

6 - 20 December 1976

## MWPC Aids Biomedical Studies

Some recent work at RL has suggested that the Multi-Wire Proportional Counter (MWPC) techniques developed for use in High Energy Physics could have important applications in biomedical studies.

A xenon-filled MWPC X-ray imaging detector has been developed with its own computer controlled data acquisition and image display. Rather than direct detection of X-rays, the new device is aimed at areas where gathering of numerical data and subsequent computation are the essential feature. Bone mineral estimation and lateral section 'tomography' are typical examples of such applications.

Preliminary tests have concentrated on bone mineral estimation and have been carried out in collaboration with the Medical Research Council's Mineral Metabolism Unit at Leeds General Infirmary. 'Tomography', the study of successive sections or layers of biological structures, has been given a boost by the development of sophisticated X-ray equipment by ENI, but the MWPC equipment could prove to be considerably less expensive.

Theoretical work carried out at RL has shown that the main systematic error affecting any measurement of

bone mass using X-ray absorption arises from the limitations on the resolution of the X-ray detector, ie its ability to record over small distances. In practice, what is required is a detector which can record changes over millimetre distances at an X-ray energy high enough to penetrate the portion of the anatomy being studied (usually the forearm).

Further studies have indicated that these requirements can be met when an X-ray beam of about 42KeV energy is used with a xenon-filled MWPC and the output X-ray pulses of the right energy are selected. This selection process proves to have a dramatic effect on the results obtained - if the right pulses are chosen, then sharp images can be obtained.

The performance of the imaging system is further enhanced by the computing power available, which enables systematic errors arising from non-uniformities in the MWPC chamber and in the beam to be eliminated.

The work now in progress is expected to enable measurements of bone mineral mass from living samples to be determined to within one per cent - a considerable advance over current techniques.

## Computer Typesetting at RL

Typesetting - the production of text in a form which is ready for direct input to a printing process - must be an integral part of any complete printing-system.

Traditionally, typesetting has required special skills in handling 'hot metal' machines, but in the last few years a much wider range of equipment has become available. This ranges from the simple IBM composer for producing camera-ready text for offset litho work to sophisticated computer-controlled systems which prepare text, edit it and compose it into pages.

RL has as yet no full typesetting system of its own, but a new development using the main computer and the FR80 microfilm recorder has enabled a complete Laboratory publication to be prepared and printed automatically.

This development is centred on the Library Accessions List - the publication with the distinctive orange heading which lists the new items acquired by the Library. This used to be printed by outside contractors from the Library's own catalogue cards. All new items coming into the Library had a catalogue card prepared, and new cards were arranged into subject groupings and used as 'text' for the Accessions List.

When the Library put its catalogue onto the computer, new items were entered in the files directly from a keyboard terminal, avoiding the need to type out catalogue cards at all. Listings of new Library material were extracted from the counter files and printed out on the line printer. This printout was reduced in size by about 45 per cent and used to make paper plates for

printing on Reprographic Services' litho machines. But this solution wasn't really acceptable. The reduced line printer output gave poor print quality and there were no broad subject groupings for easy reference. Using metal litho plates instead of paper ones improved the print quality, but made the in-house production task much more expensive and time-consuming.

Meanwhile Kate Crennell in Atlas Computing Division, as part of a project for the SRC's Data Compilation Committee, had been using the FR80 microfilm recorder to produce text output. By adding keywords to each Library catalogue entry, Kate was able to produce a program to list output under broad subject groupings - as in the old system based on catalogue cards.

The FR80 output can give acceptable print quality, and the overall result is a method of producing the Accessions List entirely in-house and with a minimum of effort. The FR80 can also be programmed to handle a number of different 'fonts' or styles to type (see Bulletin 10 for an example of Chinese FR80 output!), and this, combined with the text handling capabilities of the main computer, gives RL a typesetting system which, in principle, can be used to produce any required text publication.

The latest Accessions Lists are produced using standard FR80 hardcopy output. With a view to attempting higher quality work, experiments are being made with a special hardcopy paper which could give higher contrast and sharper detail.

### FILM BADGE NOTICE

It is Period 13. Colour Strip  
- PURPLE for 8y films and

neutron packs.

Please check that you are wearing the correct films and that all previous ones have been returned.

### THE ROYAL INSTITUTION LECTURES

Details are to hand on the programme of lectures until the end of the year incl-

uding the Christmas Lectures to be given by Sir George Porter, FRS., the R.I.'s Director.



