Rutherford Appleton Laboratory

The Post NIMROD years 1970 –1987

Computer Takes Over- The final Stretch

Atlas Computer Room

This chapter is not so easy to define as previous ones that seem to fall into neat categories of specific projects.

At this time many things are going on at once including a number of projects being bid for or planned, not all of which came to fruition. Amid the fury to program the new computer facilities were plans to replace Nimrod with a machine to be called the SNS and also to build on site a huge underground synchrotron in a ring 1/3 mile in diameter, linked to the SNS, to be called EPIC. That died a death, due to a general withdrawal of funding to science in the UK, as shall be seen in the following paragraphs, but Bernard was required to do a considerable amount of work preparing for it. Eventually computing

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takes over completely, as the way things are done at RAL change into a service to Universities.

In early 1970 Bernard transfers to the "Nimrod Accelerator And Beams Theory Group". For this 25% of his time is spent learning Fortran programming language, including writing simple programs and running them on the IBM 360 computer. He attended a Fortran Course at AERE training centre. In the archive is his original copy of "A guide to Fortran IV programming" by McCracken, published as early as 1965.

Operations staff in the computer room

A short review of computing of the time may be useful. The computer available was an IBM 360, and this occupied a large open plan room with false floors for cables. This room housed the processor racks, memory racks etc, open reel tape I/O devices, card and tape readers and teleprinters. Also large line output printers. There was no access into the room by users, only privileged Operators lived there. Associated cooling and power plant was found in adjacent rooms.
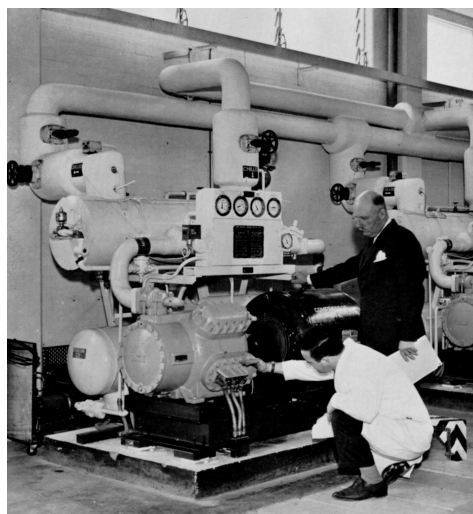
Computer air conditioning plant room

To enter a program the ubiquitous IBM punched cards were used. Each card held one line of characters, or data, and the characters were represented by holes, similar to paper tape. To produce these, large punch machines, almost as big as linotype machines, were used, and they were also able to read decks of these cards to edit one's programs.

Card punch machine

These heavy decks were sent off to the computer and came back maybe later in the day or tomorrow, depending on size and priority. Then one went to the card punch, if one was available, and rectified the error, exchanging the faulty card in the pack, and then one repeats this operation over again until correct operation is achieved. Output was in the form of fanfold paper about 15 inches wide and of infinite length. Well almost infinite, one could erroneously print the same rubbish over and over again until the box of paper ran out.

A box of cards arrives at computer reception

Much time was spent with development of computer programs assisting in the solution of problems related to the proposed SCS (Super Conducting Synchrotron) machine and beam transport systems. SCS was to become SNS (Spallation Neutron Source), the replacement for Nimrod in the same building.

He published SCS/Machine/29 "BETAMU: a short program to survey Doublet Lattice Parameters", December 1970. (In archive)

Into 1971 this work continues with programs written to carry out wide surveys of the behavior of doublet and triplet lens systems. Some work has been started to investigate the feasibility of the adapting of any of the existing beam transport programs for on-line graphics display operation.

He published NIMROD (ABT) 71-16 "DUBACC: A Fortran program to survey Quadrapole Doublet Lens Systems" March 1971, (in archive)

And also RPP/N23, "A Superconductivity Synchrotron Design Study at the Rutherford Laboratory." (Paper presented at 1971 Particle Accelerator Conference Chicago, March 1971.- I assume not personally) (in archive). This was the proposal for the new SNS to replace Nimrod in its old building. This paper explains that SCS is Super Conduction Synchrotron, later to become SNS. It also explains that it could become part of a much larger machine, which was to be the EPIC project.

