RUTHERFORD Bulletin 19

October 23–November 6 1978

Creative Computing

An intimate dialogue between a computer and a researcher or designer can effectively increase man's creativity and extend his memory. This kind of dialogue is called "interactive computing', in which the designer himself becomes part of the computation - taking decisions and guiding the step-by-step progress towards solving the problem.

Modern Technology is becoming increasingly complex and demands extensive facilities for modelling and simulation. The use of high-speed powerful computers is essential but the factors to be optimised are so involved that human interaction is still needed en route. The Science Research Council has taken a major initiative in this field by setting up a national Interactive Computing Facility which is managed centrally yet consists mainly of computers distributed among the research community. The scheme involves a pooling of resources and expertise to provide hardware systems, networking and graphics software, and also applications programs. This giant facility is being developed throughout the UK and eventually will be used by over 2000 research workers in engineering and pure science.

A National Need

In 1975 a Technical Group Report was prepared under the Chairmanship of Professor H H Rosenbrock (UMIST) entitled "Engineering Computing Requirements". The report pointed out that facilities for interactive computing available to engineering faculties in universities and polytechnics were inadequate and proposed that the SRC should step in to remedy this. The Engineering Board of SRC accepted the recommendations of the Rosenbrock Report and gave Rutherford Laboratory the responsibility to co-ordinate and manage the provision of a widely distributed national interactive computing service. Council extended the scheme to make the facilities available to all SRC-funded projects.

To create an Interactive Computing Facility one must establish as speedily as possible a network of computers and communications equipment spread over a wide area to reach the individual users. An important goal is to standardise on the most suitable hardware, and generate all 'systems' software centrally, so avoiding duplication of programming efforts at the different centres. Similarly, where agreement can be reached among research workers in a certain field on the specification of generally useful 'applications' software, a unified programme to work to provide this is more economical than for each university group to try to produce independently their own software tools for complex research projects. Further economy may be achieved by mounting and maintaining specialised sets of user programs at a single 'host' computer only, where the local expertise is greatest in a certain technique. Many jobs must be set up using interactive graphics, then passed to a large batch - processor for heavy calculations and then returned for interactive examination of the results. Extremely reliable communications and systems programs are required to support this kind of networking.

Present Status of ICF

There has been substantial progress in setting up the Interactive Computing Facility which currently serves over 600 users. A main trunk network has been established between Edinburgh, Manchester (UMIST) and Chilton, and there are secondary links radiating from these to reach individual terminals or clusters of terminals at many other sites. From many types of multi-user minicomputers (known affectionately as 'Mums') two have been investigated in-depth and are now defined as the standard for the I C F which will be based upon the use of GEC 4070 and PRIME 400 series computers. It is planned to link about fifteen MUMS into the network some probably with array processors attached and each providing computing 'on demand' for 6-10 users simultaneously. The first new MUM was installed last week at Bristol.

Progress in network techniques is extremely rapid and within 2-3 years, the present core network will be modernised to link over 20 ICF sites using the new International protocol "X25".

Meanwhile every effort is being made to reach more users with the present network. Within the past month a link was established between the Electrical Engineering Group at the University of Belfast - extending from Belfast to Daresbury Laboratory, and thence into the trunk network at Manchester. The Belfast Groups calculations are being performed on the DEC 10 computer at Edinburgh and the resulting silicon-chip geometry is output at Chilton via the FR 80 microfilm recorder.

(continued overleaf)

Up to now, nine Special Interest Groups (SIGs) have been formed among university and polytechnic research workers to advise on the specification of application packages in the following areas:

artificial intelligence
electromagnetics
electric circuit design (analogue and digital)
finite element analysis (fluid mechanics and structural)
computer-aided architecture design
control engineering
graphics pre-and post-processors

A considerable programming effort is needed, since it is planned to invest about £100,000 in the software recommended by each SIG. Some of this work will be done at Chilton and some at university and polytechnic departments under contract.

