Bulletin
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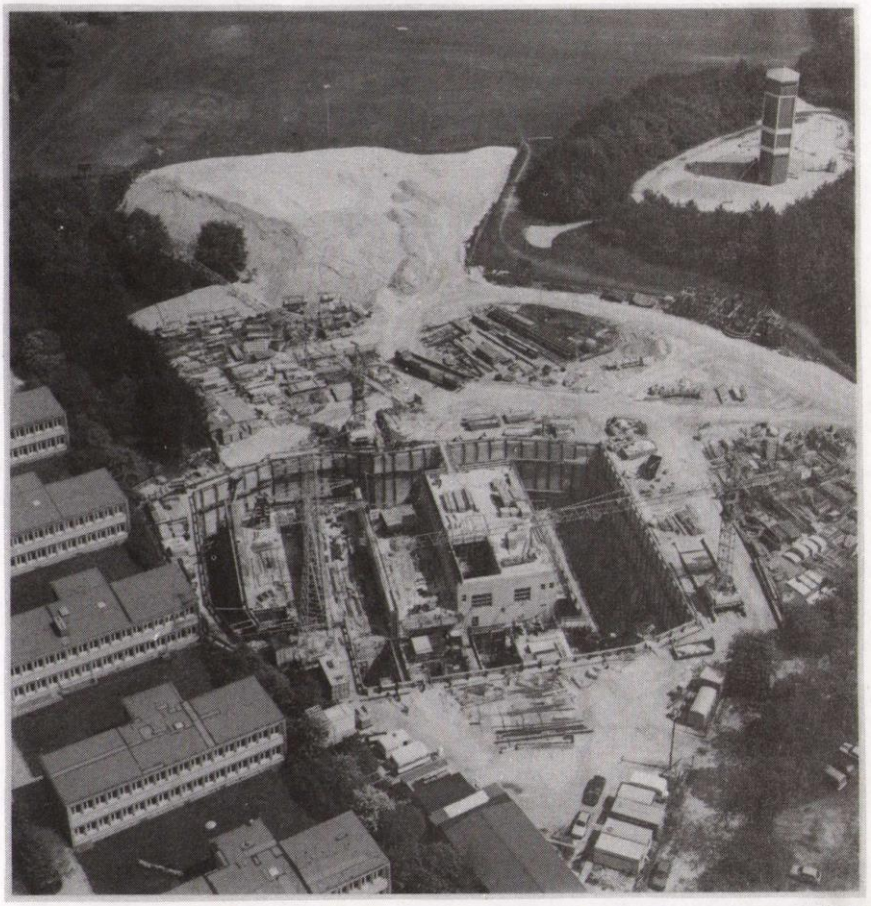
HERA, Here we come

In April 1984, the German Federal Republic approved the construction of the colliding beam accelerator HERA at the DESY site in Hamburg, to cost 660 million deutsche Mark at 1981 prices. This novel accelerator will bring opposing beams of 30 GeV electrons and 820 GeV protons into collision at unprecedented centre of mass energies.

The type of experiment possible with this accelerator can be traced back over 70 years to when the first nuclear scattering experiments took place in a basement lab in the physics department in Manchester University. A small team lead by E Rutherford used a beam of alpha particles to study the structure of the gold atom. This "alpha microscope" showed that the atom had a nucleus some 10^{-5} times smaller than the atom itself and where virtually all the atomic mass resides. Physicists have continued this kind of experiment until the present day and have been able to probe the structure of the proton (the simplest nucleus of all) using the present generation of particle accelerators, down to distances which are one hundredth of the size of the proton itself. We now know that the proton consists of quarks and gluons as do the nuclei of all the 109 known elements.

HERA will be the most powerful electron microscope ever built. It will have a diameter of about 2 km, tunneling under the Hamburg suburbs, and so will also be the biggest. When completed in 1990, it will provide physicists with the opportunity to look at the detailed structure inside the proton down to about one ten thousandth of the proton size. To find out whether this increased magnification will show only the known quarks and gluons in more detail, or some other new and completely unexpected substructure, is one of the intriguing questions which physicists will be able to answer when the experiments begin.

