RSRS NEWSLETTER

No. 105 February 1970

THE CHILBOLTON COMPUTER - PART II

It has so far been assumed that it is possible to simultaneously run several programs within the same computer. We require a computer program to control the running of the other programs in the machine and to ensure that they are run according to the system requirements. For instance, the aerial steering program must be run once every second to generate the next position for the interpolator. Such an organising program has been variously called, executive, supervisor, director ..... We have written our executive so that the order in which the programs are run is dependant on their priority, i.e. where a clash occurs, the program with high priority is run before the one with lower priority. Another basic function of all executive programs is the allocation of peripherals (input/output devices). It is very rare to find a peripheral which will allow two programs to control it at the same time without disaster resulting. Another required feature became quickly apparent when we considered the loading and deleting of programs from the computer's memory (core). Initially, programs can be loaded into adjacent areas of core with no wasted space between programs. This leaves one area of unused core in the machine. Later we may wish to remove some of the original programs and load others as we change from one experiment to the next. But if we delete a program from the middle of the original group, we have made a hole which will be almost impossible to fill completely as no two programs are the same size. As more programs are loaded and deleted, so the area of unused core becomes more and more fragmented until we are unable to load a further program because no single area is big enough to hold it. The ICL 1905 has special hardware to deal with this problem which is not available on Argus. We discovered that if each user program was given a special structure, it is possible to move programs around the core and so to recombine all the separate areas of unused core.

We decided that the easiest way of ensuring that every user programmer wrote his programs with the required structure was to define our own language and to write a compiler to convert this language to a program within the machine. This language we called SYMPLE (SYMbolic Programming LanguagE). This measure gave us a number of subsidiary benefits, principally in making the connections between the user program and executive as neat as possible. In format, the language is very similar to PLAN, the ICL machine code language and indeed, with a restricted version of SYMPLE, it is possible to trick the 1905 PLAN compiler into compiling SYMPLE to 1900 machine code. This similarity makes it easier for a user to learn SYMPLE. At the same time we took the opportunity of enhancing some of the features found in the 1900 programming language which again eases some of the user programmers' difficulties.

A basic consideration in the development of the programming system was that Argus is sited at a considerable distance from Slough, whereas Argus programs are for the most part written at Slough. It was necessary to develop a system for compiling and testing programs using the ICL 1905 computer. To this end, a SYMPLE compiler and a semi-compiled loader have been written in PLAN for the 1905 computer. In addition another program has been written to simulate the environment within the Argus computer. This is a program which makes the 1905 look like the Argus computer complete with its executive. By running programs in this simulated Argus we can expect to find most of the faults in a program without going to Chilbolton or interfering with the telescope observing program. The Slough testing system was originally written as three separate programs, which was unwieldy to use as well as giving the computer operators a lot of work. Modifications have now been made which integrate the testing system using the 1905 disc stores as a temporary storage medium. This makes the testing of Argus programs as straightforward as 1905 FORTRAN programs.

Finally it should be emphasised that the success of the work outlined here is the result of the contributions of a number of people both at Slough and at Chilbolton.

C. M. Comer

U.K.4 Data Processing

The programming of the data checking stage of this project is now well under way and the first two programs in the 1900 version of SATAN (Satellite Analysis) had their first test runs last week.

The UK3 version of SATAN was capable of dealing with both high and low speed data. The high speed data is that which is transmitted directly to tracking stations, the low speed data is played back to tracking stations from a tape recorder on board the spacecraft. The new version of SATAN has been split up into 4 programs:

HIGH SPEED STAGE ONE
HIGH SPEED STAGE TWO
LOW SPEED STAGE ONE
LOW SPEED STAGE TWO

The purpose of these programs is to "clean up" the buffer tapes produced by Mr. Luscombe's group and produce an error-free tape sorted into time order to go on to ATLAS for further processing. For both high and low speed data, the cleaning up is done during the stage one programs, when the data is written to a random access device: the stage two programs are used for unpacking the data in time order and writing it to an output tape (stage tape).

The programs currently being tested are the high speed versions, and it is expected that this testing stage will take several months. Work will start on the low speed version early next month.

B. R. Martin
M. Waite

LADIES SECTION

A POTTED COURSE IN CAR MECHANICS

(that's mechanics, the science of, not mechanics the people)

Greetings fellow lady drivers and welcome to this new course in engineering. It is in two parts and dealt with (a) Fundamental and Routine Maintenance and (b) Locating faults. Probably I should state at this juncture that this course is not intended to educate you to the point of repairing the fault, merely give you a reasonable vocabulary and enough information to make an educated guess. Shall we start then?