There are many other areas at present not covered by a SIG - eg. crystal structure calculation and problems of chemical technology. In the next few months there will also appear more users concerned with the geometrical design of microcircuit masks for use with the Electron Beam Lithographic Facility, whose hardware is presently being set up in building R1.

The presence of the ICF has already brought together several workers in a variety of disciplines who had previously been working independently. It is hoped that this possibility to pool resourses and ideas will be an added stimulus to creative research. It is hoped that some of these projects, particularly in engineering will be to the eventual benefit of British Industry.

(We plan to bring you details of the User applications of the ICF in a future issue of the Bulletin. We thank Peter Davey, Head of the ICF, for the information contained in this report).

FUEL ECONOMY

THE RADIATORS on site have been fitted with thermostatic control valves which are set to give comfortable conditions. However, it appears that several office windows have recently been left open overnight, and this seriously affects the efficiency of the Thermostat. Staff are asked to make sure that all windows are closed before they leave at night. If you have any problems with the temperature in your office or laboratory, please ring Ext 563 for advice.

REDECORATION OF LECTURE THEATRE

Members of Staff are asked to note that the Lecture Theatre will NOT be available during the period 8-27 January next year. This is to provide for schedule maintenance, including redecoration.

CERN FELLOWS & ASSOCIATES WINTER 1978 COMPETITION

These Awards are for suitably qualified scientists and technologists to enable them to work at the CERN Laboratory in Geneva, Switzerland. Applications for the next Fellowship Competition, for Awards that would normally be taken up during the winter of 1978/79, must be completed before 6 November. For further information and application forms, please contact Mr J D Walsh at the SRC Central Office, tel: Swindon (0793) 26222 Ext 2271

TRAINING

AERE COURSES
Reminders have been received concerning the following courses:-

A.P.L. Appreciation Course 7 Dec: or 22 March
Two Phase Flow and Heat Transfer 15-18 January

For fuller information please refer to AERE Courses book.

Details of the following courses may be obtained from the TRAINING SECTION Ext 6285/266.

UNIVERSITY OF SHEFFIELD
Random Vibration 4-8 December
The Design of Industrial Hydraulic Circuits 23-27 April 1979

UNIVERSITY OF BIRMINGHAM
Kinetics of State Selected Species 9-11 April 1979

SLOUGH COLLEGE OF HIGHER EDUCATION
Logic Design 10 weekly meetings commencing 16 Jan 1979.

I.E.E.
The I.E.E. has issued the deadline dates for receipt of synopses of papers for the following International Conferences.

Development in Designing and Performance of Switching Equipment. 1 December 1978.

Electrical Variable-Speed Drives 2 January 1979.

CIVIL SERVICE (Nuffield-Leverhulme) TRAVELLING FELLOWSHIPS. Details of these fellowships are held in the Training Section. R20.

SITE EMERGENCY EXERCISE

Arrangements are being made at Harwell for a Site Emergency Exercise on THURSDAY 23 NOVEMBER 1978. The Rutherford Laboratory gates will be closed during the exercise and movement around the site will be restricted to personnel involved in monitoring the exercise. Organisers of events at the Laboratory are asked to avoid this date where possible. A further announcement will be made prior to the exercise.

OVERSEAS VISITS

Dr C J S Damerell to CERN
23 Oct-2 Nov. to work on N.All Experiment.

Dr P H Sharp to CERN 23-26 October and 30 Oct-2Nov. to work on NAll (Prop 202)

Messrs N R Goddard and E R Jones to CERN Nov 5-27 to build the R.M.S. Magnet.

CHRISTIAN FELLOWSHIP

On Friday 27 October, a fascinating film entitled "Voice of the Deep" will be shown in the Lecture Theatre at 1240 hrs, running for approximately 30 mins.

Years ago man listened for sounds under the sea, but hearing none, concluded there was no sound. However there were all types of sound underwater. Man just had the wrong kind of ears. Could this be true in the spiritual realm.