It is interesting to observe that now everything is noted on scrap computer listing paper!

User's data prep area

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Towards 1973 computational work connected with beam matching for the new 70 MeV Linac Injector for Nimrod (still operating) was taking place. This involved creating a number of further computer programs.

At this point Bernard is starting to get fully involved with EPIC (Electron Proton Interecting Storage ring). This was to be a very large synchrotron style machine built in a tunnel under the entire RAL site!

This work included Costings, using a computer program, liaison with all concerned about the EPIC power supply requirements, devising a numbering scheme for the EPIC machine lattice components, space allocation drawings , preparation of drawings, diagrams etc. Some of these drawings are to hand. These show a large ring tunnel vaguely circular centred on the south end of R25 and enclosing the current Nimrod complex in the west and nearly reaching the prefabs in the south east.

The numbering scheme is apparently a major work and lead to paper RL-73-068 "Proposed reference numbering system for EPIC Lattice components", BGL, July 1973. (in archive)
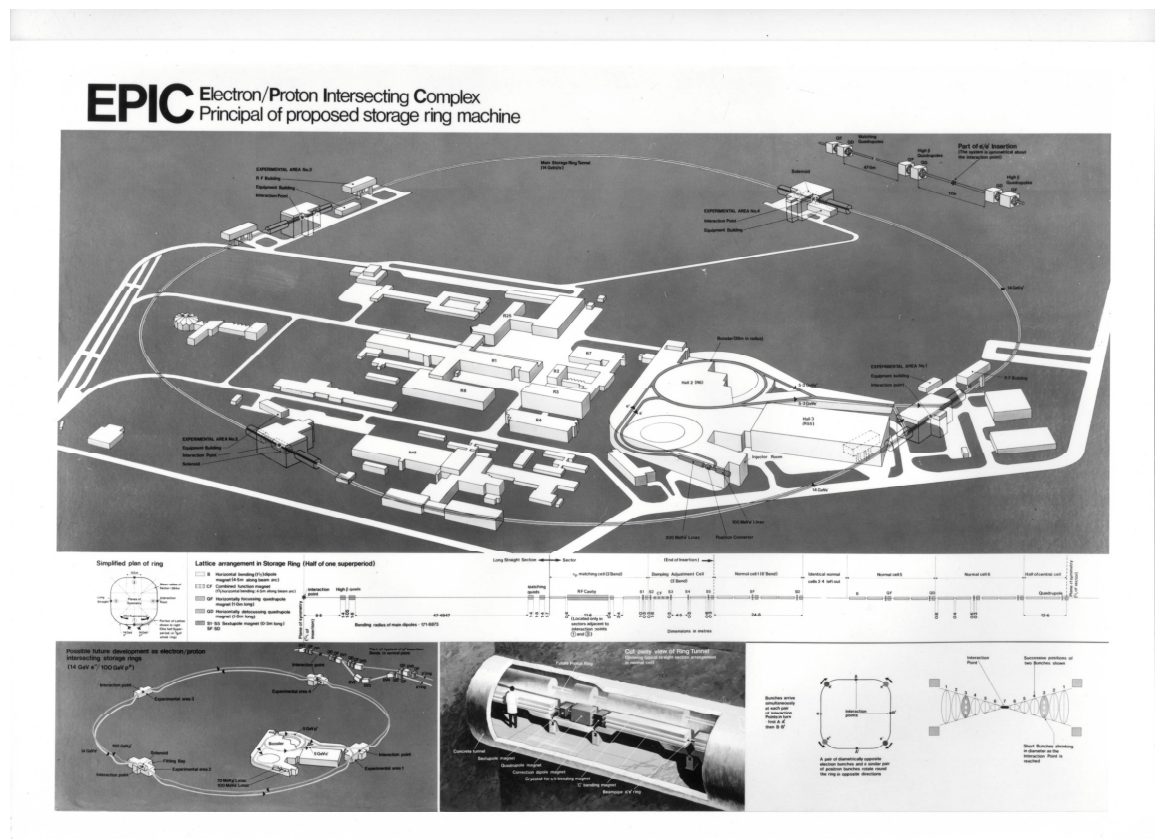
The poster produced to display the details of the EPIC project including the infamous numbering details.