Following a preparatory meeting in Genoa in October 1984, two international collaborations have been formed, calling themselves H1 (= HERA 1) and ZEUS, each proposing to build a large experiment, both of which have a strong British component. In tandem with the presentation of the technical proposals at DESY in April 1986, a similar presentation was made at a meeting of the British Particle Physics Experiments Selection Panel (PPESP) held at RAL on the 9th of June. The DESY committee has now approved both experiments and the PPESP in Britain has also recommended that the experiments be supported with funds and technical effort so that they can be constructed and operational by 1990.



Civil engineering work on the HERA North Hall, home of the H1 experiment. DESY.

The H1 collaboration brings together groups from Glasgow, Lancaster, Liverpool, Manchester and RAL in a consortium with groups from both the Federal and Democratic Republics of Germany, France, Italy, Switzerland, the USA and USSR. The British groups will provide the so-called "Forward Tracking Module", a sophisticated tracker for the charged particles which form the major constituent of the "jets" - the physical materialisation of quarks and gluons.

In addition, the H1 international collaboration has asked RAL to build the large (6 m diameter x 5.5 m long) superconducting coil for the experiment. It will be built by the Advanced and Physics Apparatus Groups in the RAL Instrumentation Division.

ZEUS has British involvement from Bristol, Imperial College and University College of London, Oxford and RAL, working with collaborators from Canada, the Federal Republic of Germany, Israel, Italy, Netherlands, Poland, Spain and USA. The British groups will join together in a common effort to build the "Central Tracking Detector" for ZEUS which will be a complex multilayer cylindrical drift chamber to track the particles which emerge at wide angles in the experiment.

(see over)

HERA *(cont'd from p1)*

Both H1 and ZEUS will incorporate state of the art technology in the mechanical and electronic engineering solutions to their design concepts. This will involve a close cooperation between the physicists and technicians on the experiments and the engineers at RAL and the university labs. There is also a large amount of close cooperation and liaison with colleagues in collaborating institutes to ensure that the interfaces between adjacent parts of the detector are correctly maintained. For example, physicists and engineers from Orsay in France and Aachen in the Federal Republic are now attending the regular tracking meetings of the H1 group held at RAL.

Both of the experiments will cost more than £25 million each to build, hence the need to establish a broad international base in order to embark on these massive projects. The next 4 years will see an intense technical effort, culminating in the excitement when the first experimental data starts to come in.

Robin Marshall of H1.

The RAL Fund

From The Director

The RAL Fund was set up early in 1985 with the intention of providing financial support for activities associated with the Laboratory but which cannot properly be paid for with public money.

The Fund now has a healthy bank balance thanks to the generosity of staff who have voluntarily diverted fees and royalties from work they have undertaken into the account, and the Division Heads Committee has been discussing ways in which the fund can now be put to good use.

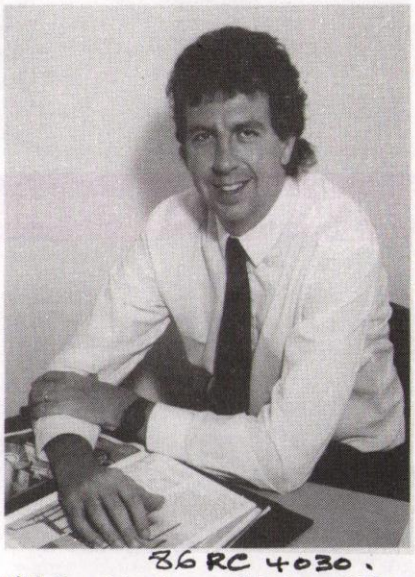
Two schemes are to be promoted in the first instance, but I am ready to consider other possibilities that do not overstretch the limited resources of the Fund.

Our first scheme is to institute an annual award for a young and junior member of staff who, during the year, has shown special endeavour and initiative which is a credit to the Laboratory. Nominations are invited from supervisors - they should produce a case for their nominee of not more than one page and submit it through their Division Head. Closing date for nominations is 1st October 1986.