Musical Notes

The Music Club

The Music Club has evolved as a number of separate groups each meeting weekly at the Recreational Society Building (R15) to pursue their own musical activities. Meetings take place in the lunch period. A piano, regularly tuned, is normally available. Any musician or group, as members of the Recreational Society, is entitled to use the facilities either by joining existing sections or starting their own.

Chamber Music Section

The Chamber Music section meets regularly during Thursday lunchtimes. The range of instruments includes, piano, violin, 'cello, clarinet, oboes and flutes and the music played includes music by Bach, Handel, Haydn, Vivaldi and Telemann, usually in arrangements for quartet or quintet, with a sprinkling of works by later composers.

The objectives of the players is to explore as wide a range of music in style and difficulty as is possible for the players, and to select a few items more comfortably within the capabilities of the group as a whole for efforts to improve the quality of the music.

It is not easy to maintain a balance between these aims but some means of their realisation can be assessed from the enthusiasm and regular attendance of the members of this group.

New musicians will always be welcome and beginners will find help and encouragement.

N.B. We have an unemployed 'cello (instrument) waiting for its musician, any volunteers?

Clarinet Section

Every Wednesday lunchtime four members of the clarinet section meet. Using three soprano clarinets and one bass clarinet they attempt, sometimes successfully, to make music.

The range of music attempted covers the History of Music from the Renaissance period through the Mozart - Beethoven period with special arrangements, to 20th century music especially written for clarinet groups.

People are often heard saying, "I wish I could play" or "I wish I could read music". - the group was formed as a vehicle to enable them to do just that. If you are interested, come and join us on Wednesday.

Handbell Section

This section exists to promote the art and science of Change-ringing on handbells. Change Ringing, as opposed to tune ringing involves the production of different permutations of the order of the bells within a strict framework of rules which govern the change from one permutation into the next. In particular each piece or touch which is rung must begin and end with rounds (the bells rung in order down the scale) and all the permutations in between must be different.

In order to avoid the virtually impossible task of learning hundreds and sometimes thousands of permutations by heart in their correct order, methods have been devised whereby each ringer only has to learn the positions of his or her bells within each permutation for a relatively short sequence of permutations known as a plain course. This normally involves remembering the pattern which the bells trace out as they change positions through the series of permutations.

Extensions beyond the plain course are effected by calls known as "bobs" and "singles" which the conductor, who is also one of the ringers, makes at strategic places. These calls only affect the change from one permutation to the next, causing the bells which are affected by them to jump to a different place in the pattern or method. Consequently the conductor has to learn the correct sequence of calls, known as the composition, as well as the method.

Members of the section would normally be experienced at change ringing on church bells as well as hand bells. Changes are rung in the same way on church bells but a church bell ringer normally rings only one bell, whilst a handbell ringer, rings two.

A sequence of 5,000 or more permutations is known as a 'peal' and takes about two hours to ring on handbells. Because of the time involved, the usual practice, is to attempt to ring a "quarter-peal" of approximately 1250 permutations. This is not always successful, failure being caused by one or more of the ringers forgetting where his or her bells should be or by the conductor miscalling the composition.

Change-ringers are invited to join the section, but the limited time available makes it impossible to undertake the teaching of change-ringing from scratch, as this can be a very lengthy process.

Present Timetable - Rutherford Music Club.

MONDAY	-	Bell Ringing (Tim Pett Ext 6189)
TUESDAY	-	Open Practice Session
WEDNESDAY	-	Clarinet Section (Sid Broughton Ext 285)
THURSDAY	-	Chamber Music Section (George Sandels Ext 6373)
FRIDAY	-	Open Practice Session

OUT AND ABOUT

Summer family-outings are easy. What to do when the weather is inclement, is a trifle more difficult. The following snippets of information may be of interest to those faced with this problem. It could be fun too!

