Rutherford Laboratory

2-9 April 1973

bulletin 13

We are extremely grateful to Dr J Howlett, the Director of the Atlas Computer Laboratory for the following article. It is interesting to recall that the bulk of the computing work of the Rutherford Laboratory was carried out on Atlas until we took delivery of the IBM 360/75 in 1967. The many achievements of the Atlas Laboratory can best be summed up by a short quote from the article by Dr Howlett in the current issue of 'QUEST'; "we set a new standard".

FAREWELL TO ATLAS

"One powerful computer, Orion, has just been installed in the Rutherford Laboratory; next year the Atlas Laboratory will take delivery of one of the most powerful computing systems in the world; C E R N is putting a great deal of thought and effort into deciding on its next computer, which it recognises will be a major piece of equipment in the Laboratory."

This was the opening sentence in a front-page article in ORBIT, the Journal of the Rutherford High Energy Laboratory, August 1963. A little further on the same article says "..... the National Institute's Orion, which ranks as a medium sized machine, has cost £350,000: the Atlas will cost £2,800,000". That issue of ORBIT had other interesting facts to reveal. My copy - preserved as an historic document - has a sort of stop-press sheet with a reproduction of a telegram to Lord Hailsham, then Minister for Science, with the message: "27TH AUGUST FIRST OPERATION NIMROD STOP MAXIMUM ENERGY 8 GEV STOP INTENSITY AT 7 GEV 10 TO POWER 10". And the Editorial starts "The Rutherford Laboratory Restaurant served its first meals to the Members of the Governing Board when they met at the Laboratory on Monday 15th July".

Well, time passes. ORBIT is no more, neither is NIRNS; Orion went in 1966 and Atlas will be switched off for the last time by the Chairman of the Science Research Council at about 3.00 p m on 30 March 1973. But NIMROD is still alive and working and the restaurant is still serving meals, so it is not entirely change and decay that all around we see. And before anyone gets the wrong idea let me say that work has just started on the new wing which is to be added to the Atlas Laboratory building.

Ten years is a long time in computer history. After the various individual university-laboratory machines of the late 1940's, the first engineered computers were built and sold in 1951-52 - the very first, in fact, being the Ferranti Mark I which went to the University of Toronto in 1951 - and it was not until 1955 that real production machines began to become available in anything like quantity. So the whole history of the computer as anything much more than a laboratory adventure goes back only 20 years and Atlas was designed before the half-way point. Like many other achievements of the computer world - including the Mark I and Mercury computers - it originated in the distinguished group in the University of Manchester led by Dr Tom Kilburn - now Professor Tom Kilburn FRS; in 1971 a lot of people were greatly pleased to hear that the American IEE had awarded Professor Kilburn their W Wallace McDowell medal "for achievement in designing and building some of the first - as well as the most powerful - computers in the world".

Atlas was certainly an adventure. It was very fast for its day, but more important, it embodied a number of features which were then quite new but which have since become woven into the fabric of computer design and technology. Probably the most important were the paged store - better known around the world now as Virtual Memory, much as the B-register for the Manchester Mark I later became the Index Register - and the first really comprehensive operating system. This was called the Atlas Supervisor and it was indeed, for its time, staggeringly complex. One very distinguished scientist with whom I was discussing our machine said it was "too clever by half".

Of course we had a rough time getting the machine into service - hardware and software faults interacted in singularly baffling ways and at times just about broke everyone's hearts. But it all came out right in the end - in fact, as one saw looking back, with no more pain and grief than has been caused by every early model of every advanced computer. History is solid on this - they all give trouble and practically break their owners' hearts; but they all come right in the end - you just have to keep your nerve.

After having got into its stride Atlas proved a tremendous success; all those fancy and far-out provisions in the hardware and software worked like a charm, and what is more, with outstanding efficiency. A very large number of research workers in British universities were able, because of Atlas, to embark on research projects and to bring them to a successful conclusion which otherwise they could never have contemplated. It was on the basis of about 5 years' work with Atlas that the Meterological Office were able to show that their proposed 10 level model of the atmosphere, with the effect of water vapour included, could be developed into a weather forecasting system, and to support the case for the 370/195 which is now installed at Bracknell. What is so sad is that so few of these splendid machines were made - 6 in all: yet another of our great British missed opportunities, to my mind.

We are closing the machine down now partly because, as an old machine, it is expensive to maintain, and partly because, although it is still going very well, we can already see signs of trouble ahead. Most of the components are now obsolete and are becoming unobtainable, and a few failures could have disastrous effects. So with much sorrow and nostalgia we shall say farewell to our faithful work-horse on Friday. The English poets can be relied upon for fitting comments on any occasion - for this, I offer you Wordsworth:

"And what if she had seen those glories fade?
Those titles vanish and that strength decay?
Yet shall some tribute of regret be paid
When her long life hath reached its final day.
Men are we, and must grieve when even the shade
Of that which once was great has passed away."