## INTERNAL EVENTS

### NIMROD LECTURE SERIES

The lecture due to be given on 7 December has been postponed until early 1977.

### FILM SHOWS

Mon., 6 December, 1230 & 1315  
Tues., 7 December, 1230 & 1315  
Lecture Theatre.

The Fire Precautions Film, 'Shame About Sheila' shown recently in the Lecture Theatre was poorly attended. This is an excellent film and only lasts for 15 minutes. It was produced by the Post Office Telecommunications Publicity Division and illustrates the correct extinguisher or fire fighting appliance to use for any given type of fire. (NOT JUST AT WORK, AT HOME AS WELL.) Foam, dry powder, BCF, CO<sub>2</sub> or water for each of these extinguisher types has its own specific use; use the wrong one and you do more harm than good. 'Shame about Sheila' - pity about Sheila - it all happened in a kitchen.

### HEP SEMINAR

Tuesday 7 December  
1100  
R61 Conference Room

Surface Waves as Carriers of Hadronic Diffraction

B Schrempp/Geneva University

### RUTHERFORD LABORATORY LECTURE

Wednesday 8 December  
1515  
Lecture Theatre

The Jet Project (see news section for summary).

Dr Alan Gibson/Deputy Manager, JET Design Group, Culham Laboratory

### THEORETICAL PHYSICS MEETING

Lecture Theatre  
Wednesday 15 December 1400  
1600

The programme is as follows:-

Bags  
Conventional Quarks

Prof. K Johnson/MIT  
Prof G Karl/Guelph & RL

Thursday 16 December 0945  
1145  
1415  
1605

$e^+e^-$  experiments  
v experiments  
Charm and beyond  
Large  $P_T$

Dr H L Lynch/SLAC & DESY  
Dr W A Venus/RL  
Dr C H Llewellyn Smith/Oxford  
Dr P V Landshoff

Friday 17 December 0945  
1145  
1415

Infrared behaviour of QCD  
The interpretation of quantum mechanics - are there difficulties?  
Topology of quark and hadron interactions

Dr J C Taylor/Oxford  
Prof Sir Rudolf Peierls/Oxford  
Prof G Veneziano/Weizmann/CERN

## EXTERNAL EVENTS

### THEORETICAL PHYSICS SEMINARS AT QMC - 1615 hrs.

6 Dec : Prof R Penrose/Oxf - Twistor view of elementary particles.  
13 Dec : Dr D B Abraham/Oxf - Correlation function for Ising ferromagnets and hard core gases.

### HEP SEMINAR AT BIRMINGHAM - 1615 hrs.

10 Dec : Dr Koniski/RL - The Zweig Rule.

### PHYSICS & GEOPHYSICS SEMINAR/BRISTOL U - 1700 hrs.

13 Dec : L A Jackson/PO Research - Optical fibres for telecommunication

### THEORETICAL & HEP SEMINAR AT SOUTHAMPTON - 1430 hrs.

10 Dec : Dr P V Landshoff/DAMTP, Camb - Jets, Quarks & Partons.

### HEP SEMINAR AT MANCHESTER U - 1415 hrs.

9 Dec : M Clark - Charged Rho photoproduction.

### THEORETICAL PHYSICS SEMINAR/MANCHESTER U - 1430 hrs.

8 Dec : Prof T B Grimy/Liverpool - Title to be announced.

### IERE DISTRICT MEETING/READING - 1930 hrs.

8 Dec : A St Johnston - The automated warehouse.

### THEORY SEMINAR/DARESBURY LAB - 1400 hrs.

13 Dec : Prof L M Falicov/Camb - Electronic, optical and magnetic properties of transition metal monoxides.  
20 Dec : Prof J Bartouv/Oxf - High Spin Rotation in Nuclei

### NUCL PHYS DIV COLLOQUIUM/AERE, CONF RM, H8 - 1530 hrs.

16 Dec : Mr T V Parsons/AERE - Grout monitoring on Thistle A oil production platform using radioactive techniques.

### THEOR PHYS SEMINARS/AERE, CONF RM, BLDG 8-g - 1415 hrs.

10 Dec : Prof M F Ashby/Camb - Fracture mechanism diagrams- an attempt to assemble and relate mechanisms of failure of round bars in tension.  
17 Dec : Prof B A Bilby/Sheffield - Behaviour of inhomogeneities in slow viscous flow.

**XMAS LUNCHES** Please read and digest the following thoroughly. Xmas lunches will be served on Tuesday 21 December and Wednesday 22 December but only to ticket holders. You will be able to buy your tickets from either the R22 shop or the R1 Coffee Lounge, from 8 to 17 December, where copies of the menus will be displayed.