The Bulletin for April 73 explains that the computer Atlas is being closed down! The current IBM 360 was installed in 1967. Atlas was installed in 1963, a totally British

manufactured computer! It goes on to re-assure readers that NIMROD and the canteen are still the same, for now.

Swappable "hard disk pack".
Not very big (< 500Mb?) and prone to crashing!

By 1974 EPIC had become the dominant activity. A paper entitled RL-74-054 "Reference numbering system for EPIC Lattice components " BGL, March 1974, (in archive) suggests that his previously proposed system has now become accepted.

Fortran programs had been written to assist in this work, including EPICOS, for costings, PARAM for EPIC parameter lists, CORDS for general co-ordination and ASTRA & FOCPAR also related to what we might now call Project Management?
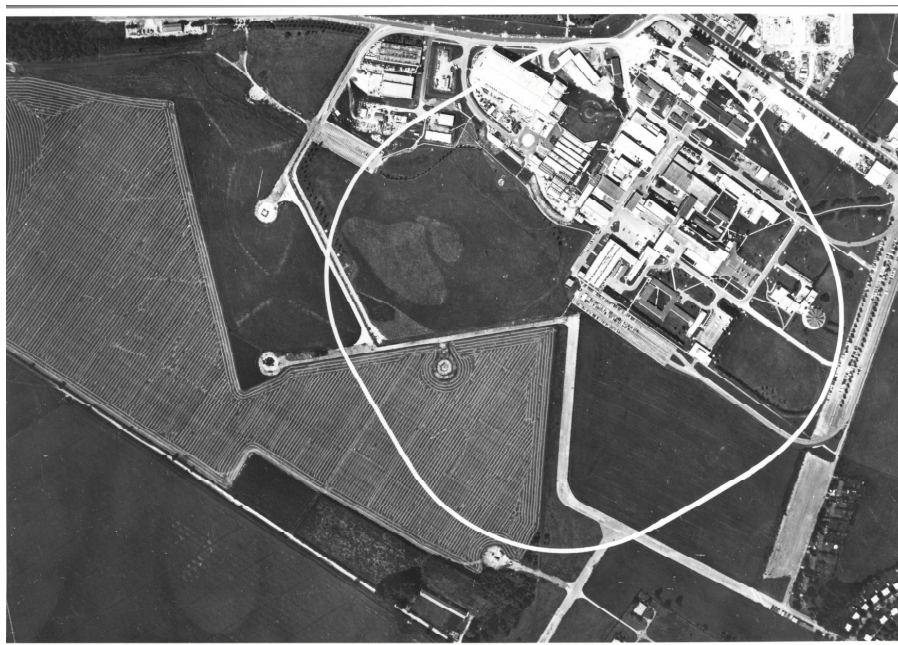
Aerial photo with overlay representing the track of the proposed tunnel for EPIC

Paper RL-74-086 entitled "Users guide to SYNCOST (pre 37-01) and EPICOST, a General purpose cost estimating program for IBM 360/370 Computers", BGL and Chadwick, June 1974 (in archive) explains these programs. Apparently they incorporated assembly language routines, and it is not clear if Bernard wrote these himself or not.

Work also included production of posters explaining EPIC, for display in the laboratory entrance hall. (in archive) The September issue of the Bulletin shows an aerial view of the RL site with the ring superimposed.

There is a newspaper cutting from the Abingdon Herald for 15th August 1974 when a denial was issued regarding any plans to move a hover train track to the RL site, from Huntingdonshire!.

In 1975 email had not really been invented, and I thought I was one of the first people to use a networked computer to send files like letters across the network in about 1979, but in the archive is a sheet of listing paper from a computer terminal. Someone on a remote computer in CERN is asking if anyone is there, and if they read this, to please pass on the message that a certain person is asking for his skiing things to be taken over!

The refining of the computer programs continued up until at least 1976. At this time Bernard was asked to assist in the preparation of a report concerning the SNS, in particular, drawings and production. His name is a small part authorship to RL-77-030-A, " A Pulsed Spallation Source for Neutron Scattering Research", March 1977. There are a number of drawings produced during this exercise. There is also a picture of the once again vacated Nimrod hall (or Tardis control room once again!).