The second scheme is to support young people who wish to undertake some charitable or other worthy cause that might require some modest financial support from the Laboratory and I shall be pleased to consider any application for this type of activity.

Young is defined as less than 30, junior to be up to and including HSO or equivalent grades.

A Press Officer-At Last



Bill Bennett, the new RAL Press Officer, is now installed in R1 and ready for business.

Bill is a physics graduate of Manchester University and an experienced journalist and broadcaster.

Past editor of 'Computer Choice' and one time deputy editor of 'Practical Computing', Bill has also worked as a feature writer on local papers in the London area and is the author of books on micro-computing, including one for children.

He is a 'communicator' and as section leader for RAL's Press and Public Relations unit, he intends to present the Laboratory's publicity material in a way that will excite the outside world as much as it excites us.

This ideal however cannot be achieved without the Laboratory playing its part. He needs the raw material with which he can work.

Please get in touch. Bill's office is Room 283, Ext. 5768.

NBSC Appointment for John Harries

It has been announced recently that in addition to his duties at RAL Dr John Harries has been appointed deputy Director of Project and Technology at the British National Space Centre (BNSC). He will act as deputy to Jeffrey Fellows.

Sales to Employees

The sale of scrap materials to RAL staff will take place on 22 August from 12 noon to 12.30 hrs in the R24 Scrap Compound.

Sportsday

Brilliant sunshine, cloudless skies and the hubbub of laughing voices - well not quite. But it didn't rain at the SERC Sportsday at Birmingham on 4 July and RAL fielded over 150 entrants/spectators, won quite a few of the honours and had a marvellous time.

For the first time in ages, our Tug-of-War team won! Alan Saxby and Helen Dorsett did their usual victorious 100 yds dash, and the Rounders team fought their way to the winners enclosure again. The Tennis competition brought RAL two first prizes, Lorna Claringbold and Tim Pett winning the mixed doubles once more, joined this year by the men's doubles pair of Ken King and Gian Gopal. Mary Shepherd, partnered by Jane Sandalls became bowls pairs champions, (yes again) and the Appleton 'B' team of six-a-side footballers led by Brien Cox won their event beating Rutherford 'A' by one goal.

At the end of the day, trophies were presented by Professor 'Bill' Mitchell, Chairman SERC, including a special award, the Sir Geoffrey Allen Award. This is presented to the person or group who, in the opinion of the Sports and Social Association's Committee, has made the greatest contribution in the previous year to the Council's sports or social activities. The 1986 Award went to the Railway Modellers Club at RAL and was collected by Ray Roberts.

Bowls

The weather was kind to the bowlers again this year and everyone had a very enjoyable day, there being some very good bowling on a very tricky green. All SERC establishments were represented.

The Triples were played in two leagues of 3 sets. In League I Steve Stoneham, Charlie Wakeford and John Turner (RAL) won one and lost 2, Tudor Morgan, John Govans and Paul Pennington (RAL) won 2 and lost one and Central Office won 2 and lost one, but won the league by shots difference. In the other league Steve Hancock, Neil Grafton and Rob Hambleton (RAL) won all three games and so had to face C.O. in the final, losing to them by 2 shots.

The Pairs started with a slight hitch but, thanks to George Shepherd, this was sorted out, and the finals were played between Mary Shepherd and Jane Sandalls against another RAL team Les Harding and Peter Mace. Les and Peter had won their way to the final against a Daresbury pair, by a large shot difference but succumbed to the play of Mary and Jane, and the cheers of the ladies' supporters club.

Thank you all for the effort you all put into the event and for bearing with Tom Hinds and myself, and again our thanks to George Shepherd for looking after the scores.

'86

Congratulations to all who took part and thanks to all who came to give support - let's try and make it even more next year.

Tudor Morgan
Chairman RAL RecSoc.

Cricket

Everyone arrived at Birmingham for the six-a-side cricket match feeling optimistic. Daresbury, rumour had it, were fielding a strong batting line up to counteract the threat of a certain Mr Hassan from Central Office.

