

R. S. R. S.

Newsletter

No. 84

April 1968

The Five-Year Forward Look

It has become the practice for the Science Research Council in reviewing its Research Programme annually to prepare a Five Year Forward Look. While the proposals for the early part of the quinquennium are expected to be reasonably firm, it is desirable also to have ideas for the later years, so that suitable financial provision can be determined and, as far as possible, priorities assessed throughout the entire field of the Council's activities.

The most recent exercise has just been completed and has been particularly important in the wake of devaluation and an urgent need to examine the contributions which the Council may be able to make towards strengthening the economy. The Station's own Research Programme is first determined in discussions with the Station Committee which then makes its recommendation to the Astronomy Space and Radio Board. This board also considers recommendations from the Space Policy and Grants Committee and the Astronomy Policy and Grants Committee.

Finally, the Astronomy Space and Radio Board in parallel with the Nuclear Physics Board and the University Science and Technology Board makes recommendations to the Science Research Council.

The present Forward Look, which has received the approval of the Science Research Council, contains a detailed programme of research for the Station, and Staff will be interested to know that, at the present time, the following items are being given priority :

1. The aim in the immediate future will be to direct considerable effort in directions where useful practical applications seem possible.
2. In the next few years the first priority must be given to full exploitation of the Chilbolton Aerial. Emphasis will be given first

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to investigations relative to developments in space and terrestrial communications. The aerial will, of course, continue to be an extremely valuable asset to the Station in the longer term and other uses will probably involve applications to radio astronomy, sometimes in collaboration with universities.

3. High priority will also be given to studies of mm.wave propagation.
4. For a limited period a concerted effort will be made to see whether, on the basis of new knowledge of the ionosphere and solar physics, improvements can be made in high frequency communications.
5. Priority in the longer-term basic research will be given, in the next few years, to :
 - (a) Co-ordinated projects for investigating the D-region of the ionosphere. Topside sounding studies of the ionosphere and related particle radiation problems.
 - (b) Radio-meteorological studies and tropospheric refractive index investigations.

J. A. SAXTON

The Work of the Measurements Group

Everyone will have read the letters in the Newsletter dealing, among other things, with the lack of communication within the station. It would seem, from general discussion, that there is quite a widespread feeling that not enough information is available as to what everyone is doing. Your Editor has therefore decided to try to remedy this, by asking members of the staff to write a few words about their work for inclusion in the Newsletter.

Perhaps I might begin by quoting baldly the "Objectives" section of the notes for the progress review of January last, where they are stated to be :-

- (a) To maintain and extend the basic measuring facilities on the Station, and to provide adequate standards both to this end and for the calibration of Station apparatus.
- (b) The issuing and maintenance of test apparatus.
- (c) The maintenance of catalogues, equipment manuals, etc.
- (d) Advising R.S.R.S. staff on commercial apparatus and equipment development.
- (e) Development of some apparatus for Chilbolton in conjunction with groups concerned.

Also included is responsibility for the equipment inventory, monthly reports to Ministry of Technology Central Instrument Information Service, arrangements for demonstrations of equipment, interviews with technical representatives, and provision of current technical data, etc.

Some of our recent work has been only indirectly concerned with these things. We have been getting rid of an accumulation of bits and pieces, and equipment which is obsolete and/or beyond economical repair; the removal of some of this being prevented only by lack of somewhere to put it, pending

disposal! Shortly we hope to move some more of the remainder over to a holding store, in what used to be the tape-store. This will include items which although never, or infrequently used, would nevertheless be difficult to replace should they be required. This will enable us to have a reorganisation of the measurements laboratory to provide more space for filing cabinets. The existing ones are already overflowing, and we have been asked to provide more, for catalogues of components and small mechanical parts. For some weeks we have been trying to reorganise these files, and also the card index. We have been working on various bits of equipment bequeathed to us by NASA, and of course the testing of the usual influx of new equipment which normally precedes the end of the financial year. We also succeeded in more or less completing the previous yearly inventory check, after a short and bitter struggle.

To come back to the main work of the group, all this is something which is becoming more difficult to do with the passage of time. Although some isolated pieces of work have been done in the past, and are referred to later, we do no "Standards" work here at present. To do this would nowadays require quite a group of people, who are not only of a good technical standard but have the necessary attitude of mind. Instead it has been the policy to use a small stock of good commercial equipment for the calibration of other equipment, the calibration of this equipment being in turn accomplished by a variety of ad hoc methods. As commercial instruments are improving all the time, it is surprising that there are members of the staff who object to the "best" instruments being retained in the Measurements Laboratory, (increasingly often, nowadays, this is in any case not true), and who are surprised that we do not wish them to go out on loan. Surely this is exactly where they should be, and more of them of better quality, if the Measurements Laboratory is to continue to do its work properly. And, although it is undoubtedly unpleasant, it is nevertheless necessary to say that there is always a small number of irresponsible people, to whom one is ill advised to make such a loan even if one were willing to allow it. The condition of some of the equipment on return to instrument store "has to be seen to be believed", as they say, to say nothing of the "if yer want it, yer can fetch it" type - fortunately rare.

