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# NEWSLETTER

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## SATELLITE - WHERE ARE YOU?

Satellite observing lies on the very diffuse border between Art and Science. Poets call it sky-gazing and have indulged in it for many years, silenced by admiration of the unlimited Power which created the universe, too shy to express their feelings in words. In today's world of rush and haste there is not time left for this sort of unproductive, inert state. People who spend hours lost in contemplation of the beauty of the sky would be called, 'not of this world' - and who wants to risk that?

It was a happy event for the star-gazers when the first artificial satellite was launched - there was now a legitimate excuse for looking up; everyone else was doing so. Praises of human power were sung, technology became a deity, suddenly even the sky was no longer a limit for the human race reaching higher and higher ...

Artificial satellites now number thousands and a new launch is an everyday occurrence. Until recent events re-asserted the value of the human element, even the successes of moon-trips were taken for granted; our silvery companion being 'raised' from the status of a mysterious altar for lover's sighs to that of a scientific exploration field. People who gaze at the sky now have a scientific purpose, their observations are important for various reasons.

Material technology is also keeping in step with the advances of operational techniques - some satellites are made of fibreglass and certain plastics which, apart from the fact that they are very useful for making satellite's body also

happen to be nearly transparent to radio waves, which renders radar useless and puts optical observers in a strong position. Very often, only optical observers can study satellites during their re-entry, when they are so low that they are visible only from a small area. The human eye is still a most sensitive instrument for determining changes in brightness and these changes may give the shape of the satellite, which might otherwise be unknown. From the satellite's flash period the direction of spin-axis can be found. Another example of the usefulness of optical observers is when several satellites are launched by one rocket and they separate very slowly. In spite of highly advanced photographic and radar techniques, under such circumstances, the human eye remains the most precise instrument.

Most optical observations are accurate enough to be used in orbital analysis, which is a method of determining the forces acting on a satellite. By using this method in studying gravitational forces, the more accurate shape of Earth was established, namely, its pear-shape with a stem at the North Pole (a difference of 40 metres) and the unevenness of the equator (the difference between the maximum and minimum radii being 70 metres). Optical observations also have an important influence on theories about the Earth's interior and the way in which it has been formed.

It is not only the 'earthly' things which are laid open to man's investigations by the method of orbital analysis; nearly all that is known about the physical properties of the atmosphere has also come from this source. Day-to-night air density variations, 27-day and 6-monthly variations, the rotation of the atmosphere, knowledge in all of these fields has been gained by analysing satellite observations.

Knowledge of the structure and dynamics of the upper atmosphere is essential for forming a model of heat conversion into other forms of energy and its transportation from the equator to the poles. With such models it is possible to predict large-scale weather systems and once again it is satellite observations which provide the necessary data for research into the behaviour of the atmosphere and the forecasting of the weather.

The list of research subjects to which optical observations can be applied is rather impressive. Amateur optical observations are the cheapest way of providing the large amount of data needed to study such a wealth of subjects and so optical observers have good reason to be proud of the achievements which they have made possible.

Human beings are by nature inquisitive and the questions 'how' and 'why' are usually uppermost in their minds, but some more down-to-earth people will

inevitably ask the question 'what for'. This article has attempted to supply some of the answers.

In spite of the importance of their work, satellite observers are shy and unassuming people and I hope that for many years to come they will look at the sky and be able to see not only the visual signs of human progress but also feel and appreciate the greatness and splendour of space, that can have no equal.

Anna Wasik

#### THE NEW R.S.R.S. COMPUTER

On Sunday 2nd August 1970 the 1905 computer will process its last program. The central computer service will then close down for about 4 weeks while the new 1904A computer is installed.

A great advantage of the 1900 series of computers is the compatibility of peripheral equipment throughout the range. As a result of this, only the central processor and core store of our present configuration are being replaced, but two new exchangeable disc storage units will be added in order to facilitate the use of the "GEORGE III" automatic operating system which will be employed on the new machine. It is worth mentioning that 1904A and GEORGE III will not make life easier for the computer operations staff. On the contrary, they will have to work even harder than they do already due to the greater power of the computer. Were it not for GEORGE, however, we would have to employ more operators to cope with the increased amount of work that will pass through the machine. Users will probably welcome GEORGE, as it will provide them with a means of exerting much more control over the running of their programs than they have at present. They will accomplish this by means of programming their operating instructions.

