

Rutherford Appleton Laboratory

Bulletin

A Monthly Newsletter for RAL Staff

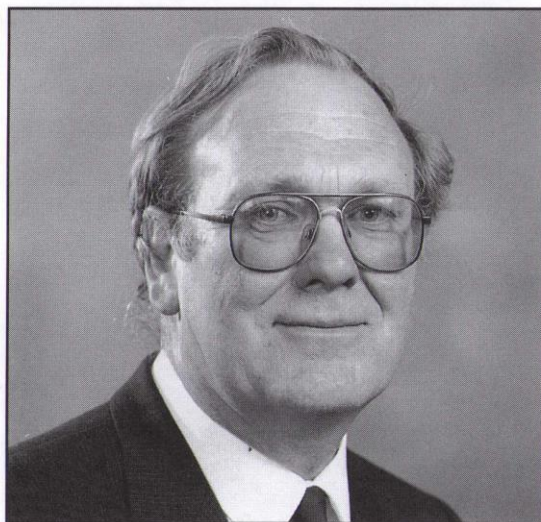
August 1994

Mike's a jolly good fellow

Mike Morris, RAL's Chief Engineer and Head of Technology Department, has been made a Fellow of The Royal Academy of Engineering for his achievements in engineering.

Mike, pictured right, is responsible for providing engineering support and expertise to RAL's science programmes and for the management and development of technologies in such fields as superconductivity, cryogenics, control systems and wind energy. Mike plays an active part in engineering across the Laboratory including chairing the Engineering Training Panel and overseeing the career development of engineers.

Mike joined SERC (then NIRNS) in 1964 as an Engineer working on the Hydrogen Bubble Chamber. He has since worked at Daresbury Laboratory, and at the Royal Greenwich Observatory as Deputy Director and Project Manager responsible for the design and construction of the Isaac Newton group of telescopes on the island of La Palma, including the William Herschel optical telescope. Mike was awarded an OBE in the 1992 Honours List and is a Fellow of the Institution of Mechanical Engineers. ■



(90RC4145)

DRAL launches Technology Transfer and Exploitation seminars for industry

The first of a series of Technology Transfer and Exploitation seminars for industry was held at the Laboratory on 15 July. Launched by DRAL in response to the 1993 Government White Paper on Science and Technology, the seminars aim to bring a wide range of the joint Laboratories' expertise within reach of UK industry and expand the exploitation of technology from the science and engineering base at DRAL by the industrial and commercial sector.

In the first seminar, 25 representatives from 24 companies heard about the work of Space Science Department including its close technological involvement in

Astronomy and Earth Observation, particularly with the European Space Agency (ESA) and the National Aeronautics and Space Administration (NASA), from Laboratory staff working in the area of space science.

"All the companies which attended the seminar will be contacted for their reactions," said Gordon Walker, Head of RAL. "The initial indication is that this first event was successful and will be the prototype for future seminars in other industrial sectors. The Laboratory has made a good start in presenting its skills to a wider audience."

Future seminars will cover such

subjects as materials, electronics, surface science, microengineering and informatics. For further information about the seminars, contact Adrian Wheldon in the Commercial Office on ext 6826. ■

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New horizons for laser scientist

Professor Mike Key, Head of the Central Laser Facility, begins a year's sabbatical at the University of California's Lawrence Livermore Laboratory near San Francisco this month.



(94RC1577)

Mike, pictured left, is a specialist in the application of ultra-powerful lasers and will be working with Nova, the world's most powerful laser. The research work is concerned with producing thermo-nuclear reactions and Mike will be using some of the techniques developed at RAL. The research involves shooting laser beams at tiny pellets of fusionable material, creating conditions similar to those which exist at the interior of stars. The aim of the research will be to produce an alternative, cleaner source of nuclear power. The US team interested in the work carried out at RAL has hired Mike for a year to increase the interaction between the work of the USA and the UK in this area and has agreed to fund further similar research at RAL in the future.

It is 20 years since Mike last had sabbatical leave. On that occasion he worked in the Max Planck Institute in Munich, Germany. He's delighted to have been granted this opportunity: "Of course I'll be thinking of my colleagues back at RAL, but I shall gain a great deal in terms of new ideas and enthusiasm which I can bring back to the Laboratory on my return."