The cold bar and grill will operate as usual.

**BULLETIN NOTICE** The next issue, No 22 will cover a period of three weeks, 20th December - 10 January 1977. Copy for inclusion in No 22 should be sent to the Editor not later than Monday 13th December.

The deadline for copy for inclusion in Bulletin No 1/77 is 1000 hours, Tuesday 4 January, but please send as much as possible before Christmas.



## RUTHERFORD LABORATORY LECTURE

The RL has had close links  
with the UKAEA Culham  
Laboratory for many years

so it is with pleasure that we welcome Dr Alan Gibson to  
give the next talk in this series of lectures. His talk  
entitled, 'The Jet Project', will be given at 15.15 hours  
in the Lecture Theatre on Wednesday 8 December.

Dr Gibson, Physics Group Leader of the Jet design team  
was a member of the ZETA team at Harwell and at Culham  
his worked on both the CLEO and DITE experiments. He has  
kindly supplied the following summary of his talk.

'JET is a large European toroidal fusion experiment, the  
design has been prepared by a fully integrated European  
Design Team and the Project is now ready to proceed to  
the construction phase.

A general account of the Project will be given,  
especially of the objectives, the programme and the  
design. The history, time scale and cost of the Project  
will be mentioned as will its relation to the World  
Fusion Programme.'

## HARWELL MAIN GATE

The period of the temporary  
closure of the Harwell Main  
Gate will cease at 6a.m. on Monday 6 December 1976 and  
the entrance arrangements for Harwell will resort to  
normal as set out in the Appendix to RLC 16/76.

## CHRISTMAS MAIL ARRANGEMENTS

The last delivery of Rutherford  
mail to the Post Office will leave  
the Main Post Room at 1100 hours on

Friday 24 December. Mail reaching the Post Room after  
this time will not be taken to the Post Office until  
Wednesday 29 December 1976.

## OVERSEAS VISITS

Dr K Sumorok, to CERN, 1-10 December  
to work on software for Omega beam

dump experiment.

Mr B J Charles, to CERN, 6-10 December, to work on on-line  
computing system for Omega/EMC.

Mr G B Stapleton, to CERN, 6-8 December for discussions.

Mr A R Gillman, to CERN, 6-17 December, to work on WA3  
experiment.

Dr R J N Phillips, to Germany, 7-11 December to lecture  
at Bonn, Wuppertal, Bielefeld and Dortmund.

Dr J J Thresher, to CERN, 9-15 December, to work on  
Proposal 140.

Dr C J S Damerell, to CERN, 10-13 December for further work  
on WA3.

Dr R W Newport, Mr W Turner & Mr B Edwards, to CERN, 20-22  
December, to attend European Hybrid Spectrometer meeting.

## I.P.C.S.

A General Meeting will be held in the Lecture  
Theatre at 1300 hours on Tuesday, 14 December

Mr J H Aram, Chairman, Staff Side, SRC Whitley  
Council, will speak on 'Recent SRC Negotiations  
on Man Power and Redundancy Procedures'.

MEMBERS OF ALL STAFF ASSOCIATIONS AT THE RL  
ARE INVITED TO ATTEND

## Retirements

The chance of a retirement present usually indicates  
something about the recipients future activities; at  
times it suggests a long suspected reluctance to arise  
with the lark, eg the automatic teamaker.

The reverse is more likely with Bertie Payne who  
left the Lab recently, having accepted early retirement.  
He has always had a keen interest in nature which of  
recent years has crystallised into two specific  
branches - bird watching and gardening.

His choice of books - 'Watching Sea Birds, British  
Birds of Prey, Ducks of Britain and Europe, The Winter  
Birds, The Amateur Gardener, and The Complete Indoor  
Gardener, suggests that Bertie has no intention of  
hibernating during the winter months.

David Thomas spoke of his pleasure in being asked to  
make the presentation; he had been quite surprised at  
the choice of books, noting the absence of one on indoor  
birds. The gift was a token of recognition of Bertie's  
long service at the Lab; he had contributed a great  
deal in so many fields.

Bertie, another of the old Malvern group, left college  
in 1940 and joined the radar unit at Dundee. It had  
moved there from Bawdsey on the east coast, but after a  
few months the unit moved again to Swanage on the south  
coast, staying there for two years before finding a  
permanent home at Malvern.

