

R. S. R. S.

Newsletter

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Studies of the high atmosphere (Meteorological Office)

A detector sensitive only to radiation of a specified wave-length in the ultraviolet region indicates the amount of molecular oxygen present in the atmosphere between the satellite and the Sun. This information enables scientists at the Meteorological Office at Bracknell to work out the vertical distribution of oxygen in the Earth's atmosphere at levels where molecular oxygen is being destroyed by solar radiation.

There are three distinct heat input regions in the Earth's atmosphere. The lowest region is the actual surface of the Earth, where solar radiation ('sunshine') is absorbed; the second region extends from a height of about 35-70 Km where near ultraviolet radiation (2500-3000 Å) is absorbed by ozone; and the third region above 100 Km is where far ultraviolet radiation is absorbed, mostly by molecular oxygen. There is considerable interest in measuring the concentrations of oxygen and ozone as the energy input into the atmosphere depends very much on the amount of ozone and oxygen present.

The equipment contains 4 ion chambers looking sideways from the "top-hat" on top of the spacecraft, evenly spread around its circumference, and hence giving continuous viewing of the ultra-violet light from the Sun as the spacecraft spins (provided that the spin axis is at the correct angle at injection into orbit). The chambers contain P/Xylene gas at low pressure and have a window of sapphire or barium fluoride resulting in a peak response at 1450 Å. The ion chamber potential comes from batteries contained in the experiment and the outputs from the 4 chambers are combined and amplified by a very sensitive D.C. amplifier developed by the Meteorological Office.

/Very Low

Very Low Frequency Experiment (University of Sheffield)

This experiment is designed primarily to study the spatial and temporal characteristics of VLF radiation (1 to 20 KHz) above the ionosphere. This synoptic study of VLF phenomena is an extension of studies made in such satellites as Alouette I and II and Injun III in which real-time observations of the more detailed dispersive and spectral characteristics of the signals have been limited to the vicinity of STADAN stations.

There are two main classes of VLF phenomena: whistlers, generated in lightning discharges and observed mainly in medium latitudes; and natural VLF emissions - a high latitude phenomenon occurring principally in the auroral zones and associated with the precipitation of charged particles (mainly electrons) along the Earth's magnetic field lines.

The VLF observations on UK-3 are made at three representative frequencies in the VLF band (3.2, 9.6 and 16 KHz). At the highest frequency a wide and narrow pass-band centred on Rugby radio station (call sign GBR) makes it possible to study the field pattern (of special transmissions) from GBR as well as whistler and VLF emissions.

Ground based observations of the VLF emissions are made at a number of different points including the Faroe Islands (by Mr. Martin Haasen, a radio amateur at Torshavn), the British Antarctic Survey Base at Halley Bay and at Sheffield University. In addition ground-based observations are made, through the co-operation of the French space research organisation, using French receivers at Winkfield, Johannesburg, Quito and Santiago.

The aerial is a 14-turn screened loop mounted with its axis along the spin axis of the satellite. Power consumption is $\frac{1}{4}$ watt and the receiver, which contains 183 transistors and 800 other components, is contained in a box 8" x 6" x 6", total weight 8.5 lbs.

World-wide survey of the ionosphere (University of Birmingham)

The objective of the Birmingham experiment is a world-wide survey of the ionosphere above the F2 maximum by measuring the ionisation density and temperature at frequent points along the path of the satellite. The measurements of ionisation density are made with the R.F. plasma probe, developed by the Birmingham group, and the temperature measurements are carried out by a new probe in the form of a pair of matched, small spheres drawing electric current from the space environment.

The combination of this survey with similar extensive measurements of magnetic fields, particle streams and solar radiation which are planned for U.S. geophysical satellites should give valuable new information on the production, world-wide distribution and movements of ionisation above the F₂ maximum.

/The R.F.

The R.F. plasma probe takes the form of a pair of sensor grids, and these are placed at the end of a boom while the electron temperature spheres are carried on a balancing boom at the opposite side of the satellite. These booms avoid the plasma sheath and wake regions of the space vehicle. The two associated electronic packages are mounted inside the satellite. The data are stored and read out once every orbit as well as being telemetered in real time.

Mapping large-scale noise sources in the galaxy (University of Manchester)

At frequencies below about 20 MHz ground based observations of cosmic noise are severely limited by the ionosphere and by man-made interference. The Jodrell Bank experiment aims at measuring the emission of radio noise (sky brightness) with sufficient angular resolving power to provide information about the distribution of radiation across the sky by ionospheric refraction.

A special feature of the measuring techniques is the use of the ionospheric focussing effect. The frequency of the receiver in the satellite is swept slowly and repeatedly across the range 2 to 5 MHz: whenever the frequency is the same as the local ionospheric cut-off frequency focussing of the receiver aerial will occur, giving a beam-width of about 40° at 2 MHz and about 20° at 5 MHz using a bandwidth of 30 MHz.

Noise generated in the ionosphere is also detected at the lower frequencies, and the near polar orbit of UK-3 makes it possible to explore the geographical distribution of the source. If it is related to particle streams from the Sun variation with time should also be detected.

The aerial is a loop antenna mounted on the ends of the booms. A small matching unit at the tip of one of the booms and connected directly to the antenna contains varactor diodes which tune the antenna and its local oscillator. The receiver in the satellite, connected to the matching unit by concentric cable, sweeps between 2.0 and 4.7 MHz every 112 seconds.

STOP PRESS

Mr. R. W. Meadows has recently been appointed to the new Organisational S.P.S.O. Post at R.S.R.S. On behalf of Staff at Ditton Park and at the Outstations we offer our congratulations.

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REFLECTIONS

Running through rainstorms chasing the light of
another day,
Another space in the emptiness.
Naught to hear but the sound that nothing makes
As it is rattled in a can.

