R.S.R.S. Newsletter

Christmas 1967 No. 80

The Editor has again given me space in the Newsletter to express my sincere good wishes to all members of the Staff and their families for a very happy Christmas and a successful New Year.

1967 has been an eventful year for R.S.R.S. and has seen the final consolidation of the staff of the Station under the S.R.C. Next year is not going to be easy for us in view of the present economic condition of the Country, but I am confident that we shall continue to have sufficient resources to do a great deal of significant and useful work. We should therefore regard our present difficulties as a spur to increased effort and I have no doubt that, in this spirit, we can indeed make 1968 a successful year for the Station as well as for ourselves.

J. A. Saxton

The R.S.R.S. Symposium on "Particle Effects in the Ionosphere above 100 km"

On 28th November 1967 about fifty people, half visitors and half R.S.R.S. staff, gathered for one of a series of technical symposia being held on the Station. Fortunately the day was free of the hazards associated with an English November, although a "delaying action" was successfully carried out by the Southern Region. Nevertheless, once safely arrived at R.S.R.S., the participants were ably served with coffee, lunch and tea by the catering staff, to whom thanks are due.

The subject "Particle Effects in the Ionosphere" is a very topical one here at R.S.R.S., because several rocket and satellite experiments in the Station's programme are concerned with measurements of energetic particles. It seemed an opportune time for experimenters and theorists in this country to put together their knowledge of this still rather mysterious topic.

Briefly the situation seems to be this. There is little doubt that the parts of the ionosphere above 100 km - the E and F layers - are normally produced by ultraviolet light and X-rays from the sun. The same applies to the normal D layer below 100 km, although the C layer around 60 km is attributed to a certain class of energetic particles, namely cosmic rays from outside the solar system.

Thus above 100 km particle effects are likely to be most important under abnormal conditions, notably at times of magnetic disturbance, when many complicated phenomena occur in the ionoshere.

Magnetic disturbances or "storms" often follow solar flares, which are known to be a source of high energy particles. But because of the 'barrier' presented by the earth's magnetic field, only the most energetic particles (MeV protons) from the sun can penetrate directly into the earth's atmosphere. Less energetic particles such as those which enter the atmosphere in high latitudes and give rise to auroral displays, cannot come straight from the sun. Instead, they probably originate somewhere in the earth's outer atmosphere, though just how they gain their energy is not yet clear.

These auroral particles, which are absorbed in the E layer just above 100 km, were the subject of some papers at the Symposium; both rocket measurements and ionospheric observations were described. Other papers dealt with the observations, made with the U.K.2 and U.K. 3 satellites, of some types of r.f. noise which are possibly caused by particles.

Outside the auroral and polar regions, there is very little <u>direct</u> evidence of particle effects in the upper ionosphere; but there are at least two observed phenomena which <u>might</u> be caused by particles. One is that the F layer does not entirely disappear at night, but seems to be maintained in some way. The other is that the electron temperature in the nighttime F layer, as measured by U.K.1 and other satellites, consistently exceeds the temperature at which the neutral air is believed to be. This excess of temperature must be produced by some source of energy, and it has often been suggested that this energy is carried by an influx of low energy particles (electrons or protons below 1 keV) from the outer atmosphere. If such particles exist, they would also produce the faint red

airglow which can be detected by optical means in the night sky. Unfortunately, as several speakers pointed out at the Symposium, calculations based on the best available data are not accurate enough to determine whether the ionization and heating in the night ionosphere are really due to particles; nor is it known where such particles might come from.

An obvious solution is to devise a rocket or satellite experiment to measure the particle fluxes, but this turns out to be extremely difficult. So, because no convincing grounds exist for proof or disproof, one is still able to invoke the magic catchword "particles" to explain ionospheric observations which lack a better explanation. Perhaps, by the next time R.S.R.S. organizes a Symposium on this topic, someone will have provided the crucial experimental evidence. Till then one must conclude, as did participants at the Symposium, "Yes .... particles are a problem .... but we can have a good time discussing them!"

Henry Rishbeth

OBITUARY

Charles Stuart Fowler

Most members of the staff will already have heard of the death of Mr. C. S. Fowler in Wexham Hospital on 2nd December after a short illness. His death makes sad news not only for past and present members of R.S.R.S. staff but also for many friends in several countries overseas.

