world network of over 100 stations) for planning radio communication services and for upper atmosphere research.

The fascinating display, of photographs and memorabilia of these early days at Ditton Park, on show during the Celebration, will be exhibited in the Foyer of R1 at Chilton during the fortnight 26 January to 6 February.

INTERNAL Events

NIMROD LECTURES
R61 CONF. ROOM - 1400 hrs

26 Jan Prof L Hand/Cornell
"Fermilab Experiment 553 - One Event or None?"

LECTURE THEATRE - 1400 hrs

29 Jan Prof. G. Preperata/Bari
"Radical Ideas on Confinement"

HEP LECTURES
R61 CONF. ROOM - 1400 hrs

28 Jan Dr D Ross/Southampton
"Multijet Events in QCD"

ASTROPHYSICS SEMINARS
R61 CONF. ROOM - 1400 hrs

28 Jan Prof. Jack Meadows/Leicester
"Asteroids"

EXTERNAL Events

NPD COLLOQUIM
CONF. ROOM H8 - AERE - 1530 hrs

29 Jan Dr J A Cairns/AERE
"Aspects of Current Catalysis Research at Harwell"

5 Feb Dr W N Charman/UMIST
"The Physics of the Eye"

THEORY GROUP SEMINARS
DARESBURY - 1400 hrs

26 Jan Dr C V Sukumar/Oxford
"Pechukas Model for Inelastic Scattering"

2 Feb Dr J A Tostevin/Surrey
"Antisymmetrisation Effects in Deuteron Elastic Scattering".

HEP SEMINARS
DAMPT - CAMBRIDGE - 1500 hrs

30 Jan Dr P Scharback/RAL
"Gauge Invariance Structure in Perturbative QCD"

PHYSICS COLLOQUIA
CLARENDON LAB - OXFORD - 1545 hrs

30 Jan Prof. D W Sciama/Oxford
"Do Massive Neutrinos Dominate the Universe?"

6 Feb Dr R J N Phillips/RAL
"Neutrino Oscillations"

PART THEORY SEMINARS
NPL - OXFORD - 1430 hrs

30 Jan R Horgan/Cambridge
"Heavy Quarks in a Bag"

6 Feb M Green/QMC
"A Review of Lattice Gauge Theories"

PART PHYS. MEETINGS
BIRMINGHAM - 1615 hrs

23 Jan Dr M Pennington/Durham
"Perturbative QCD: When does it make Sense?"

6 Feb Dr D R Ward/Cambridge
"$\bar{p}p$ - pp Differences and $\bar{p}p$ Annihilations"

ELEM PART PHYS SEMINARS
NPD - OXFORD - 1430 hrs

5 Feb Dr Richard Mount/Oxford
"Results on Hadron Production in Deep Inelastic Muon Scattering".

12 Feb James Wallace - Hadrill/CERN
"Triple Jets and Rapidity Correlations".

SHEP SEMINARS
SOUTHAMPTON - 1430 hrs

30 Jan Dr A Schwimmer/I.C.
"Bound Fermion Masses in Gauge Theories"

6 Feb Dr D Bailin/Sussex
"Superfluid Quark Matter"

SMM - The Bad News

Having informed you of the Solar Maximum Mission satellite (SMM) launch in February 1980 and of the exceptionally good performance of the scientific instruments since then, sadly we now have to announce its premature end owing to component failure within the satellite attitude control system.

The SMM was the first of a series of general purpose reusable satellites. These satellites (retrievable at the end of their mission by the Space Shuttle) are designed to carry the various packages of observational instruments needed for individual experiments. It is in this MMS section that the failures have occurred. Specifically, three fuses in the drive electronics for the attitude control reaction wheels blew, over a period from mid-November to early December. The reason for their failure was under-specification made worse by the evaporation of their filaments in the vacuum of space.

At the time of this failure the scientific instruments provided by the observing teams were all functioning normally. Because of the dependence of the high accuracy instruments, such as XRP, on precise pointing and pointing stability this satellite failure essentially terminates their solar data gathering activities.

Some limited control is available by using a system in which electric currents passed through conducting bars within the spacecraft, interact with the magnetic field of the earth to provide a torque by the motor principle. There is probably sufficient control with this system to allow the satellite to remain roughly sun pointing and hence powered by means of its solar panels so that at a later date it may be recovered.

Film Badge Notice

Period 2 commences Monday 26 January. Colour Strip GREEN for Beta-gamma films.

Please change your films promptly and return ALL old ones.

WHAT'S NEW?

Lecture Theatre - 5 Feb. - 3.15 p.m.

ULTRA FINE LITHOGRAPHY FOR MICROELECTRONICS by R A Lawes

Lithography for the manufacture of integrated circuits has for long been firmly based upon optical equipment operating at ultra-violet wavelengths and using both contact and projection methods.