From time to time some "real" measurements work has been undertaken here. For example a good deal of work was done at one time, by Mr. J. A. Lane and others, on the measurement of power at microwave frequencies, resulting in some International Comparisons in this field. Mr. Gordon-Smith has worked on the calibration of radio noise-sources, again providing useful comparisons with other laboratories. (This is one piece of work which we are about to revive, to enable calibrations of the Chilbolton equipment to be made expeditiously and with adequate accuracy.) Messrs. Lane and Pearson developed a method for the calibration of meters for the indication of very high (and therefore dangerous) flux densities at microwave frequencies. These, and a few other pieces of work have, however, been isolated pieces of work of relatively short duration.

The repair and maintenance of test apparatus is now, as far as possible, carried out on the Station. It is not only time-consuming, but often very expensive, to send it outside. One receiver manufacturer, for example, has never charged less than £80 for a repair. Some repairs of course we cannot do here, and occasionally it takes a little time to obtain spare parts, but on the whole this part of the service has of late improved considerably.

We do try, as far as possible, to keep up the supply of up-to-date catalogues and equipment manuals. Quite apart from wastage due to loss or non-return, however, it is difficult to keep up-to-date for other reasons. The production of catalogues and manuals takes time. Many manufacturers first advertise new equipment in one of many technical journals, or free hand-outs such as Electronic Equipment News. One always does one's best to read these, but it must be realized that the number of new electronic devices or instruments produced annually is at present between 6 and 7 thousand! Speaking purely personally, I would like to see some use made here of one of the commercial data systems, such as Indata, who maintain a staff to continually analyse and disseminate information of this kind, in chosen categories.

I see that we are also responsible for "issuing" equipment, but as most of it is always on loan, it is rare that we have anything to "issue", other than those "useful" items that nobody will use. All we can do, as often as not, is to try to tell you where suitable equipment can be found, but as it frequently moves around the Station without our knowledge, we often cannot even do that. We do make mistakes in the index - everyone does - but do not blame us every time you have to chase equipment round the Station. More often than not it is not our fault!

F. V. BALE

Reprints and Internal Memoranda

Available with this Newsletter is a supplement containing a list of all Internal Memoranda available on the Station. On a separate sheet, at the back of the Newsletter, will be published each month a list of recent reprints available in Registry together with the titles of any Internal Memoranda received by the Library in the previous month. In this way it is hoped that those who wish so to do may compile their own up-to-date Reprint and I.M. index.

(Editor)

A Rare Phenomenon

It is not often that one sees a natural phenomenon on whose very existence doubt has been cast. On the evening of Thursday 18th April my wife, mother-in-law and I saw what I can only conclude to have been ball lightning, an occurrence which, on occasion, has been described more exotically as an unidentified flying object or flying saucer.

At the time of the event an intense thunderstorm was in progress with torrential rain and a high wind. Immediately following a not particularly intense flash of lightning a very bright spherical object appeared above the ground where the lightning had struck. While its distance was very difficult to estimate we agreed that it was more than a quarter of a mile away and had an angular diameter at least half as large as that of the sun. The ball hovered almost motionless at about 50-100 feet for some five seconds and disappeared quietly with a hazy or smoky appearance. We were uncertain about the colour, but think it had a yellowish or reddish tinge.

Previous reports of ball lightning agree with much of what we saw. An object at 400 m with an angular diameter of $\frac{1}{4}^{\circ}$ would have a radius of about 1 m. The usual estimate reported is about 15 cm but estimated radii of several metres have occurred. On many occasions the ball lightning has disappeared with a violent explosion, while several reports of shattered buildings have been recorded! I am happy to say that we suffered no such catastrophe but look forward to the next time.

E. DUNFORD

Station News

Recent Happenings

The Director and Mr. Horner attended, on March 26th/27th a meeting of the URSI Co-ordinating Committee, as Chairman of URSI Commissions II and VIII respectively. This committee, which consists of the principal URSI officers and the Chairman and Vice-Chairman of each Commission, met to discuss the organisations and programme for the next URSI General Assembly which will take place in Ottawa in 1969. Ex-members of R.S.R.S. attending were Dr. Smith-Rose, as an Honorary President; Professor Beynon, the Vice-President and Dr. Minnis, as the recently appointed Acting Secretary-General. Mr. Ratcliffe, also an Honorary President, was unable to come.

A representative from the COI recently visited the Station and talked to senior staff. The discussions were recorded and will be used in radio programmes being compiled, mainly for overseas consumption.

Discussions with Post Office representatives are in progress, to see how the propagation work of the Station, at centimetre and millimetre wavelengths, can help to accelerate the development of communications services. It is intended that a joint programme will be undertaken, with particular emphasis on the adverse effects of precipitation on radio links.

Mr. Sandford has just returned from Boulder where he attended a conference on laser probing of the atmosphere.