In 1977 a program called GRARDS was produced, a program for use on the IBM 360 system to produce high quality hardcopy listings of punched cards (or "Electric" files) by means of the FR80 microfilm recorder, with facilities for limited variation of the output style. This is something which had become a basic facility by the time I worked at RAL: in 1985.

Also a paper was produced, RL-77-033/B "Users guide to FOCPAD", 1977

At the end of this year the December edition of the Harwell Bulletin "Harlequin" published a photo of a number of veterans who had reached their 30 years within the AERE organisation, and Bernard is one of them. Mention is made that AERE was formed from the few that developed the 4MeV machine at TRE which led to a commercial development for medical work at Hammersmith Hospital.

By 1978 the Nimrod building is having to be extended to fit the new SNS. But for Bernard the computer is continuing to make its mark. He produces a report entitled PMICS/P152 "A preliminary progress report on a survey of currently available single user (table top) mini computers suitable for use by the ICF". This may be the time he brought home a very expensive HP graphics terminal to try out (play with). I recall being allowed to use this, and it was programmed in a special BASIC language, and used a

storage tube for the graphics. The ICF, is the Interactive Computing facility. This is to be the core of his work for the remaining part of his career. The SRC at RL would now provide distributed computing power by putting networked multi user machines into Universities and providing central support with both operating system and general user support. Ultimately there were site managers and support was filtered through them. Most of the machines concerned were Prime and GEC multi user mini computers. This is the start of a different type of job for Bernard, as the role now becomes a service one.

30 YEARS' SERVICE Standing (left to right): K.C. Knox, W. Lowe, B.G. Loach (SRC), J.L. Hanks, V.A. Hodgkins
Sitting (left to right): V.J. Freestone, W. Morrow, Mrs. D.M. Ireson, T.J. Hassett (Culham Lab.), J.D. Dewhurst

The 30 years service photo from December 1977 Harlequin

During this year he attends a DEC system-10 course at UMIST (Manchester). He also had to attend "away" courses in Southampton and London, concerning evaluating computer hardware.

The management role involved supervision of computing contracts at Manchester (UMIST) and Edinburgh (ERCC), involvement with research grant applications, and administration of the allocation of ICF facilities (very time consuming). Work was now diverting away from the hardware of nuclear physics for the first time in his career, towards management and accounting.

In 1979 JEVM/P66/79 "Revision of Existing Resource Allocations to Individual Accounts in Relation to the Effects of the New Charging Algolrithms on These, and on the Accounting Programs and Usage Summaries at ERCC and UMIST" was published. Must qualify for the most annoyingly long paper title.