Section A. Fundamental and Routine Maintenance

Point one to remember is that the attitude of gentlemen to lady drivers is on the whole tinged with exasperation and despair, also a burning desire to fix the fault for you and so maintain their front of male superiority. More of this facet of male human nature in Section B.

On the whole cars are delivered with an instruction book, as with all large appliances it is advisable to read this before going any further. This book will

in no way assist you, due mainly to the fact that it is a book written by men, for men, and in some alien tongue, it is however always best to have read it as a defence. Some useful facts are to be found in this book, there is always, for instance, a diagram of the facia so that you know what all the peculiar drawings on the knobs are. This helped me no end as I laboured under the misapprehension that the choke control operated the fan belt - (well, I mean, it had a picture of fan blades on it didn't it?). It also tells you in what order your pistons fire, and believe me, only a man could design a car to fire one, three, two, four!

Also in the book you will find the capacities of various parts of your car. These are summarized below.

Tyre Pressures

Well quite honestly, tyre pressures are tyre pressures and those air lines at garages frighten me to death, I mean your tyre could explode couldn't it? I should get the petrol pump attendant to do that for you. I'm told they should be done every week but I do mine about every six months and I've only had three flat tyres in the last two months.

Sump capacity

I like that word, SUMP, it is in fact the space allocated for you to keep your oil in. Cars need oil for some-thing I suppose, I just keep mine topped up because I don't like to see the space go to waste, and anyway my man gives me a shocking telling-off if I don't. You can see how much oil you've got by looking at the dipstick. This is a fiddly little iron rod stuck in a hole to one side of your car and when you pull it out the oil mark indicates the depth of oil. It's a bit primitive but then cars aren't very subtle are they?

If you find you don't have enough oil in your car you can either fill it yourself or get the garage man to do it for you. In this case it is quite adequate to nonchalantly say:

"A quart of GTX please"

GTX is a good oil to choose because you can't show your ignorance by asking for the wrong grade or for a summer oil in winter. And please don't ask me what the difference is!

If you fill it yourself it's a bit more complicated. As you would expect the hole to fill it with oil is nowhere near the hole for gauging the amount of oil you have left. In fact the hole is situated underneath the oil filler cap on top of the engine. One point, don't for goodness sake confuse the oil filler cap with the radiator cap! There is a picture in the instruction book.

My mother and I once poured seven pints of water into the oil sump and we have never lived it down.

Radiator

You fill this with water.

NB. In winter water and antifreeze. The antifreeze lark can be a bit of a job as you have to "drain the block"* and refill the whole system with your solution of antifreeze. It is almost definitely a man's job.

Miscellaneous

Odd things do from time to time pack up and a few good phrases are all thats needed with a hint that the job ought to be done fairly soon, all this needless to say within earshot of your man.

Phrase	Meaning
I think the sealed beam unit needs replacing.	The headlamp bulb has gone.
I think the slow-running jet is blocked.	The car won't start.
The compression in No. 4 seems to be down a bit.	You can't overtake that snooty woman in the decrepit old Rover any more.
Don't you think the king-pins and bushes need replacing? I think the track rod is bent.	The car doesn't seem to go in the direction you're steering.

Just one last word - it is always as well to have a reliable man on the other end of a telephone just in case the second half of this course is as useless as the first.

Patricia Dadds

*"Drain the block" - this is a good phrase to remember and will be explained later.

Staff News

Congratulations to:

Barry Martin who has gained his D. Phil. for a thesis entitled 'Semi-Analytic Numerical Solutions of Eigen Value Problems with Boundary Singularities'.

Mrs D. Baldwin now C.O.

Welcome to:

R. G. Maby	Sandwich Course Student
T. G. Bryant	Stores Supervisory (Grade III)
Mrs H. B. Peel	Industrial Messenger P/T
J. C. Butler	Industrial Messenger P/T

Resignations

Mrs J. M. Murphy	S/O (Perm)
Miss M. A. Bland	S/A (Perm)
C. T. Chua	A.E.O. (Perm)
J. R. F. Edwards	S/A (Perm)
R. N. Butler	Photographer (Perm)
R. C. Dorey	Craftsman I
W. D. J. Morgan	Skilled Labourer (Non-Perm)

Other Changes

C. Murphy	Technician III. Left U.K. 7.1.70
	Arrive Singapore 30.1.70

Station News

The Director has returned from the C.C.I.R. Plenary Assembly in New Delhi where he was formally elected Chairman of International Study Group V. This group is concerned with the various aspects of tropospheric and ground-wave propagation. The Chairmanship of National Study Group V is now relinquished by the Director and the new Chairman will be Mr. J. A. Lane.