Bill Toner, Mike's deputy, will assume the role of acting Head in his absence. ■

A happy union

Love and marriage. Horse and carriage. Science and technology and ... art. Art? The last may not seem like an obvious partnership but Darlington-based artist Jozefa Rogocki has proved that they are a perfect match. Her sculpture, which was exhibited at a recent community arts festival in Cleveland, was inspired by RAL's dark matter project in the Boulby Potash mine near Whitby.

The sculpture was constructed from materials which are used in the project and in the mining operation, such as salt crystals, potash, pure lead chevron bricks and pure copper. The aim of the exhibition was to reflect how science and technology relate to the immediate environment and culture of the local area, once a major centre for the older technologies of the mining and steel industries.



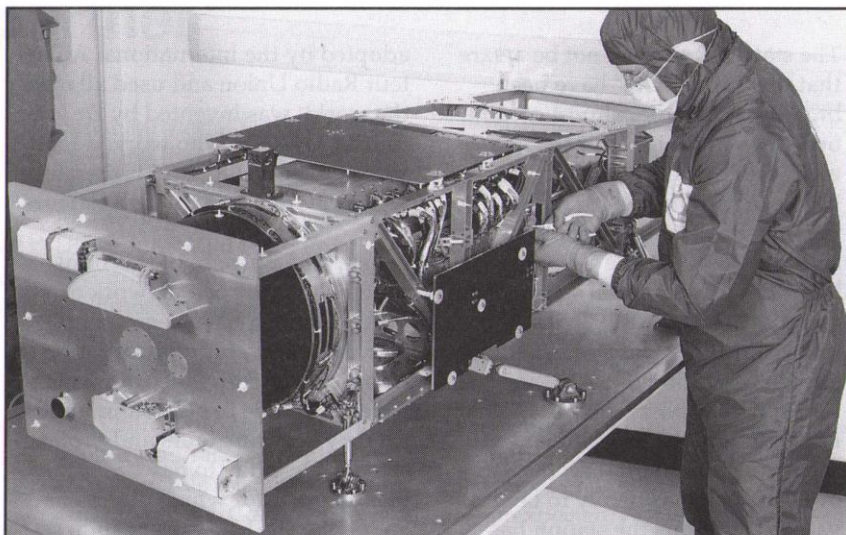
Jozefa Rogocki with her sculpture which was inspired by the dark matter project (94RC4344)

The search for dark matter is critical to our understanding of our Universe. About 90% of the matter contained in the Universe is invisible to us. The search for this missing or dark matter needs to take place far from the interference of cosmic rays at the Earth's surface. RAL has installed a detector one kilometre underground at the Boulby Mine, the deepest in Europe, to try to find an explanation of this mystery. ■

RAL delivers experiment for major solar mission

Despite many years of study by solar physicists, the Sun's atmosphere remains a mystery to us. RAL has recently completed an important stage in the construction of a unique and powerful space instrument which scientists hope will help them to unravel the mystery. The Coronal Diagnostic Spectrometer (CDS), built by an international consortium led by RAL, is to be launched in July 1995. CDS will provide an unprecedented insight into the Sun's atmosphere.

The first cornerstone of the European Space Agency's (ESA) Horizon 2000 space programme, which includes the Cluster and SOHO (Solar and Heliospheric Observatory) mission, is designed to study the Sun and its influence on the Earth. Due to be launched on board an Atlas IIaS launch vehicle in July 1995, SOHO will take four months to reach its operating position at the so-called Langrangian point between the Sun and the Earth where the gravitational pull of the two are equal. From there SOHO will have a continuous view of the Sun. It will monitor the solar wind upstream of the Earth, allow close investigation of the solar corona and provide information on the interior of the Sun. On board the SOHO spacecraft, with a field view of approxi-



CDS flight model final assembly (94RC2699)

mately 200,000 km square on the Sun's surface, CDS will record the extreme ultraviolet component of the solar spectrum whose emission lines provide a wealth of plasma diagnostic features which will yield information on conditions which exist in the corona.

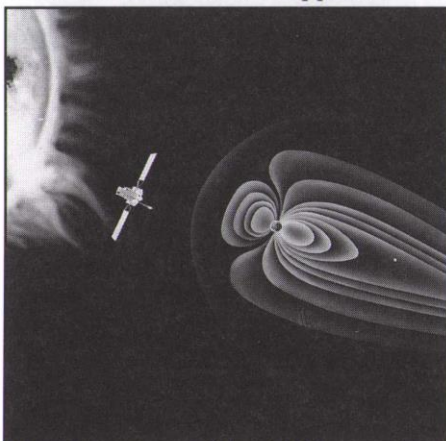
Beginning in 1987 with the proposal phase, the experiment team constructed and tested two prototype instruments before embarking on the flight model programme in 1992. Assembly was completed at the end of last year and was followed by a thorough test and calibration phase.