Soon it will be tomorrow,
The neverwas, the soon to be, and the forever after.
Today's friends disappear in the mists
and become yesterday's ghosts.

The eternal philosopher raises his hands to the clouds,
I understand, he cries in his misery,
I know the meaning,
But he still trembles.

And come the after years what is left,
only the memory - Bitter-sweet.
The mind polishes the good to marble finish,
Whilst the bad is left to rot, only to be remembered
when it rains.

Time stumbles crazily on towards the guillotine
only to be burnt at the stake.
Miserable speck of dust -
do you really think you matter.

Pity but I'm afraid,
Frightened of everything but myself -
But then it's difficult to fear that which you
don't understand.

If I were to think more my mind would fall,
Plummet like a stone into the sea of indifference.
But through all this one thing's clear,
The people will march on to their destiny -
blindfold.

R.R.L.

SPACEWORD II

Answers

- | | | | |
|----------------|------------|-------------|-----------------|
| 1. Gravitation | 6. Perigee | 8. Pier | 9. Seed |
| 10. A.S.A. | 12. Years | 13. Costs | 14. Pie |
| 16. I.O.U.S. | 18. Dior | 19. Satanic | 20. Luminescent |

Down

- | | | | |
|----------------|------------|------------|----------|
| 1. Geophysical | 2. Veer | 3. Twins | 4. Toes |
| 5. Nondescript | 6. Pegasus | 7. Elastic | 10. Asp |
| 11. Ace | 15. Image | 17. Sari | 18. Disc |

/STAFF NEWS

STAFF NEWS

Congratulations to :

Dr. and Mrs. Rodney Bent on the birth of their son Timothy Nicholas on 18th June.

Rodney Knight and Edith Buckner on their engagement.

Resignations

Mrs. P. E. Martin T/C.O.

SPORTS AND SOCIAL CLUB NEWS

Social Evening with A.C.O.

On 15th June R.S.R.S. were hosts to A.C.O. for an evening of social activities. The occasion was well supported by both R.S.R.S. and A.C.O. and also blessed with fine weather which enabled outdoor sports to be pursued with enthusiasm!

The results of the various activities are :-

Tennis A win for R.S.R.S. by 8 sets to 1. 3 mixed doubles matches were played of 3 sets each. - Veronica Lovell and Gus Gordon-Smith won 3-0, Clare Seabrook and Bob Fitcher won 3-0, and Maureen Stacey and Richard Smith won 2-1.

Cricket A.C.O. won the cricket match, scoring 56 runs for the loss of 4 wickets in reply to the R.S.R.S. score of 55 all out. (More details in the cricket section)

Bowls Messrs. Spencer, Clarke, Meadows and Haxton (ex - R.S.R.S.) were our representatives in this event, but were beaten by the A.C.O. team in a match of 21 ends. At 18 ends the scores were level but R.S.R.S. lost on the last 3 ends.

Snooker The combination of John Tyler and Bill Bellchambers proved to be too strong for the A.C.O. team who were narrowly beaten (on the black) by 1 game to nil.

Table-tennis R.S.R.S. beat A.C.O. by 4 games to 1. R.S.R.S. were represented by Rodney Knight, Harry Meswani, Paul Dickinson and Tony Gibson.

Another social evening is planned for 27th July with the A.C.O. this time acting as hosts.

B. R. MAY

Cricket

Thanks to the excellent weather of recent weeks there are several matches on which to report. The first, against A.C.O. on 15th June, resulted in a win for A.C.O. No less than six R.S.R.S. batsmen had the dubious distinction of scoring 'ducks'; only May (25), Boulton (12) and Moosajee (12) offered any resistance and we were all out for 55. A.C.O. rapidly passed this score for the loss of four wickets.

/A Smith-Rose

A Smith-Rose Cup match was played on 22nd June when 'NORTH' defeated 'SOUTH' with unexpected ease! The scores were : SOUTH 20 (May 15) - NORTH 21-1 (Freeston 16 n.o.); for the NORTH, Davies took 5 wickets for 3 runs.

The 'ability of the individual' was put to test in a single-wicket competition on 6th July. Having first resolved the complexities of organisation, sixteen players contested the first round. The highest scoring match was that between Hopkins (17) and Davies (14), but several of the matches resulted in close finishes. The eventual finalists were Lane and Harrison, P. J., the former revealing latent talents to win the competition with a nonchalant square cut to the boundary. Apart from some slight controversy over the rules, this seems to have been a successful innovation which provided some enjoyable cricket.

On 12th July we enjoyed our first taste of success when we defeated by 10 wickets, a team from the Meteorological Office Experimental Station. The visitors were all out for 58, and R.S.R.S. openers Freeston (36) and Dunford (20) batted well to score 60 without loss.

We now face A.C.O. in the return match on July 27th with renewed confidence.

GRAHAM THOMAS

LETTER TO THE OUTSTATIONS

Dear Colleagues,

The rural round continues here. A pike lazing in the moat, cygnets swimming on the moat and cattle, just being cattle, round the moat. The unexpected too; the sight - should it be view? - of a fox on a couple of occasions. In fact, were our masts and huts not here, the landscape would be a timeless pastoral.

For better or worse, though, we too are in Arcady and it's quite surprising how the warm sunshine brings out the field work. Anybody with the flimsiest excuse for erecting a mast or tripod can be found making measurements in odd corners of West Park. The pursuit of truth and Solar U-V go hand-in-hand.

Come to think of it, now we have a fox couldn't we create the Ditton Hunt? The letters M.F.H. are not without honour and might look well with the high distinctions held by - well - 'the task of filling in the blank I'd rather leave to you', not,

Yours sincerely,

The Editor.