FILM BADGE NOTICE

Period 4 commenced on Monday, 26 March.
Colour Strip ORANGE for βγ films.

Please check that you are wearing the correct dosimeter and that all old ones are returned.

INTERNAL EVENTS

NIMROD LECTURE SERIES
Monday 2 April
11.30
Lecture Theatre

Partial Wave Analysis of the 3π and Kππ Systems

Dr J D Hansen/CERN

HEP DISCUSSION GROUP
Wednesday 4 April
11.00
Conference Room, Building R1

Three Body Final State in Low Energy K^-p Reaction

Dr P Litchfield/CERN

TRADE DEMONSTRATION
Wednesday 4 April
10.00 - 16.00
East Wing Conference Room, R1

Presentation by British Olivetti of a Data Input/Output Cassette Video System

All interested in remote computing facilities are welcome.

SEMINAR IN COMPUTING
Friday 6 April
11.00
Lecture Theatre

Computer Animation

F R A Hopgood/Atlas

The talk will describe some of the work on computer animation done at the Atlas Laboratory using the SD 4020. Some examples of films made at Atlas will be shown and there will be some discussion of both hardware and software problems involved.

NIMROD LECTURE SERIES
Monday 9 April
11.30
Lecture Theatre

Polarisation in Strong Interactions

Dr R P Worden/RHEL

EXTERNAL EVENTS

DARESBURY LECTURE SERIES
Monday 2 April - Friday 13 April
11.00
Daresbury Lecture Theatre

Electroproduction at High Energies (Lecture Series)

F. Close/DNPL

INSTITUTE OF MATHEMATICS
Monday 16 April - Wed 18 April
Loughborough University of Technology

Conference on 'Software for Numerical Mathematics and its Applications'

Further details from the Editor

OXFORD POLYTECHNIC COURSE
Wednesday 30 May - Friday 1 June

Short Course on Non Destructive Testing. Course Fee £15.
Further details from the Editor.

EVENTS AT AERE

THEORETICAL PHYSICS SEMINAR
Tuesday 3 April
14.00
Conference Room, Building 8.9

Optical Activity and Quantum Electrodynamics

Professor E A Power/UCL

NUCLEAR PHYSICS COLLOQUIUM
Thursday 5 April
15.30
Conference Room, Hangar 8

Friction and Wear of Ion Implanted Steel

Dr N E W Hartley/N P Division

TA NEWS

We reported in Bulletin 37, at the time of the end of the first sky scan, that S2/68 was then observing the same stars as it did soon after launch but that the comparison of the signals would not be possible for several months. We now have this data from our colleagues in Liege and the results are highly satisfactory. Many signals have been compared from stars observed at the beginning and end of the first scan, in all cases the magnitude of the signals are the same within the expected statistical fluctuations. The same result applies to a comparison of the signals from a star in the constellation of PERSEUS which was observed on orbit 2487 at the end of the first sky scan and also on orbit 5221 at the start of the second. The integrated signals on the S2/68 photometer channel were 11020 counts and 10924 counts respectively. This means that the photometric calibration of the instrument is still completely in tact ie it survived the intense solar flares of August 72 and also the hibernation phase. During the manufacture, test and calibration of S2/68 immense care was taken to minimise any possibility of contamination of the mirrors of the S2/68 optical system and also rigorously to control the materials and processes used so that contamination in orbit would be minimised. (mirrors operating in the far ultra violet are particularly sensitive to even very thin contaminating films and since there are four reflectors in the S2/68 spectrometer, a small change in reflectance makes a large change in overall optical efficiency). At the time many people found the contamination control measures very irksome! However, they are now seen to have paid off handsomely in the form of a large amount of highly consistent data.

SOCIAL NEWS

CHRISTIAN FELLOWSHIP

All are welcome to come along for a time of prayer led by Graham Turner of Surrey University. The meeting commences at 12.30 pm on Friday, 6 April, in the Conference Room, Building R12.

RUTHERFORD FOLK CLUB

The next meeting of the Folk Club is at 20.00 hours on Friday 6 April in the Restaurant Coffee Lounge when the attraction will be Sean Cannon who plays guitar and whose songs will feature both English and Irish Traditional Folk music.

RECORD SOCIETY

Tuesday 3 April at 12.40 in the Lecture Theatre when a stereo performance of Bartok's Concerto for Orchestra will be given. First performed in 1944 in New York, it has found a home in the repertoire of almost every orchestra in the world.