Rutherford 'A' moved comfortably to the semi-finals disposing of Daresbury 'B' and Central Office 'B' along the way. Rutherford 'B' found themselves in the same group as C.O. 'A' and Daresbury 'A'. They batted well but were really no match for the stronger sides.

The semi-finals paired Rutherford 'A' and Central Office 'A' and Daresbury 'A' against Central Office 'B'. Rutherford 'A' lost the toss and were asked to bat. After a good start wickets fell rather too often and a total of 57 was all that was made off the allotted five 8-ball overs. Central Office started slowly but with only 58 to aim for and Mr Hassan at the crease, Rutherford's chance had almost gone. But drama was to come - a dropped catch which could have changed the match and then an injury to Yaki (Hassan) who needed a runner. (I don't know why - he hit most balls for 4!!!). After that Central Office 'A' hit the winning runs in the last over.

In the other semi-final Daresbury 'A's batsmen proved too strong for the Central Offices' 'B' side.

The final was quite close, but in the end Central Office deservedly lifted the cup again! Anyone who believes (as I did) that Central Office were a one man team, think again: Yaki Hassan did not bat in the final as a result of the injury sustained in the semi-final.

Well done Central Office. One day, maybe, RAL can muster up a team to wrestle the cup back to the Lab.

A Napper.

Football

The Six-a-side Football made a "Good" start, when organiser Kevin Lewis was left behind at RAL! Apart from this, a good day was had by all.

A total of 14 teams entered, nine being from RAL, and at the end of the qualifying league matches we were left with 6 RAL teams, a Daresbury team and a Central Office team.

Results.

Rutherford	'A'	2	C.O		1
Appleton	'B'	1	Appleton	'C'	0
Daresbury	'A'	4	Atlas	'A'	1
Appleton	'A'	4	Rutherford	'B'	1

(see over)

Sports *(cont'd from p3)*

Semi-finals.

Rutherford	'A'	5	Daresbury	'A'	3
Appleton	'B'	3	Appleton	'A'	0

Rutherford 'A' having played a very tiring semi-final, being 2-0 down at half-time before fighting back, were understandably jaded in the final against Appleton 'B'. In an end to end game the lead changed hands several times, the final score being a draw 3-3. Extra time was played and Rutherford 'A's efforts in the semi-finals began to tell on them. Tired legs could do nothing to stop Appleton snatching a goal to win 4-3.

My thanks to all referees and all who helped in the initial crisis.

Mick Dew.

Tennis

This year's tennis competition was played at the main Civil Service Sports ground in Birmingham, so that the competitors could watch the other sports and the other sportsmen could watch us!

The mixed competition had six entries, two each from RAL, Atlas and Central Office, while the mens competition attracted only four pairs, three from RAL and one from Daresbury - a fifth from RGO having dropped out the day before the event.

The competitions took the form of a round-robin with the mixed pairs playing 8 games against every other pair and the men playing 16 games against each other. The event was well organised with a fairly strict time schedule due to the fact that only two courts are available at the ground. Fortunately the rain held off and everything was completed on time.

In the mixed event last year's finalists were again contending for the cup. Tim Pett and Lorna Claringbold went into the final game of the competition against Tony Short and Jan Charles with only a single game separating them. Tony and Jan took time to settle, as nerves seemed to creep in, so Tim and Lorna took the game 6-2 to win the cup for the seventh consecutive time.

In the mens competition, the opening match had resulted in an 8-8 draw between the RAL pairs of Colin Walters and Barry Whittaker and Gian Gopal and Ken King. It then became a question of which of these pairs would take most games from the remaining pairs during the day. Gian and Ken came out on top but with only two games in it.

Lorna Claringbold

"Insight"

Jeremy Curtis discussing Space Engineering with six young engineers who visited the Laboratory in July while attending an "Insight" course in Oxford.

"Insight is organised by the Engineering Industry Training Board to encourage the participation of women in all fields of engineering. The tour they made of RAL was, therefore, slanted towards this aspect of our work.