The experiment was then delivered to Marconi, Portsmouth to be integrated with the payload model. Mechanical and electrical integration and system tests took place during the spring and early summer. This month, the payload module will be transported to Toulouse in France to be mounted on the service module. The entire spacecraft will be moved in April 1995 to the Kennedy Space Center for the launch campaign. Since the greatest scientific gains will be

made through multi-experiment observations (there are 12 experiments on SOHO) each experiment team will maintain a planning and operations group at the operations facility at the Goddard Space Flight Center near Washington. The nominal lifetime of the mission is two years but it can be extended to six years.

The resources required to complete the experiment are considerable. For instance, the design, construction and test effort for CDS has involved over 100 staff years of effort at RAL alone, primarily from Space Science and Technology Departments. The total cost of the experiment is of the order of £17 million. ■

Richard Harrison
Space Science Department



An artist's impression of the SOHO spacecraft between the Sun and the Earth (89FC1691)

Radio RAL comes home!

The staff of RAL may not be aware that the initials 'RAL' have been broadcast on radio, almost continuously day and night, for the last eight years. The RAL Radio Club has been responsible for the operation of a propagation beacon, call sign GB3RAL (the GB3 part identifies it as a special station from Great Britain), since 1986. Until a few years ago it was sited at a little known outstation of RAL, the Ionospheric Observatory at Ditton Park, Slough, the last remnant of the Appleton Laboratory. However, that site has finally to be vacated and thus the station has been brought to Chilton.

You may already have noticed the new mast and strange receiving aerials which have appeared on the grass to the south west of the site: these belong to the new ionospheric sounder (ionosonde) which has been operating at RAL since last December (see June's issue of the Bulletin for more on the ionosonde). The antenna of the beacon is a much more modest affair; a mere six metres high, attached to the side of the Radio Club shack. The beacon transmitter is of ancient design, using vacuum valves, its output power being limited to ten watts. Nevertheless, under the right conditions, it can be heard all over the world. It transmits a continuous tone on the frequency of 28.215 MHz (in the part of the amateur 10 metre band allocated for beacons) interrupted at regular intervals by its call sign given in the Morse code (for the technically minded, it uses FSK - frequency shift keying) followed by a six character code known as the *Locator*, indicating its position on the globe. This Locator code, now

adopted by the International Amateur Radio Union and used all over the world, was invented by Dr John Morris, G4ANB, who worked for some time at AERE and is therefore well known to local radio amateurs.

What is the purpose of this transmitter? It is part of a network of beacons which have been set up world-wide to study propagation in a part of the radio spectrum which is very variable in behaviour and is used by both amateurs and professionals. On a day to day basis, it tells an operator which directions are giving the best propagation so that he can turn his directional rotary antenna for the best results. In the longer term, reports and observations of these beacons provide material for serious studies of radio propagation. The author, a member of the Propagation Studies Committee of the Radio Society of Great Britain, has presented a professional paper based on the analysis of the observation of these beacons (G H Grayer and M Harrison, 'Spatial and temporal correlations in bistatic communications via 28 MHz sporadic E', IEE Conference on HF Radio Systems and Techniques, Edinburgh, 22-25 July 1991).

Thanks to the assistance of Ivan and Roy Church, Roy Evans and John Wright, all licensed radio amateurs, GB3RAL will hopefully continue to serve the world and at the same time advertise that RAL is involved in the world of science.

The RAL Radio Club is supported by the Rec Soc and possesses a well equipped shack and antenna farm on site. New members are welcome. For further information, contact the

Secretary, John Wright (G3VPW) in R25. ■

Geoff Grayer (G3NAQ)

Particle Physics Department

Congratulations ...

to Keith Jeffery, Head of Systems Engineering Division in Informatics Department on his recent appointment as Honorary Professor at Heriot-Watt University. The title is granted by the University in recognition of Keith's support with research activities in the area of databases within the Department of Computing and Electrical Engineering. Keith is also Honorary Senior Visiting Fellow at the University of Birmingham.



Professor Keith Jeffery

(94RB4584)

And ...

to Mick Shaw of the Central Laser Facility on his promotion on Individual Merit to Grade 6.