At Banbury Museum from 17 October-14 November, and at Wantage Museum from 15 November-6 January,

"An Exhibition of Oxfordshire Smocks".

Wantage Museum has started its programme of Winter Walkabouts.

On Saturday 28 October a Lace-making demonstration will take place from 10.0am-1200pm and from 2-4pm, and on Saturday 11 November from 2.30-4pm. Mrs L Murdock will demonstrate Glass Engraving, both at the Civic Hall, Wantage.

Last year the Ironbridge Gorge Museum Project won the Award of 'European Museum of the Year". Neil Cossons the Director of the project, will give an illustrated lecture on this exciting concept at the Civic Hall, Wantage on Thursday 2 November at 7.30pm. Tickets are available from Millers Bookshop, Wantage.

BLOOD DONORS

A record number of donors attended the sessions held at the Laboratory on 20 and 21 September. Mrs Phipps of the Regional Transfusion Centre wishes to thank everyone who reported at the Clinic - a remarkable total of 231. Mrs D Irvine who arranges the sessions also thanks donors for making her hard work so worthwhile, and hopes to see you all again in MARCH 1979.

If you are not a donor already, perhaps you would consider becoming one. Because of the nature of work at the Rutherford regular donors are not always available when the sessions are held, so new donors are always needed. Potential donors who have suffered Jaundice are not necessarily precluded. Come along and be tested.

Gone West

Friday October 6th was a sad day for all the friends and colleagues of Bill Oliver, most of whom seemed to be crushed together in a small local Hostelry to drink a toast to his future health, wealth and happiness, and to wish him well in his new job at Swindon. Geoff Stapleton made the presentation on behalf of Bills' many admirers, spoke of all the qualities for which Bill would be very much missed, and left him, for perhaps the first time in his life, speechless.

However he eventually recovered enough to say a very warm thankyou to everyone, and reminded us that he expected to see us from time to time.

Bill joined NIRNS in 1961, and working in "Reprographics" Science Admin for 17 years, was well known throughout the Laboratory. His cheerful disposition was a tonic to many of us .

Thanks Bill - we'll miss you!

THANKS FROM BILL OLIVER

May I take this opportunity of thanking all friends and colleagues for the excellent radio presented to me on the occasion of my departure from the Laboratory. All the best to everyone.

RUTHERFORD SOCCER 1977-78

The results of the three soccer competitions for last season were:

(1) Rutherford Laboratory Champions : CA Division
Runners-up : Atlas

(2) Rutherford-Harwell League Div I : CA Division
Champions
Runners up : Blg 353 (Harwell)
Relegated to Div II : Blg 459 (Harwell)
Rutherford-Harwell League
Div II Champions : Administration (Harwell)-promoted to Div I.
Runners up : Atlas

The full results were

Division 1

	P	W	L	D	F	A	Goal Diff	Pts
CA	12	10	2	0	43	13	30	20
353	12	8	4	0	40	26	14	16
B462	12	7	2	1	30	25	5	15
Rovers	12	5	5	2	19	20	-1	12
Apprentices	12	6	6	0	20	26	-6	12
SDS	12	4	8	0	18	23	-5	8
459	12	0	11	1	11	48	-37	1

Division 2

	P	W	L	D	F	A	Goal Diff	Pts
Admin	10	8	0	2	54	7	47	18
Atlas	10	8	1	1	50	8	42	17
HEP (Ruth)	10	5	4	1	20	21	1	11
B Mess	10	3	2	3	23	34	11	9
Nomads(Ruth)	10	1	8	1	12	38	26	3
Spartans	10	1	9	0	8	58	50	2

(3) Rutherford-Harwell K.O. Cup. : Administration (Harwell)
Winners
Losers : Rovers (Harwell)

Special thanks are conveyed to Les Patton (Match Secretary) and David Lucas (referee) for running the competitions and to Phil Lewis for helping out with the refereeing task. The new season will be starting shortly.