As a result of the New Delhi meeting there has been some reorganisation of the Study Groups. A new Study Group II now deals with radio astronomy and space research while Study Group IV is now responsible only for Space Communications Systems. There is no change in Study Groups V or VI. The National Study Group structure follows that of the International Groups, and Dr. Horner is now Chairman of National Study Group II.

The Station Review Panel has begun its work and is in the process of interviewing representatives of a wide range of organisations interested in the use of radio so that the relevance of our work to their needs may be fully explored.

The Station Committee has met to consider the Research Programme for the immediate future. Their recommendations will be made known to the Astronomy Space and Radio Board of the S.R.C. when it meets in March and will reflect continuation of the reorientation policies adopted in recent years.

The Deputy Director will attend a one-week course, from March 16th on "The Management of Research and Development Programs" at the Civil Service College, Sunningdale Park.

The Station will be closed from lunch time on Thursday, 26th March until Tuesday, 31st March, for the Easter holiday.

Mr. A. J. Hall and Dr. P. Dickinson left for Canada on February 23rd, to attend the launch of four Canadian Black Brant rockets. This launch will coincide with the Solar Eclipse on March 7th. The Station experiments carried by the rockets will measure X-rays and Lyman-Alpha radiation from the sun. The Canadian experiments will measure D-Region ionisation.

Sports and Social Club

Film Shows

The next film show is on "Aviation" and will be shown in the Board Room at 1 p.m. on February 26th.

Patricia Dadds

Table Tennis

Since the previous notes the team has played 3 league matches, winning 2 and losing 1. The match against Slough Community Centre's "Hunters" team was lost 6-4 after some very close individual results. The previous match was lost 8-2. If R.S.R.S. win all the remaining matches, there will be 3 teams at the top of Division 4 all of whom will have lost 2 matches. In any event, R.S.R.S. is likely to finish third on average and should still finish third if one more match is lost.

P. Muzlish

Bridge Club

There has been nothing to report for the last few months - in fact the only activity has been the regular lunch-time sessions in room E133. However two home matches are due shortly - against Road Research Laboratories, and against the National Physical Laboratory - both old rivals of ours.

The ex-D.S.I.R. cup match has provisionally been arranged for Sunday May 3rd at the Warren Springs Laboratory, Stevenage, and intending entrants should contact me by the beginning of April.

Also, if there is sufficient support, a bridge evening will be held before Easter - either on Tuesday 17 March or on Friday 20 March - for full details please see the main notice board.

R. J. Pratt

Wine Circle

Home-Brewed Beers

Beer is one of the oldest alcoholic drinks known to mankind and in this article it is hoped to introduce people to the pleasures of brewing one's own "poison". Brewing has the advantage, over winemaking, that less patience is required before one is able to consume the finished product. To the amateur Brewer there are two methods of brewing beer. He can either brew from the basic ingredients as in commercial brewing or use one of the concentrates available from the majority of stockists of amateur winemaking equipment.

Before commencing certain minimum requirements must be met. The first and most important is an understanding household! This is necessary as up to the bottling state the characteristic smell of beer will tend to pervade the whole house. If this

requirement can be met, or overcome, the following items are required:

(1) A suitable sized plastic fermentation vessel (e.g. a new dustbin)

(2) Plastic syphon tubing

(3) A supply of suitable bottles with closures

(4) Sterilising solution

(5) The ingredients.

In brewing, cleanliness is of paramount importance and this will be dealt with in some detail as it is also of interest to winemakers. All utensils should be thoroughly washed, using a liquid soap detergent, followed by a rinse in clean water. Deposits in bottles may be removed by ordinary neat household bleach, provided the bottles are thoroughly rinsed afterwards. The utensils should then be treated with a sterilising solution e.g. two Campden tablets and a saltspoon of Citric acid dissolved in one pint of water. This quantity can be used to sterilise all one's equipment by pouring it from one utensil to the other. It is essential that the sterilising solution contacts all surfaces which will be exposed to the beer.

To brew beer from the basic ingredients requires a fair amount of time and so the interested reader is recommended to consult a textbook (some are given at the end of this article).

The brewing of beer from concentrates is however, a comparatively simple matter. The concentrate and sugar are dissolved in the requisite amount of water in the fermentation vessel and the yeast added. The vessel is then covered and left in a warm place for several days, before syphoning-off into another container. After a few more days it is bottled and then, in about a week, it may be drunk. Full detailed instructions are usually supplied with each can of concentrate.

In conclusion a word of warning. It is possible to brew beers with an alcohol content of 10% which is roughly equivalent to the Frenchman's vin ordinaire. At this potency a wineglass full is the same as a tankard of commercial beer.