In recent years, research into alternative methods for mask-making and silicon slice exposure has encompassed several other forms of radiation including electrons, soft X-Rays and ion beams.

Scanning electron beam lithography has already displaced optical lithography as the best technique for production mask-making due to its flexibility, accuracy and resolution. Scanning methods at present lack the bandwidth necessary to be economic in production so there is much interest in developing a parallel-flood exposure system capable of replicating micron and sub-micron features on to silicon slices.

After reviewing some of the methods that have been investigated, attention will be focussed on those techniques likely to appear in routine production lines over the next few years.

Peter Barker OBE

34640

We should like to offer our congratulations to Mr Peter Barker, head of Projects Group in Space and Astrophysics Division, awarded the Honour of OBE in the New Year list. Peter Barker has played a vital role in the responsibility for the engineering design and performance of very demanding space projects which have kept the UK in the forefront of space science. Much is due to Peter for the conspicuous success of the European Space Research Organisation's ultra-violet astronomical satellite S2/68 launched in 1972, the International Ultra-violet Explorer (IUE), a joint project with NASA, launched in 1979, and the two X-ray satellites Ariel 5 and Ariel 6 launched in 1975 and 1979. IUE and Ariel 6 are still providing very good data and IUE is expected to do so for a number of years yet.

Congratulations also to all our colleagues and close associates of the SRC who have been honoured.

Sir Michael Swann FRS - former member of Council - Life Peerage;
Dr J B Adams CMG, FRS, lately Director-General, CERN - Knight Bachelor;
Mr W J Charnley CB, formerly assessor to Council - Knight Bachelor;
Dr J W White, lately Director ILL - Order of St Michael and St George (CMG); Mr A G Senior, Chairman of Marine Technology Management Committee - CBE; Prof M R Horne, Civil Engineering Sub-Committee - OBE;
Mr T Evans, Central Office - MBE;
Mr G E Murphy, Daresbury - BEM.

Missing

If anyone knows the whereabout of a calculator removed from my office desk, would they please contact R Eason, R1, Ext 6345.

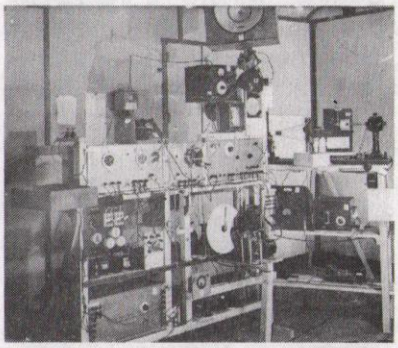
The calculator in question is a 'minic-card' FX-48 and is the size of a credit card. As this model is no longer available, I would appreciate its return.

Iono-what?

Following Marconi's demonstration that radio waves could be detected beyond the visible horizon, it had been postulated that the reflection of these waves was caused by a layer of electrically conducting gases high above the earth's surface.

Appleton and his co-workers proved the existence of not one but a series of these regions of 'ionised gases' (afterwards named the ionosphere by Watson-Watt) and went on to discover that the height and density of these layers varied with the degree of solar activity.

A series of measurements of heights and densities of ionised layers was undertaken which, with the realisation of the importance of the fluctuating ionospheric pattern to radio communications, became an observational routine.



The first Ionosonde at Slough.

The first pulse transmitter based on a simple, self pulsing valve oscillator derived from a time base circuit produced at Slough for a cathode ray oscillograph, was the ancestor of the modern ionospheric sounding equipment or ionosonde. When an improved transmitter, developed by Ratcliffe and White was installed, the Ionospheric Observatory was established.

Glazebrook Medal for Dr Stafford

The Institute of Physics has announced the award of the Glazebrook Medal and Prize for 1981 to Dr G H Stafford in recognition of his "outstanding contribution to the organisation of experimental high energy physics, particularly through the direction of the Rutherford Laboratory".

Instituted in 1965 in honour of Sir Richard Tetley Glazebrook, President of the Institute of Physics 1920-21, it is awarded annually.

Dr Stafford is the second member of the Laboratories to receive the Award, Dr T G Pickavance having been given the honour in 1979.

We offer our congratulations to Dr Stafford.

Harry Hurst Logs Out

34578

Harry Hurst and Geoff Manning admire the 'strange device' presented to Harry as a memento of his years at Chilton.

The Atlas Centre Colloquium was full to overflowing on Christmas Eve, as many friends gathered to wish Harry Hurst a happy retirement after 16 years at Chilton.

Making the presentation, Dr Geoff Manning said it was a pleasure to be asked to wish Harry the best in his retirement. He had been surprised to discover Harry's many past occupations - that he had started work as a journalist, and had at one time been Military Adviser to the Polish Resettlement Corps in Scotland!

Harry joined NIRNS in 1964 as an SEO, and had responsibility for ORION, Bubble Chamber work, IBM 7090s and links with Darmstadt. Then followed the IBM 360/75 computer, and the 360/195 in 1971, and in 1977 we got a second 360/195 to keep Harry busy. Not content with that, the 3032 followed. "As we have no more money to buy him more computers" joked Geoff, "We have to let him go!"