Welcomed by Peter Clee, who explained the role of the professional engineer at RAL, they also had the opportunity of talking to half-a-dozen of RAL's women scientists and engineers; Kate Lidiard, (an ex-"Insight" student herself) and Georgina Howes (both of Geophysics and Radio Division), Debbie Thomas (Technology), Zoe Bowden (Neutron Division), Judith Hart (Laser Division), and Julia Gardiner (ISIS); giving them a broad overall picture of the opportunities available to women engineering graduates in modern research.

86 RC 3813

"Olympiad"

86 RC 3880.

VULCAN's 6-beam target chamber for x-ray laser research gets a close inspection.

Students visiting the UK to compete in the XVII International Physics Olympiad, were guests of RAL on Wednesday 16 July.

They came from 13 different countries including Hungary, Turkey, Finland, Spain, Russia and Holland, putting a strain on RAL's linguistic capacity, brilliantly overcome, with help from friends and the students own multilingual capabilities.

A tour of ISIS and the Laser Facility; demonstration of the latest computer graphics systems and an exposition on the latest results from Giotto provided a lively and stimulating day for students and hosts alike.

The Olympiad, which was held at Harrow this year, is a competition for pre-university physics students, already selected by competition in their home countries, and consists of theoretical and practical physics examinations. Diplomas are awarded to the winners of various sections and a points total decides the overall winner.

To the many of you who gave unstinted time and effort to making the day such a success, Thank you.

And, the results of the competition? Well it would appear from the list of special, Gold, silver and bronze medals awarded, that Russia won, Romania came second, and the rest of the medals were spread very nicely amongst the other participants.

Bulletin

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Missing

These items are the subject of loss reports. Please relay any information concerning them to the enquirer named.

Ultra-sonic Bath Inv.No. V004409.
Mike Farmer, Ext. 5122

A I Leakseeker Ser. No. 5953
A Paley, Ext. 6119

COMARK Digital Thermometer Model 3110
Ser. No. 10536
D E Baynham, Ext. 5374

Electrician's tool kit - Removed from R55
P Surtell, Ext. 6300

Telenova Bleeper No. 94
Mrs A Cox, Ext. 6253

Film Badge Notice

It is Period 9 Colour strip BROWN. Please return all beta - gamma films and fast neutron badges promptly.

Trade Exhibition

Racal Instrumentation will be displaying their frequency measuring devices, microwave equipment and general purpose recorders in the R12 Conference Room on 18 September from 1000 to 1600 hours.

RAL Lectures

The next lecture in this series will take place on Thursday 11 September 1986 at 3.15 p.m. in the R22 Lecture Theatre

"THE STAR WARS INITIATIVE"

by

DR DAVID BAKER

(Space Consultants International Limited)

In March 1983, President Reagan publicly declared his Administration's commitment to a ballistic missile defence based on new technology in directed and kinetic energy weapons. The programme, lasting five or six years, is designed to explore the possibility of deploying a defensive screen on Earth and in space to protect US and NATO cities and the instruments of retaliation, should a reciprocal response be needed. But all of that, said the President, should be en route to the negotiated removal of all nuclear weapons "from the face of the Earth".

The Lecture will describe the President's plan, relate it to earlier work on ballistic missile defence and discuss its implications for strategic conflict and the principle of deterrence. In so far as time permits, it is hoped that the ensuing debate will embrace issues such as the consequences for pure research, the balance between military and civilian R & D at strategic defence levels and the problems regarding classified applications.

Xmas Parties

For your Xmas Parties, book the Games Room in the RecSoc Building R58!

The room is available at lunch-times over the pre-Xmas period from 12.00 to 14.00 hrs.

For further information please contact K Lewis, Ext. 6713. For buffets contact Mike Dew, Ext. 5545 or Tudor Morgan, Ext. 5563.

Yoga

The Yoga club meets each week in R68 Conference Room at 12 noon on Mondays.

If you want to learn more about Yoga, of if you just want some gentle exercise, you will be very welcome.

Please contact Jerry Mayers, Ext. 5683 or Jack Wheeler, Ext. 5570 for more details (or just turn up for the class).

Crib

Time marches on!
The 1986/87 season of the RAL Lunch-time Crib League is due to start in early October.
Entries please as soon as possible to Tony Lubbock Room 2.66 R1.