On file is a letter dated 11th September informing him that his absence on 22 June on strike action (Nation-wide Civil Service strike) was unauthorised with various undesirable consequences including a loss of contributions to his pension!
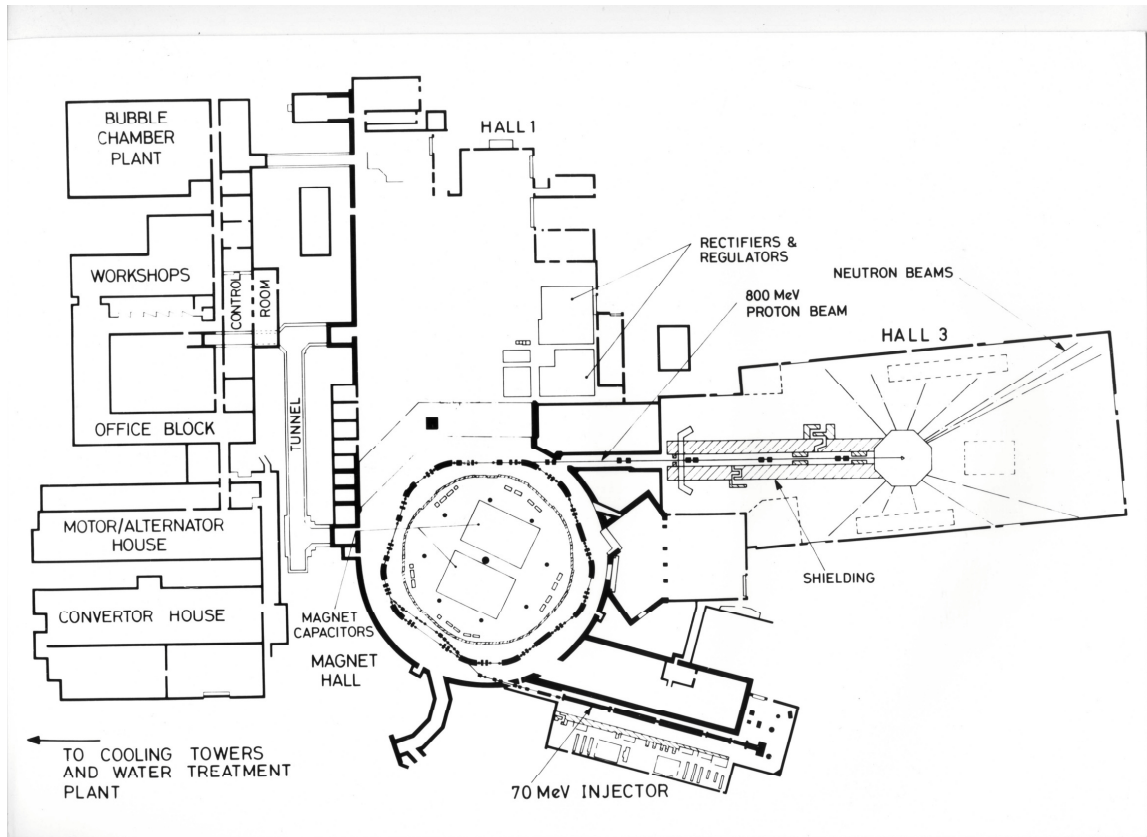
Plan of the SNS installation proposed to take the space of Nimrod.

Life took a dive in October 79 when he had to ask for special leave to deal with the affairs of his mother who died in September.

There is a brochure concerning the computing facility dated 1979 which introduces us to the ICF, with lots of period computing pictures.

There is an inventory statement dated 1981 advising us that Bernard has in his possession one Texas instruments calculator and one angle-poise lamp!!

There is a copy of the infamous AL54 grant application form, which was a fundamental part of his administration for the period involved.

In 1982 Bernard lost his father and had the mammoth task of assisting his brother clearing the family home of 50 years at Shirley, Birmingham.

A memo dated August 1985 explains how a user may send an email OUTSIDE of the PROFS operating system. "If you wish to communicate with a person on another system, although it is unlikely you will need to do so often"!….. "You may also send email to the

States, but you must ask permission first"! These are the early days of the JANET network when academic use of email was in its infancy, and use for any non-academic purpose would be banned.

GEC 4070 mini computer at RAL, also deployed to Universities

In summer of 1985 he would find some distraction as the marriage of his younger son Martin to Linda Henton was to take place in September.

On September 30th 1985 Bernard was invited to perform the closedown of the DEC-10 computer in Edinburgh. In his speech he explains that he joined the ICF in January 1978. There were two Dec-10 machines, ERCC and UMIST, and they were the main parts of the networked ICF. The machine started out as a PDP-10 for the British Library but government funding changes caused that contract to be cancelled and its diversion to the SRC was a big face saver for the government to avoid cancellation charges, and resulted in a very quick delivery for the SRC! There is a long story in this speech about 15 years of politics which must have made it rather more boring than he said it was going to be. No wonder he was later paid in his retirement to write the history!. The final specification of the computer was 760K memory and 900Mb disks. It started with 64K memory and 50 Mb disk space, but no tape drives.

The Forum '85 computing newsletter for Nov/Dec contains a small paragraph by Bernard on the closure of the ICF's most powerful machine. In two subsequent editions in 1986 Bernard's story from the speech is repeated. (in archive)

One Glasgow correspondent subsequently follows up with praise and some criticism of Bernard's story.

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At this time records of his activities are scare compared to previous decades. The last 5 years probably became somewhat mundane compared to his previous experiences. My own experiences of working in the ICF during the mid 80s gave me a feel for what life was becoming like. I joined in 1984 and worked alongside Bernard (metaphorically in the ICF) until his retirement in December 1985.