LUNCHTIME MUSIC AND FILMS

The programme continues, with alternating Films and Concerts on Wednesdays at 1230 hrs in the Lecture Theatre.

Wednesday 1 November — "Variations" Andrew Lloyd Webber

Wednesday 8 November — FACTS OF FATIGUE
A technical film about the 'Achilles Heel' of modern welded structures.

and — OUT IN FRONT
How the dinghy sailor can get the best out of Terylene sails.

INTERNAL EVENTS

NIMROD LECTURE SERIES
Monday 23 October
1130 hrs
Lecture Theatre

The Structure of Final States associated with a large p_t Neutral Trigger

Dr A Clark /CERN

Monday 30 October
1130
R22 Lecture Theatre

"Jets"

Dr T Walsh /DESY

Monday 6 November
1130
R22 Lecture Theatre

"Nucleon - Nucleon Scattering at Triumph and Argonne Energies!"

Prof D V Bugg /QMC

HEP SEMINAR
Wednesday 25 October
1100 hrs
R61 Conference Room

QCD in hard processes - jets parton model, jet calculus and beyond

Dr K Konishi/R.L.

EXTERNAL EVENTS

NPD COLLOQUIUM/551 AERE - 1530 hrs

2 Nov: Margaret Pereira/Aldermaston - Recent Developments in Forensic Science.

9 Nov: Dr L G Sanders/NPD - Current Research on Neutron Interrogation of Earth Media.

THEO.PHYS.SEMINARS/CONF.RM.(1.17) BLDG 8.9 AERE - 1400 hrs

30 Oct: Dr J-L Calais/Uppsala - Some aspects of instability problem in Hartree-Fock schemes and beyond.

7 Nov: Dr M H Day/T.P.D. - The binding of an electron in the wake of a fast ion.

PART.PHYS.SEMINARS/BIRMINGHAM U. - 1615 hrs

27 Oct: Dr D Newton/Lancaster U - Photoproduction results from the Omega Spectrometer. Part 1.

3 Nov: Dr C Llewellyn - Smith/Oxford U. - QCD predictions for processes involving real photons

10 Nov. Dr G Thompson/Oxford U. - A Study of the diffractive 3 pion system at 92 GeV/c beam momentum.

PHYS AND GEOPHYS COLLOQUIA/BRISTOL U. RM G12 FORT ROYAL- 1700 hrs

30 Oct: Prof. F Janouch/Stockholm - The Life and Work of Lev Landau.

HEP SEMINARS/ROOMB DAMTP CAMBRIDGE - 1500 hrs

3 Nov: L Castillejo/U.C. - Classification of Yang-Mills fields at a point.

10 Nov: G G Ross/Oxford - Factorisation and the parton model in QDC

SCHUSTER COLLOQUIA/BRAGG L.TH. MANCHESTER U. - 1615 hrs

25 Oct: Dr R A James/Manchester U. - Spiral Galaxies

THEO.PHYS.SEMINARS/MANCHESTER U. - 1630 hrs

1 Nov: Dr D M Brink/Oxford U. - Deep inelastic Heavy Ion Scattering.

8 Nov: Dr I P Johnstone/Queen's (Kingston) and Manchester - Configurational Purity of Nuclear States in the Upper $f_{7/2}$ shell.