A further advantage of the 1900 series of computers is what is called 'the upwards compatibility of programs'. This means that provided a more powerful 1900 series computer is acquired, all existing programs will continue to work without any modification at all.

The two main advantages of the 1904A will be increased speed and extra available core store. Both of these will be more than doubled compared with the 1905, and the core store of the 1904A can be further increased should this ever be necessary.

The increased core store will be welcomed by many of our users who feel restricted by the present 23K\* available and also by the limit of 11K on our present short run stream which enables short runs which can be inefficient with regard to computer usage to be 'time-shared' with Background jobs of up to 12K in

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\*1K is 1024 computer sotrage units (words)

size. The 11K figure is dictated by the sizes of the compilers and consolidators otherwise it could well be smaller.

The present computer was handed over to us by I.C.L. on 30th November 1967. Since that time approximately 7000 hours of computer time have been used.

The major users have been Satellite Prediction Group (nearly 2000 hours) and The Lower Ionosphere Group (nearly 1000 hours). The Upper Ionosphere Group, The Rockets Group, The ESRO Group and the Computer Group have all used approximately 500 hours during this period.

Initially the computer was used for about 40 hours per week, but now almost 100 hours of computer time are used each week. This has been made possible by the introduction of shift work and the help of voluntary overtime workers at weekends.

In spite of the very high growth rate of computer usage on the 1905, the amount of time used by the Station on the Atlas computer at Chilton has also continued to grow. The programs processed at Atlas are usually either too big for the 1905 to handle or they take such a long time on the 1905 that they cannot be guaranteed a satisfactory turn-around time.

The continued increase in the time used at Atlas is one of the main reasons for the purchase of the new computer. This use of Atlas will probably reach an all time high during August when R.S.R.S. will be without a computer, for several groups have already arranged to send their more important production work there during the shut down period. Program testing for short jobs will continue to take place by means of a daily run to an I.C.L. computer at Putney.

Another most important reason for getting the 1904A is to speed up turn-around time for research workers who continually need to develop new computer programs: the fast turn-around time will be achieved by two means.

- (a) Faster turn around of 'closed shop' jobs submitted on cards and paper tape
- (b) instant turn around by means of 4 on-line terminals similar to the one on which the present JEAN service is provided.

The effect should be that quite a lot of research work will be done a lot quicker.

The most important reasons however for getting the new computer are that the anticipated amount of data to be processed during the next few years, as a result of the R.S.R.S. research programme is just far too much for our present system to cope with.

It is clear from the amount of time that has been used on the 1905 that the computer is a most popular tool for scientific research, and I am sure that the computer users regard it as an absolutely essential tool also, but it should be remembered that this time has cost the Station approximately £1 for every minute used, and this cost is something else that approximately doubles with the new computer. One of the features of GEORGE III is an accounting system which allocates users time each month and debits users' accounts when they use computer time, so that in a sense they have a bank account of computer time: GEORGE has even been known to allow overdrafts. It is to be hoped though that the computer time will be treated with the same respect as a monthly salary and not unnecessarily squandered by careless or ill-planned programming. It will not be possible to double our computer power again for a very long time.

B. R. Martin

Staff News

Congratulations:-

Kathy and Jock Gourlay, on the birth of their daughter, Helen Kathleen on May 6th.  
Mrs. I. W. Gibson now Typist I

Welcome to:

M. Fortune	Sandwich Course Student
Mrs. J. M. Briggs	Clerk/Typist (part-time) (Singapore)
Mrs. J. M. Murphy	Tech. Officer (Singapore)
G. K. Tan	Tech. Officer (Singapore)

Resignations

Mrs. J. E. Berry	Clerk/Typist (part-time (Singapore)
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Other Changes

R. J. Cathrew	E.O. (returned from Singapore)
Mackrell, G. E.	E.O. (returned from Falkland Islands)
Battacharyya, S. K.	E. O. (arrived Singapore)

News of Former Staff

Congratulations to Barbara (Kaiser) and David Petrie on the birth of their son Iain David on 17th April.

### Station News

Dr. Horner headed a delegation to the Scientific and Technical Sub-committee of the U.N. Committee for the Peaceful Uses of Outer Space, at the United Nations headquarters in New York, from the 13th-24th April.