There are copies of letters he had to send around the Universities announcing his impending retirement on 11th December 1985. He has one received from ERCC in return wishing him a happy retirement, and another as DEC-10 steward from the ERCC/RAL Dec-10 project with a degree of humour. A party was held at the Crispin in Harwell village on 9th December from 12 –2 pm. This is mentioned in Bulletin for 24th March 86, as part of an item on at least 5 others who retired in the last few months.

Bob Hopgood handing out his retirement certificate

The comment "not a single penny of illegal profit" in his rather tongue in cheek letter from the DEC-10 retirement letter is an indication of the scientific precision with which he probably carried out his management duties, to the annoyance of some concerned!. But if you put a scientist into an administrative function, one can only suffer the consequences!

His retirement gave him a further 16 years during which he was able to make some long awaited trips to visit Switzerland and Austria, even France, where he continued to enjoy his photographic hobby and produced further vast quantities of colour slides. He didn't leave RAL behind easily. During the first year or so the opportunity was taken up to fulfil a consultancy request from RAL to produce a history of the DEC-10 installation. Clearly they thought it had taken up an enormous amount of his time and effort leaving him well qualified to do this enormous report, I wonder what it was used for? (in archive)

Other interests he explored further included local history as he was a member of the Abingdon Archaeological and Historical Society. He was also keen to visit many industrial archaeological sites around the UK.

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Mr B G Loach
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Our Ref: CO/RB/101 C.7 pt.2

11 December 1985

Dear Mr Loach,

I am writing to you on the occasion of your retirement from the
Science and Engineering Research Council to thank you for over
42 years Public Service.

Since you joined the Ministry of Supply in 1943, you have worked
continuously for AERE, and subsequently NIRNS and the SERC.
During that time you have carried out duties for the Proton
Linear Accelerator, and Nimrod, including the preparation of
Maintenance Handbooks and other documentation; the Nimrod
Accelerator and Beams Theory Group, where you became involved in
Fortran computing; the Electron Proton Intersecting Storage
Ring Complex; and programming and computational work on the IBM
360/195 computer, including development of such programmes as
CORDS and GRARDS.

More recently you joined the management group of SERC's ICF,
dealing with all aspects of the work of ICF installations at,
among others, UMIST and ERCC. This has included assessment of
the computing content and requirements of SERC grant
applications; liaison with users and Central Office
Secretariats; and management of financial and contractual
matters related to various installations.

These many and varied tasks have been carried out efficiently
and with care and skill; in particular those tasks of your
difficult but essential role in the SERC grant procedures. You
will be sorely missed by your many colleagues and contacts, and
may I take this opportunity to add my good wishes to theirs that
your retirement is a long and happy one.
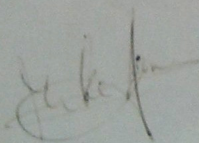
Yours sincerely

[signature]

Certificate

This is to certify that
        Bernard Guest Loach
has given 8 years and 10 months faithful
service from 10th December 1976 until
30th September 1985 as the Chief Steward
of the DECsystem-10 affairs; always
ensuring that its users enjoyed their
full rights and privileges and that its
custodians were not able to make a
single penny of illegal profit.

                                signed
(with all our best wishes for a long and happy
retirement),

for the   for the
Rutherford Appleton   Edinburgh Regional
Laboratory, SERC.   Computing Centre

                                 J. Phillips

His somewhat early death in 2002 was unexpected and a sad end to a long and varied scientific career with 47 years devoted to public service in just ONE job, and essentially one employer. Although the definition of the employer changed many times, starting with the Ministry of Aircraft Production, they were all parts of government research, which metamorphosed into different organisations over time. This biography has told an interesting story of that transposition from wartime Ministry to the Scientific Research Council of the 1980s.

In his memory a tree was planted by the riverbank in Abingdon, opposite St Helen Church, one of his favourite local views.

Memorial tree at Abingdon river meadows in 2015.

The words on his grave read:

In Loving Memory Of
A Dear Husband And Father
Bernard Guest Loach
24th September 2002 aged 79
He Treasured Life And All The
Marvels Of The Universe
He Was My Life

"

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