SEVEN-A-SIDE SOCCER

LEAGUE FIXTURES

Week beginning - 2 April

Monday 2 April - R55 v R9
Tuesday 3 April - R25 v Trans
Wednesday 4 April - C A Div v Admin
Thursday 5 April - 351 v App.
Friday 6 April - G O v Atlas

FOOTBALL LEAGUE TABLE - 28 MARCH

TEAMS	P	W	D	L	F	A	Pts
351	4	4	0	0	17	1	8
R25	5	2	3	0	7	4	7
G.O.	3	3	0	0	16	4	6
C A Div	4	1	2	1	8	7	4
Casuals	5	2	0	3	7	9	4
R55	5	2	0	3	7	20	4
Trans	4	1	1	2	10	8	3
Admin	3	1	1	1	6	8	3
R9	4	1	1	2	5	6	3
Atlas	3	1	0	2	7	10	2
Apprentices	4	1	0	3	10	14	2
R H G	4	1	0	3	5	14	2

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Deadline for Insertions	GENERAL & SOCIAL NEWS	INTERNAL & EXTERNAL EVENTS
	Tuesday 1600	Wednesday 1200

THE PHYSICS EXHIBITION

The 1973 Physics Exhibition is to be held at Earl's Court, London from 9 - 13 April. Tickets (free) may be obtained from C J Heming, Building R20, Ext 6607 or the Editor.

The Laboratory is staging a very interesting display this year entitled "Remote Computer Facilities at the Rutherford Laboratory". A GEC 2050 workstation with its associated equipment will be on-line to the IBM 360/195 central computer at the Laboratory and an example of an interactive graphics program as an aid to magnet design, will be demonstrated.

SITE EMERGENCY

Recognition Test Sounding of the Site Emergency Klaxons will be carried out as follows:-

1. The Klaxons will be sounded for a recognition test at 10.00 hours on Tuesday 3 April 1973.

2. Notice Boards announcing the sounding will be posted at all entrances to the Laboratory from mid-day Monday 2 April 1973 until after the test has been completed.

3. Any defective Klaxons which may be noticed during the test should be reported to Mr E P G Lane, Ext 270.

NATIONAL SAVINGS - WEEKLY CYCLE ENDING 31 MARCH 1973

Certificates can be collected from the Cash Office, R20 from 3 April onwards. New members wishing to join the Scheme can obtain enrolment forms from the Cash Office. Forms must be returned not later than 5 April.

CASH OFFICE - TEMPORARY CLOSURE

The Cash Office will be closed for the morning only on Monday 2 April 1973. Afternoon opening hours will be as normal, i.e. from 14.00 - 16.00 hours.

SCIENTIFIC AND CHRISTIAN HUMANISM

A Conference on 'Scientific and Christian Humanism'. organised by The Modern Churchmen's Union, is to be held at Culham College, Abingdon from 23 - 27 July 1973. The Speakers include:-

Professor Sir Herman Bondi KCB, FRS Professor of Mathematics, Kings College, London.

Professor H C Longuet-Higgins FRS, Professor of Machine Intelligence at Edinburgh University.

Professor M W Thring, Head of the Department of Mechanical Engineering, Queen Mary College, London.

Professor E LaB. Cherbonnier, Head of the Department of Religion at Trinity College, Hartford, Connecticut.

Professor J Ferguson, Director of Studies in Arts at the Open University.

Dr E W Bastin of the Cambridge Language Research Unit.

Mr H Ottaway, Contributor to the Pelican History of Music and the new Grove Dictionary of Music.

The purpose of the Conference is first to hear something of what Scientists are saying both in their own field and in the wider aspects of Science in relation to human life. The contribution of poets and musicians to our understanding will also be considered, and at the end a number of theologians will assess what has been said in relation to the Christian religion.

The Conference is open to all who are interested in its subject. The cost including residence of the College is £10.50 or for meetings only £2.00.

Further details, booking forms etc can be obtained from the Honorary Secretary:-

Rev F E Compton, Caynham Vicarage, Ludlow, Shropshire, SY8 3BN.

OVERSEAS VISITS

Dr Venus, to the USA, 1 - 8 April, for discussions at ANL and to visit NAL.
Mr D A Gray, to CERN, 2 - 4 April, to attend meeting of the 300 GeV Machine Advisory Committee.
Dr L C W Hobbis, to Grenoble, 2 - 5 April, to attend seminar on Ultra Cold Neutrons at the High Flux Reactor.
The Director, to CERN, 3 - 4 April, to attend Nuclear Physics Research Committee meeting.
Mr P D Hey and Dr B H Meardon, to Grenoble, 3 - 6 April, for discussions about apparatus at the ILL.