Suitable Textbooks

"Hints on Home Brewing" by C. J. J. Berry, publ. by Amateur Winemaker at 2/6
"Home-Brewed Beers and Stouts" by C. J. J. Berry " " " at 5/-
"Brewing better Beers" by K. Shales " " " at 5/-

Frank Bennett

Motor Club

We still need more entrants for our rally which is to be held on Sunday March 22nd. The start will be at Maidenhead Thicket (O.S. Map 159 Map Reference 859 809) at 11.00 a.m.

The rally will be a pleasant country drive, with a spot of navigation to prevent the front seat passenger from back seat driving. Further details may be obtained from

R. Marsh

Camera Club

The lunchtime slide shows this year have visited India (Eric Dunford and Henry Rishbeth); South Uist, with a glimpse of the Scottish mainland (Paul Dickinson) and the north coast of France ("A confetti on the Côte d'Opale", by Pierre Mierinck). These shows are open to all, and are announced on the notice boards a few days beforehand.

Henry Rishbeth

Crossnumber - Solution

A 6	B 7	C 2	D 2	E 2	F 8	G 2
H 2	6	I 3	1	9	5	5
J 5	8	1	K 6	8	5	L 9
M 7	5	8	3	6	N 9	8
7	O 1	9	P 9	5	6	Q 7
1	R 9	0	1	S 1	0	9
T 1	6	0	2	1	U 4	9

Letter H is uniquely defined, and complete consideration of N ac., U ac., L dn. and N dn. enables all four to be solved together.

Other solutions are grouped in a similar manner.

R. J. Pratt

Apologies to readers for an error in C across. It should read E down - M across.

Letter of thanks

Red Gables,
Amport,
Andover,
Hampshire
Tel: Weyhill 375

I know of no better way of saying "thank you" to my colleagues at RSFS/RSRS than by asking for this note to be printed in the next issue of the Newsletter.

I had been looking forward to my retirement on the 13th of February with mixed feelings and I had half hoped that I might be allowed to slip quietly away. But this was not to be; the staff at RSFS were gathered together and I was presented with a magnificent pewter tankard by Mr. Meadows. In his speech he made some congratulatory remarks which I am sure I don't deserve.

I would like to offer my sincere thanks to everybody who contributed towards this most graceful and useful tankard. I can assure everyone that I shall think of them whenever I fill it with my own home brew - at least once a day! You couldn't have thought of a better present.

My regards and best wishes to all at RSFS and RSRS. Amport is not very far from Chilbolton and my wife and I would be delighted to see all who have time to drop in at "Red Gables", and so "Au Revoir".

John W. Murray

Letter to the Outstations

Dear Colleagues,

Herewith a curious tale. It was found the other week that, contrary to accepted practice and the I.P.C.S.handbook, a senior member of Staff was sharing his office; if you are hoping for revelations, nameless abominations etc. don't bother to read on, ours is a family magazine, and the Senior member in question was not even aware of his partner. It was a Cox and Box arrangement and, curious paradox, the unofficial inhabitant was discovered only when he had no further needs. In short, a rat had run its last race and left the earthly remains in the ducting to lie in cold obstruction and to rot.

This fact of death soon manifested itself and a removal operation was mounted. Next, to crush the general cause of this particular complaint, the Health authorities were appealed to and the man arrived. In the best Holmesian tradition the expert spent little time dealing with the obvious and almost at once occupied himself with the seemingly irrelevant. He went for a stroll round the outside of the building. Returning shortly afterwards he pronounced - 'A simple case; block up a hole over by the boiler house and all will be well'. He then left, presumably to tackle more subtle problems worthy of his steel.

It was all very impressive, so much so that when this expert asks the Corporation for a rise it would be well for the Mayor to grant it. He seems to like serious music while working, no one saw him with a radio but the sound of a flute or recorder was heard. Funny old tune it was, sort of German, fourteenth century, it seemed to,

Yours sincerely,

The Editor

REPRINT LIST FEBRUARY 1970

G. W. Paltridge — Reflection from elevated layers in the troposphere
Proc. I.E.E. 1970 117. 23-26

M. R. Bowman, A. J. Gibson and M. C. W. Sandford — Application of dye lasers to probe the upper atmosphere by resonance scattering.
Radio and Electronic Eng. 1970 39 29-32.
Reprinted from the Proc. of the I.E.R.E., Conference on "Lasers and Opto-Electronics" held at the University of Southampton on 25th to 28th March 1969.

INTERNAL MEMORANDA

Molecular Ion Distributions in the F2 layer by H. Rishbeth.
U.R.S.I. XVIth General Assembly, Ottawa, August 1969.

A Review of F-Region Dynamics. (Review paper for Session III-5)
by H. Rishbeth.