ISIS renews collaboration with first international partner

ISIS has concluded a collaboration agreement with the Indian Bhabha Atomic Research Centre (BARC) near Bombay which will provide £200,000 of beam line equipment for Phase I of the OSIRIS project which will see a second cold neutron guide installed at ISIS.

ISIS is now operating at its design specification. Over 500 experiments are carried out each year on its 15 neutron and three muon instruments, for 1200 scientists from the UK, Europe and around the world. When the first Indian agreement was signed in 1984 ISIS had yet to produce any neutrons or muons and BARC was our first interna-

tional partner. It was appropriate therefore that Dr B A Dasannacharya, the project scientist for the original agreement and now Director of Solid State Physics and Spectroscopy at BARC, was present to witness Dr Paul Williams, DRAL's Director, formally sign the second agreement.

The OSIRIS project will explore the scientific and instrumental horizons available to cold neutrons on pulsed sources. Cold neutrons travel very slowly and their energies can therefore be measured very precisely. They are thus ideal to measure very low vibrations in molecules at the micro electron volt

level. In the planning stages of ISIS, its ability to generate copious quantities of hot neutrons, well beyond intensities available from reactors, was heralded as opening up new areas of science to neutron scattering such as magnetic excitational spectroscopy. This it has certainly done but experience gained during the first years of operation of ISIS - the world's first high intensity pulsed neutron source - has shown that it is also an unexpectedly powerful source of cold neutrons. Phase II of the project will be funded by a Collaborative Research Grant from SERC, one of the last it awarded, to Professor D K Ross of the University of Salford. ■

*Colin Carlile
Science Department*



From left to right, standing: Dr Colin Carlile, Head of ISIS Spectroscopy and Support Division and OSIRIS Project Leader, Prof D K Ross, University of Salford and Dr Andrew Taylor, Head of Science Department and of ISIS. Seated: Dr Williams and Dr Dasannacharya (94RC3529)

RAL plays host to young scientists

Young scientists attending an international meeting in London were given the chance to see science in an 'everyday' context when they visited RAL earlier this month. The 36 students were among 300 participants in the 36th meeting of the International Youth Science Forum. This was the fourth year in succession that organisers of the event had chosen to send their students to the Laboratory.

The aims of the Forum are to give the students an insight into science and its applications for the benefit of society and to develop a greater understanding between young people of different nationalities, from different customs and different scientific areas. The group which visited RAL included students from Canada, Cyprus,



Students attending the International Youth Science Forum gather outside R71 at the start of their visit to RAL (94RB4642)

Hong Kong, Japan, Poland, South Africa, Turkey and Zambia.

The visit to RAL is an important element in the students' two-week programme as it gives them the

opportunity to see the many and varied ways in which science can be applied. Their visit included tours around the Central Microstructure Facility, ISIS, Central Computing and Space Science. ■

Ken Phillips: Guide to the Sun

Ken Phillips' book 'Guide to the Sun', is about to be published in paperback. Since it was published in 1992 by Cambridge University Press, the book has sold 3400 copies worldwide, more than half in the United States, and has been adopted as a course book by a number of UK and US universities and colleges.

Ken, an astrophysicist in Space Science Department, had the idea of writing the book in the days of the Solar Maximum Mission, a NASA spacecraft in which RAL played a large part. There was very little literature which dealt with both the space-based and the more traditional ground-based observatory view of solar physics.

As he got down to writing the book, Ken found that the scope increased enormously as there were so many new developments in the late 1980s to write about. The book took seven years to complete.

The book includes an introduction to the history of solar studies, a discussion of the solar interior, solar atmosphere, solar wind and the Sun's interaction with the Earth; the Sun as a star; solar energy, and observing the Sun with telescopes and spacecraft. There are extensive discussions on some of the more exciting solar problems being studied at present, such as the solar neutrino problem, solar oscillations ('helioseismology'), flares and the perennial problem of how the

corona is heated. Although he claims not to be overenthusiastic about writing any follow-ups, Ken has been asked to contribute the solar sections to a new dictionary of astronomy which will be published in about 18 months time. "It is gratifying to have written a book, especially a scientific book," explains Ken, "but I don't recommend it as a living. The royalties don't exactly allow you to have a life of luxury!"