ELEM.PART.PHYS.SEMINAR/L.TH.N.P.D. OXFORD U. - 1430 hrs

26 Oct: Dr J Mulvey - Report from HEP Conference at Tokyo

THEO.PHYS.SEMINARS/QMC - 1615 hrs

30 Oct: Prof M Kléman/Paris-Sud. - Principles of a classification of defects in physics of condensed matter.

6 Nov: Prof N D Mermin/Cornell and Sussex - Superflow in helium three.

ELEM.PART.PHYS.SEMINARS/WESTFIELD COLL.LONDON U - 1400 hrs

25 Oct: Dr A P White/Imperial - The SLAC 40-inch Hybrid Programme.

1 Nov: Prof T W B Kibble/Imperial - Geometry of Quantum Mechanics and Nonlinear Generalisations.

8 Nov: Dr P Higgs/Edinburgh - Spontaneous Breaking of Supersymmetrics.

THEO. AND HEP SEMINARS/SOUTHAMPTON U. - 1430 hrs

27 Oct: Dr D J Olive/Imperial - Supersymmetric solitons

3 Nov: Dr P West/King's College - Supergravity.

10 Nov: Dr C H Llewellyn-Smith/Oxford - QCD predictions for processes involving real photons.

HEP SEMINARS/CAVENDISH LAB.CAMBRIDGE - 1500 hrs

1 Nov: Dr P J Cornan/Imperial - Experiments with SLAC Hybrid Facility to test Exchange Degeneracy in Hypercharge Exchange Reactions.

Festinas Secunda and Tertia

Not a rare progressive disease as you might at first suspect, but the names (Festina - Latin for hurrying) of the SRC entries in the recent Civil Service Sailing Association Yacht race from Southsea to Cherbourg which was scheduled to start on Friday 29 September. F. Secunda, a Contessa 32 was skippered by Martin Hall of the Appleton Laboratory with a crew drawn from Swindon Central Office, the Rutherford Laboratory as well as Appleton. The other SRC boat, F. Tertia an extremely exciting new Petersen design, also built by Rogers as a Contessa 35, was crewed by SRC staff from Daresbury Laboratory. The Daresbury crew are to be congratulated on their splendid effort in organising their entry in the race at such long distance.

The crew of Secunda were fortunate in being able to come together six days before the race in order to work up. This took the form of a dry (joke!) run to Cherbourg and back prior to the race. We crossed the line at Southsea Monday morning, the time corresponding to the state of tide which would occur at the start of the race and laid a course for the Bembridge ledge buoy and then subsequently to Cherbourg. We were able to carry the spinnaker most of the way in a northwesterly about force 2. Our return voyage (after laying in appropriate stores) the next night to Cowes round the Needles was much more eventful having to reach in a force 6 with 3 reefs in the mains'l. Fortunately the next day was suitable for drying; and yacht rigging make ideal clothes lines. It is said that yacht-racing is like standing under a cold shower tearing up pound notes. We had already tasted the cold shower part; a sudden twang above, the sight of the spinnaker floating ahead and then under the yacht, gave us all a foretaste of the second aspect. However, Ratsey and Lapthorne did a quick overnight job and Spencers made a new halliard while we waited so we were still in with a good chance. As the day of the race approached the weather forecasts became very gloomy with gales all round Britain. The morning forecast on the day of the race turned out to be as bad as expected with severe gales forecast everywhere. Despite this inauspicious start a fair number of yachts arrived at the start in winds around the 7 mark. As expected the race to Cherbourg was replaced by a substitute series of courses around the buoys in the Solent.

These races nevertheless were extremely exciting, Solent racing being almost unique with interesting tides and shoals to worry about, but without the heavy seas in open water.

The winds were strong, force 7 or 8 on the Friday and Saturday, but with less wind on Sunday.

Tertia had the misfortune to retire during the first race with a broken forestay but crossed the line first in the other two races.

Secunda true to her name had to be content with overall second place - the highest place that an SRC boat has achieved in the race yet.

The writer regrets that he was unable to get a photograph of the racing yachts. The photograph given is one of his holiday snaps - just to give the flavour.

HORTICULTURAL SOCIETY

The Secretary of the "National Sweet Pea Society", Mr L H O Williams will be giving a Lecture on Sweet Peas to the AERE Horticultural Society in the Rutherford Laboratory Lecture Theatre (R22) on Wednesday 25 October at 7.30 pm. Visitors will be very welcome. The entrance fee for members is 25p; for visitors 30p. Coffee will be available at 10p and a raffle will be held.

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