In 1968 Harry made the difficult transition from SEO to CEO, a promotion achieved by only three people in the Laboratories' history, and in 1974 was made SPSO. As far afield as Italy his worth was recognised and he was awarded the 'Enrico Fermi' medal in 1971 by Pisa University.
Geoff Manning presented gifts on behalf of all Harry's friends; a bouquet to Dorothy, his wife, and an engraved silver salver, champagne and a card to Harry. An ingenious memento in the form of two 195s which also formed the initials HH and contained old computer components, gave great delight.

Harry replied that he was quite speechless - he would like to know who had given away his secrets!

"Thank you all for the friendships and many hours of interesting work I have enjoyed in my time here. Thank you especially to my own staff, particularly the computer operators who have done myself and the Laboratories so well. A Happy Christmas and New Year and all best wishes for the future" he concluded.

Just Great

The winning team (from L-R standing) Graham Murdoch, Sean Sunderland, Andy Napper, Russell Newman, Martin Stenzhorn and Andy Flesher (in front) John Mackerness, Bob McClure (Captain) and Steve Townsend. *34566*

The supremacy of SRC soccer now rests firmly in the hands, or should it be at the feet, of the R2 seven-a-side team. Having beaten the SRC teams to win the Sports Day Trophy, they have now dispelled any lingering delusions of grandeur held by other Rutherford teams by winning the Rutherford Trophy.

This team is the pheonix of the now defunct R20 team, and its change in fortune is marked from the change of manager from an Administrator to an Engineer. Could Malcolm Allison's problem be that he is one of lifes administrators? The addition of two or three younger players has given the team a mobility that was previously absent and has extended the playing career of the oldest member of the side by about 3 years. What a heady cocktail the mixture of this side makes, with the champagne experience of the younger members made more potent by the fine old brandy maturity added by the older members. Up front the strikers are clinically efficient, the mid-field ebbs and flows with the tide of play with a lunar constancy. At the back the sweeping is done with a dexterity and economy of effort borne of years of experience as a 'Stopper Centre-half', whilst the goalkeeping is efficient and courageous.

The next pinnacle to climb is the league that contains the teams from AERE, and after that who knows? Today the SRC tomorrow the world, - unless Admin get the dates wrong!

Sales to Employees

Sales of scrap metal/plastics as set out in RLN 12/73 will be made on 6 and 20 February at the Scrap Compound, rear of R40 from 1200 - 1230 hrs.

Unclaimed T.I.59

A Texas Instruments calculator type T.I.59 Serial No. 0022117 has been returned from repair to R & D Stores Building R56.

Will its owner please ring Ext 412.

Lunchtime Music

Lecture Theatre - 1245 hrs - 28 January

"FROM THE NEW WORLD"
Dvorak

On this recording the Czech Philharmonic Orchestra is conducted by Karel Ancerl.

Panic Over

Tuesday 13th January saw the retirement of our only Stores Woman or should we say Stores person. Peggy Hull, who has been with the Stores Section for almost seven years, left to join her husband in retirement.

Peggy was one of those small cogs that are so important to the running of a Section, and those of us that have had dealings with her will understand why. Her friendly help and sound guidance to those "forlorn" looking customers thumbing their way through the Stores catalogues, presented the sort of helpful assistance that the Stores Section would want to show the Laboratories.

"Panic" will never mean the same to Peggy and should now be imprinted firmly on her mind after 'phoning through so many to A.E.R.E. They (A.E.R.E.) will probably miss her as much as we will!

On behalf of all her friends and colleagues both at Rutherford and Appleton Laboratories and A.E.R.E. Peggy was presented with a tea service and large bouquet of flowers by Mr H Aldred of the Stores Section.

We wish you all the best Peggy and a happy retirement. There is no need to panic now!

Crib

The winter league started on 10 Oct. 1980 and the first half finished on 5 Dec.1980. The second half re-started on 17 Jan.1981. To date all teams have played seven rounds. Peter Craske's 'Sparks' having won six of theirs are in first position with 12 points, J F Purling and his 'Bisto Kids' are at present runners-up with 10 points.

Will all players who are interested in entering the Civil Service Southern Region Championship please contact Tudor Morgan Ext 563 or Peter Craske Ext 232. This tournament should have taken place in November, but was cancelled due to lack of support. The organisers are prepared to try again sometime early this year; the venue to be the CSSS Building, Reading.

So come along all you Crib players - lets' see what we can do!

Bulletin

Editor: Jean Banford
Building R20
Rutherford and Appleton Laboratories
Chilton, Didcot, Oxon OX11 0QX
Abingdon (0235) 21900 ext 484

Deadline for insertions: ~~Mon. 2 Feb.~~