Has anyone else in the Lab written a book? If so, let us know. We'll be pleased to publish the details. It may not get you on to the bestsellers' list but it may increase sales by one or two books! ■

RAL successes in Sports Days 1993/94

Head of RAL, Gordon Walker, presented the winners of events at the 1993 and 1994 indoor and outdoor sports days with their individual mementoes of sporting success at a lunchtime gathering in the Rec Soc lounge on Wednesday 3 August. A good excuse for a

little liquid refreshment on a hot day resulted in a fair turnout to witness the presentations. RAL's successes came in a wide variety of sports, ranging from bowls to badminton and from cribbage to croquet. Gordon urged everyone to get some further practice in for next

year, particularly as he found that he had no 1994 outdoor sports day winners to congratulate. No doubt Gordon will also be working hard to improve on the highly commendable second place achieved by RAL in the recent inter-establishment golf tournament held at Mapledurham, near Reading. ■

Some of the winners receiving their mementoes from Gordon Walker. Clockwise from top left: Richard Lawrence, Badminton, mixed pairs 1993 and mens doubles 1994; Diane Ayres, 100 metres 1993; Richard Bishop and Natalie Bealing, cribbage 1994; Tudor Morgan and Bob Maybury, bowls, pairs 1993.



(94RC4646)



(94RC4652)



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Noticeboard

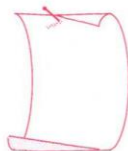
Acknowledgements

David Mann - "I wish to thank all the colleagues who I did not get the opportunity to see prior to my retirement for making my years at the Laboratory so pleasant and satisfying. Thank you for my parting gifts, all of which will be useful but also rather special to me. May I also wish everyone success as the Laboratory changes its relationship with the Research Councils and with the users of the Laboratory's facilities over the coming months."

Keith Soutern would like to thank everyone who gave so generously to the Blenheim Ward fund at the Churchill Hospital in memory of his wife Brenda. Keith also wishes to say goodbye to his old friends and colleagues at the Lab and to apologise to those he missed. "It's been a pleasure working with you all."

Retirements

Eric Wakefield, a mechanical craftsman in the Engineering and Building Works Division retired on 15 July after 13 years at RAL. Not a lot of people know that, as Eric insisted that he did not want a fuss. An ex-Matthew Hall and Geo E Taylor man, his industrious pipe-fitting skills are legendary and he will be sorely missed. His workshop colleagues managed to force him to accept a presentation clock and retirement gifts of a battery drill/screwdriver and strimmer while wishing him well at a quiet 'do' in the Rec Soc bar - *Barrie Bridgeman*



Library tours

Have you ever wondered whether the library has any interesting books? Did you know you can find out AND borrow the books without leaving your office? For answers to these and many more questions, why not come along for a library tour? The tours last 30-45 minutes and there are two types available; a general tour and an introduction to databases (library database, BIDS, Inspec CD-ROM and online search services). Contact the library desk on ext 5384 to book your place.

Return to sender

A small parcel sent from DRAL on 13 May 1994 addressed to Ms Allison Elliot has been returned due to 'insufficient/incorrect' address. Will the sender please contact Chris Taylor on ext 6370 or OV/VM id CJT.

Rwanda appeal

Thank you to everyone who gave so generously to the collection in aid of the Rwanda appeal and to those who helped to collect the money. A total of £550 was raised. The money will be paid to the Disasters Emergency Committee, a body made up of the seven main charities working in the area. For those of you who missed the collection but would still like to contribute, contact Liz Green on ext 6285 - *Anne Barton*

Health & fitness club

Images, the health and fitness club in the Old Gaol, Abingdon, is offering group membership (minimum 10 members) for £100 per person, a saving of £150 on single membership. As a member, you will have access to many of the centre's facilities including the swimming pool, jacuzzi, sauna and gym. If you would like to take advantage of this unbeatable offer, write to Faiz Mahmmud, R63, Rm 1.13.

Short mat bowls

Well, not that short. The mat is about 45' long and 6' wide. It is a game of skill played to similar rules as the outdoor game but has the advantage of being played indoors. Our club runs two league sides and is looking for new members. You are guaranteed a good evening's entertainment with the bonus of travel to exciting locations: Chilton, Grove, Wallingford and even Oxford. Refreshments are available at all venues. We play at Didcot Labour Club although we have no political affiliations. If you would like to come along to meet us, either on a Monday or Wednesday evening at 7.30, contact Edith Knight on ext 6205 or Didcot 813929 for more information - *Edith Knight, Sec, DLC Short Mat Bowls Club*

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