Future Events

Mr. Horner, Dr. King and Dr. Bent will be visiting Tokyo next month. Dr. King is taking part in the COSPAR Assembly. The others will be there mainly to attend an International Conference on Atmospheric Electricity, but will also spend some time at the COSPAR meetings. They will visit Singapore on the way out and attend the NASA Symposium on Ariel III on the way back.

At the Royal Society Soiree on May 16th, the Ariel III satellite will be featured and Mr. J. Murphy will be there to discuss the Station's experiment.

Staff News

Congratulations to :-

Mr. & Mrs. Derek Thorpe on the birth of their son Mark on 29th March.
Dr. & Mrs. Eric Dunford on the birth of their son Andrew on 13th April.
Mr. Rodney Knight and Miss Edith Buckner on their marriage at Slough on 23rd March.
Dr. Mike Quigley on his engagement to Miss Helen McCall of Edinburgh.

Welcome to :-

Miss H. P. Huggins	Perm. S.A.
J. S. Wright	N/Perm. A.E.O. (Falkland Is.)
Mrs. B. Jeremiah	P/T Machine Operator
F. J. Dickenson	Radio Tech. Seconded from Board of Trade to Falkland Islands
Mrs. M. W. Hutchings	P/T Cleaner
L. P. Smith	N/Perm. Labourer-Messenger
Mrs. A. R. Williams	P/T Canteen Assistant

Resignations

A. Dean	Perm. E.O. (Winkfield)
G. E. F. Brant	N/Perm. S.A.
S. T. C. Quek	E.O. (Estab.)
Miss C. Seabrook	N/Perm. A.E.O.
W. R. Bellchambers	Signals Officer. Ended Secondment. Returned to Board of Trade.
J. Juleff	E.O. (Estab.)
G. Hodder	Exec.O. (Estab.) (London Office)
A. Colsell	N/Perm. Labourer-Messenger
Mrs. H. M. Hutchings	P/T Cleaner

Sports and Social Club News

Bridge Club

The D.S.I.R. Cup Competition was held at R.S.R.S. on Sunday the 31st March. This match, which is open to all establishments which used to be part of the D.S.I.R., has been won for two years previously by this Station. This year, our first team consisting of Dr. and Mrs. Bain, Mr. and Mrs. Gordon-Smith was placed second out of eight teams and the cup went to R.R.L. Crowthorne.

We still have two matches to play this season, against N.P.L. on the 26th April and against I.C.I. some time in May.

MARTIN BOWMAN

Badminton Club

On Monday 8th April, after much press ganging players and shifting of the North-South dividing line (I believe the boundary finished up somewhere in the Thames Valley) the Smith-Rose Cup Tournament took place at the Baldwin Institute, Eton.

Sixteen players spent an energetic evening playing off a total of sixteen mixed doubles. The end result being a win for the South by ten games to six.

A. F. SMITH

LETTER TO THE OUTSTATIONS

Recently I've been going on a bit about the new laboratory extensions; it seems only right to mention that these are by no means the only changes around Ditton Park. Take the Workshop facilities, for instance, two spacious extra buildings have been added, both equipped with loading bays. One of these areas is for packing and despatch, whilst the other, suitably fitted out with a tasteful variety of furnaces, constitutes a heat treatment and erection shop.

Most interesting of all to the post-prandial promenader, however, is a home-brewed effort rapidly rising hard by these stately pleasure domes. It is, at present, a skeletal thing of beams, joists, tenons, no doubt a mortice or two, and other beauties and mysteries of the carpenter's art, and must be nearly a hundred feet long.

When completed this will, we are told, form the new World Data Centre, but I beg ~~leave~~ to wonder. There is a sort of antediluvian familiarity about it, antediluvian indeed an hundred feet cubits? Could it be? The weather has been very variable of late, hot, cold, moist and dry not leaping in order to their stations. Perhaps the latest umpteen level numerical forecast model has told our Masters to make ready. After all we are in the Thames Valley.

Is there, in Establishment Office, a Most Secret list of staff, two by two? It's most important to find out, for I want to make sure of an Editress to accompany,

Yours sincerely,

The Editor

REPRINTS

March 1968

Sporadic-E and the F2 layer at middle latitudes

J. W. King, R. Pratt and W. S. Newman

Published : J.A.T.P. Date 1968 Vol. 30 Pages 463-467

Airglow observations and the decay of the ionospheric equatorial anomaly

J. W. King

Published : J.A.T.P. Date 1968 Vol. 30 Pages 391-402

The time of the sunrise effect in the topside ionosphere in summer

J. W. King, D. Eccles and K. C. Reed

Published : J.A.T.P. Date 1968 Vol. 30 Pages 423-430

The relationship between 10 cm solar flux and electron concentration in the topside ionosphere

J. W. King and K. C. Reed

Published : J.A.T.P. Date 1968 Vol. 30 Pages 431-437

The energy loss factor for electron collision in the D region

J. W. King

Published : J.A.T.P. Date 1968 Vol. 30 Pages 459-462

Internal Memoranda - Nil