Dr. Horner also attended a meeting of the I.C.S.U. Inter-Union Commission on the allocation of frequencies for Radio Astronomy and Space Science, at Gothenberg, Sweden, from the 4th-7th May.

Mr. A. Rogers will go to Sardinia on May 24th for approximately five weeks, in order to launch two Skylark rockets for Dr. Burrows. The rockets will carry magnetometer experiments, to study Sporadic E conditions.

A central Induction Course, attended by 18 staff from various S.R.C. Establishments, was held at the Station on May 19th and 20th.

### Sports and Social Club

The following officers were elected at the A.G.M. on April 29th:-

Chairman	Betty Carroll
Vice-Chairman	Mike Farman
Secretary	Pat Dadds
Treasurer	Dennison Lepine
Ass. Treasurer	Hanne Lennon
Minutes Secretary	Marie Huggins
Committee	Rodney Knight
	John Crawford
	Piers Eggett

### Sports Day

The S.R.C. Sports Day will be held at the Civil Servants Sports Ground, Chiswick, on July 1st. Further details may be found on the notice board.

### Bridge Club

The final two matches of the season have now been played, with the following results:-

The first was at home on 24th April when we lost to NPL by 17 IMP's - despite leading 38-32 at the half way stage.



by ..., with his girl friend ....., who was a ..... in a Japanese night club called ..... . He continued his tale by telling of his ..... as a ..... of ..... with a tribe of ..... petrol pump attendants belonging to the .... .

They motored on, passing ..... trust land on which stood the ..... of a castle, the former home of a ....., who was killed with a ..... in an accident on the sports field.

Suddenly the road was blocked by a police ..... who was brandishing an ..... . He was searching for a ....., captain ....., who had escaped from his ..... while in ..... to ..... jail. The constable described him, just for the ....., as a ..... known to be armed with a ..... and thought to be heading for his home town of ....., sleeping by day and travelling by ..... .

Forewarned, our friends drove on to the next cafe, which was run by a ....., nicknamed ....., who served them with Worthington. .... and ham ..... . He supplied them with a copy of the Daily ..... and the headlines told him of the prisoner's exploits. He had kidnapped a ....., the daughter of a ....., and was holding her to ransom.

After downing their victuals, they continued on their way, to be confronted in a short while at the ..... of a hill, with an Aston Martin slewed right across the road. The driver ....., had caught up with the criminal, taking him into custody and releasing the girl.

All this happened within a ..... of 57 miles and still our friend had not reached his destination. You may have better luck on the next Motor Club rally, and may be the ..... :

Footnote: The next Motor Club Rally will be on July 26th.

R. Marsh

#### Camera Club

At the A.G.M. on 22 April 1970 the Committee for 1970/71 was constituted as follows: Secretary, Henry Rishbeth; Treasurer, Paul Dickinson, Committee Member, Gerry Webb. It is hoped that the Club darkroom will be available for use by members later in the year.

Henry Rishbeth

Letter to the Outstations

Dear Colleagues

There was a time, long past, when the major real estate of the then Radio Research Station consisted of the Old Buildings and a few huts, and all research was carried out with EF50s and Pye plugs. It was the custom of those days to take tea breaks communally in Hut 13, the Staff being summoned by the sound of a golden trumpet - very well, if you must, the fire klaxon. The system was open to abuse but had much to commend it in terms of exchange of ideas, some of which were actually relevant to research.

This elegant fashion, modified to the needs of the present day, has been revived in what might be termed the Wednesday Morning Mingle. Once a week, from the four corners of the laboratory, all foregather in the restaurant to take a dish of tea, or coffee, and engage in that traffic of the mind so necessary to the upkeep of any culture.

On the face of it this seems to be a good thing, provided all work with a will to promote communication up, down, and sideways. The most recent session produced a satisfactory random cocktail noise in which, we hope, was embedded the occasional Great Thought which will fructify to the everlasting benefit of Natural Philosophy. We can but hope that, given time these gatherings will assume the aura of J. J. Thomson's Cavendish teas.

It may be that nowadays we need some stronger vehicle to get us off the ground quickly. Go to pot we may not, but, bearing in mind that a symposium was originally a classical chat-up cum booze-up, may we perhaps look forward to State supplied stimulants to aid the information flow and make even better an effort which seems worthy to many including,

Yours sincerely

The Editor