Bertie worked on ground transmitters until 1948 when,  
with others, he joined the AERE unit at Malvern develop-  
ing small accelerators for medical use. He came to  
Harwell in 1951 eventually to work on the design, con-  
struction and development of the Variable Energy  
Cyclotron which was undertaken by the RL for AERE.  
Although he transferred to the Lab at the beginning  
of 1961 he continued to work on the VEC until its  
completion in 1969.

Having been concerned with RF (radio frequency)  
problems for all of his working life the chance to work  
on superconducting magnets proved both interesting and  
challenging.

In reply to the presentation speech, Bertie thanked  
David for his kind words and everyone for the books;  
he had anticipated problems over his interest in birds.  
The next problem was 'What is Bertie going to do for a  
celebration as it is well known that he had not been to  
a Xmas party for years'. The answer was an open invita-  
tion for any of his old friends and colleagues to

celebrate at his new home in Wales.

Since then a letter from Bertie confirms the invitation  
'for all you good people to call on us in Wales if you  
happen to be down that way'. That way, as from 6 January  
1977, is - Mr H E Payne, Haroldston Glen, Broadhaven,  
Haverford West, Pembrokeshire, S Wales.

If you thought that Bertie's real name was Herbert,  
you're wrong; its Harold - but thats another story.

\* \* \* \* \*

A large number of Lab staff gathered in R32 on  
5 November to wish Sam Hiscocks a long and happy  
retirement. Although the scene was familiar the  
occasion was unusual as Sam was not a member of the  
Rutherford Laboratory staff.

David Harrison before making the presentation  
remarked that Sam had only had 2 jobs in his life, the  
first in the Army which he joined in 1926 and the  
second with Glover & Partner.

After training as a sapper in the Royal Engineers,  
Sam spent 3 years at Gibraltar and was then posted to  
Singapore in 1937. When the Japanese overran the  
place in 1941 he was taken prisoner and spent a lot of  
the next 4 years helping to build the Burma railway.  
After his release he returned to England, completed  
34 years service in the RE's and retired in 1960 with  
the rank of Captain.

He was taken on by Glover & Partner that year and  
came to the Lab and stayed for 16 years.

David said he was honoured to be asked to make the  
presentation speech and although pleased to mark the  
occasion of Sams retirement he was also very sad to see  
him go. He had worked for David for over 15 years and  
evidence of his efforts could be seen all over the Lab.  
Apart from the numerous drawings he had produced, Sam  
had been king of RL site plans for a very long time;  
however doors were his speciality and Sam's doors were  
all over the place.

David concluded by thanking him for all the hard work  
and loyalty he had given over the past 15 years and on  
behalf of all his friends presented him with 4 silver  
goblets and a silver tray, wishing him a long and happy  
retirement.

In reply Sam expressed his thanks for the gifts,  
which included a framed map of the site. He had really  
enjoyed his years at the RL and had made many friends.



In the beginning there was Shell Mex House, the first home of the Department of Atomic Energy in the Ministry of Supply. It was to this newly formed headquarters that Dr R H V M Dawton came on his return from Montreal at the beginning of 1946 after two years in the USA working on the Manhattan Project.

It was also the beginning of a new and challenging career that was to last for thirty years until his retirement at the end of September this year.

Ralph Dawton left his LCC school, Chiswick at 15, spent two years at Acton and Chiswick Polytechnic and then obtained a job as mechanic/instrument maker at the Royal Institution, Albermarle Street. He also started working at evening classes for 'matriculation'.

After 3-4 years in the R.I. workshops he was transferred to the nearby Davy Faraday Laboratory which had close association with the R.I., working, in Ralph's words "as a sort of mechanic/lab assistant." He still continued with his evening classes (having passed his matric) and obtained his B.Sc.; being a glutton for work he continued studying, - for his Ph.D.

At the outbreak of war Ralph had been transferred to Birmingham to work on radiolocation problems in Professor Oliphant's team. Study was still the order of the night and day, and Ralph was awarded his Ph.D. in 1944. The long years of hard work had paid off.

Prof. Oliphant who had started to transfer the work of his team in the summer of 1943 on to the electro-magnetic separation of uranium, paid another visit to the USA late that year to confer with Ernest Lawrence at Berkeley. As a result, the British work was shut down early in 1944 and Oliphant, his team, and other recruits, totalling about 35 physicists, engineers and chemists went to the USA to assist in the Manhattan Project. Ralph was a member of that team working first at Berkeley and later at the vast Oak Ridge plant where the uranium 235 was produced for the first atom bomb.

The war was over and the British scientists moved out, some to join those already working at Chalk River others including Ralph, to the Montreal Laboratory from where he returned to the U.K. early in 1946.

Following the decision to create a British Experimental Establishment, the aerodrome at Harwell was selected in 1945 as the most suitable place and later Professor Cockcroft was appointed as the first Director, for a time combining the posts of Director of the Montreal and Chalk River Labs and Harwell.

On the first of February 1946 Harwell was a bleak & deserted spot when Prof. Cockcroft arrived from Canada to tour the site; Ralph says it was still bleak and deserted when he arrived about Easter time. Then began the slow but rapidly increasing build up; by the summer

about 40 people had arrived, 200 by the autumn, and then soaring up to quickly exceed the 1944 forecast of 360 total staff.

Ralph's two years experience in the USA was soon put to good use as he became involved with both the small & large E.M. separators working with Doug Allen (one of the 35 at Berkeley, now Prof. Allen of Reading University and RL). Apart from a spell with Prof. Thonemann on the plutonium separation plant for B220, his association with Doug Allen continued for many years. Ralph's interest and experience on ion sources was put to good use when the Vertical Tandem Generator Project was started in 1956 & again in 1960 with the Oxford Project, Doug Allen being Project Leader for both. Also in 1960 Ralph joined the NIRNS organisation & has been a member of the RL staff since then although working mostly inside the AERE fence. Although he retired at the end of September, his acknowledge expertise in the field of ion sources and beam handling has meant his retention by Harwell as a consultant.

By all accounts Ralph's retirement celebration went on for several days with various presentations, one being from the Oxford Group.

Outside his working life Ralph has always had his music. For many years he sang in various choirs and played the oboe in local orchestras. He still is a member of the Abingdon Musical Society's orchestra and also plays in a number of small groups including the Thursdays lunch time group at the Lab.

Ralph, we all wish you a long and happy retirement with many years enjoyment in your music making, giving pleasure to many others.

*In conclusion a personal thank you from the Editor to Ted Johnston (Dr J E M Johnston, Asst. to Div Head, E. M.Sc., Div. AERE) for his help in researching some of the facts. Now Ralph has retired, Ted is probably the last remaining 'active' member of the 'first of the few' at Harwell although not for much longer, as he retires on 17 December. Luckily he has kept all his old note books and masses of scrap pads dating back to the Shell Mex House days. Looking through these with Ted produced fascinating glimpses of the early days, the arrivals of many well known people, the various boards, the build up of staff and, amusing oddments. Ralph for instance had as one of his project numbers, GUK 24 - for rubber bungs! Also discovered was a query about an order for a Mcleods gauge in August 1946 - had it been received? Seems that things haven't changed all that much in 30 years.*

*I am sure that many old friends especially those who knew Ted in the Malvern days will join in wishing him a long and happy retirement.*

**A FISHY STORY** The annual fishing match took place on Saturday 6 November at Clifton Hampden. Twelve anglers fished the five hour match in atrocious conditions with strong winds and driving rain. To add to the misery the river was very high. From the amount of fish caught it was gathered that the fish didn't think much of the conditions either.

Through all the gloom and wet, it was George Render who emerged as the winner with Charles Halliday second and Frank Smith third.

If anyone ever says to you that the fish bite better when it's raining - dont believe them.

**CHESS** The annual chess tournament is now approaching the half way point and with three rounds completed the leader board shows Jim Riddle and Peter Craske sharing first place with 3 points apiece, Peter Hemmings with 2½ points and Dick Apsey with 2. Right on the heels of the leaders are a bunch of players so rapid changes in the above positions are likely.

**STOP PRESS** As we go to press we hear that early in the fourth round Peter Craske has beaten Jim Riddle.

**CHRISTIAN FELLOWSHIP** The Annual Carol Service in the Lecture Theatre will be held on Friday, 10 December, starting at 1235 and will last for about 30 minutes. So come along, exercise those lungs and raise the roof.

The following Friday we welcome John Newbold formerly of R18 workshop, who will be home for a short period from South Africa. Many old friends will no doubt welcome the chance to meet him and listen to his experiences so why not come along on the 17th December at 12.30 in the R12 Conference Room.

**HORTICULTURAL SOCIETY EVENING LECTURE** Do not forget the date, 8 December or the time, 1930 hours for the Society's evening lecture to be given by Mrs Beryl Fudge who will be demonstrating the art of floral decoration with the emphasis on Christmas. See you at the Lecture Theatre with your 20 pence which also entitles you to coffee and biscuits in the interval. Members, (and non members welcomed) dont forget the surprise free gift if you can produce your membership card.