"Chas", as he was known to all of us, joined the station in 1947 after 15 years service in the R.A.F., starting as an apprentice in the Electrical and Wireless Group, as it then was, at Cranwell and ending as a Flight Lieutenant at the end of World War II. His early work at the station was on radio noise and the measurement of phase velocity at low frequencies. Following the move into the "new building" he took charge of the measurements laboratory and his contribution in setting-up the basic facilities there did much to assist the experimental work of the whole station. In 1963 he joined the group developing microwave refractometers for tropospheric investigations and his technical skill in building these instruments for use on balloons and helicopters was widely recognised. He was sole or joint author of several published papers and for many years was an active member of several committees of the Institution of Electronic and Radio Engineers. He became an Associate Member of this Institution in 1941 and a Member in 1966.

Several colleagues from R.S.R.S. and many others from the U.K. and overseas will long remember with special affection and gratitude his notable contribution to the organization of the N.A.T.O. Advanced Study Institute held at Aberystwyth in September last.

It is difficult to visualise R.S.R.S. without "Chas's" cheery presence and all of us have lost a very good friend. We extend our most sincere sympathy to Mrs Fowler and her family at this time.

Staff News

Congratulations to:

D. R. E. Milton	on having passed the Civil Service C.O. exam.

Welcome to:

Miss J. M. Wood	Perm. S.O.
B. P. Gardner	Perm. Exec. O.
Ho. Hew Lee	Non. Perm. Tech. Officer (Singapore)
R. Flatt	Non. Perm. Labourer

Resignations

Mrs W. E. Smith	Specialist Teleprinter Op. Non. Perm. (Winkfield)
Mrs K. Driscoll	Part Time Duplicator Operator
Mrs E. S. Faulkner	Est. C.O.
Miss D. M. Preece	Est. S.A.
H. C. Chong	Non. Perm. Tech. Officer (Singapore)
Mrs J. M. Selway	Temp. Part Time Typist (Falkland Is.)
A. J. Marshall	Non. Perm. Labourer (Winkfield)

Books

Books have many uses. They can be enjoyed, ploughed through, skipped through, devoured, and occasionally read. They come in handy for reference, for cribbing, for information, for guidance, for entertainment, for losing, for resting teacups on, for absorbing drips from same, for propping open windows, for gathering dust, for one-up-man-ship value (A signed copy of the THOUGHTS OF MAO is one of that kind), for supporting odd legged tables and chairs, for sitting on when chairs/space are limited (only large books are suitable), for stocking libraries, for keeping on desks, for losing from same, for scribbling in (an annoying practice).

All these things and more, can make your life enriched and fulfilled. So please sign your books and journals out, so I know who has the best teastand or window propper ..... it makes a book very happy to know someone cares enough to sign it out (complexes, you know) .. it makes me happy too.

Thelibrarianwhoisfedupwithchasingmissingbooksandjournals.

Sports and Social Club News

Camera Club

Two slide shows have been held recently, on the topics of "East Africa" (Henry Rishbeth) and "Southern Spain, Gibraltar and Tangier" (Richard Messias). All are welcome at these shows, which are advertised a few days beforehand on the Notice Board.

Henry Rishbeth

Variations

The following forms of address have reached R.S.R.S. during the last year or so:-

Rudo and Space Research Station

R.S.R. Station,
Dillonponk, ...

The Radio Space Research Station
Griffin Park

S.R.C. Radio and Research Station,

Newman Radio and Space Research Station

Scinner Research Council

Rapid and Space Research Station

Rapid Spacefield Stn.
Chilbolton,
Jants

Radio Ex Space Research Station

Radio and Spares Research Association

R.S.R.S.
Buckets, England

Royal Society Research Station

Radio and Space Research Station
Ditton Park
Slouth

Radio and Space Rest Centre,
2, Hon Park .....

Letter to the Outstations

Dear Colleagues,

You will have seen elsewhere an appreciation of Chas. Fowler and there seems little than can be added. I and many others have enjoyed working with this cheerful and skilful comrade; we are shocked by his death, but happy to have known him.

Christmas approaches with the usual acceleration. Just now it seemed too early to start doing anything, now we are pushed to get all done before the amiable lethargy of the Afternoon of the Station Christmas Lunch. To be fair, the social committee and their helpers seem not to have been caught out by Chronos. Decorations were done - on time; an excellent Dance was arranged - on time, and no doubt those who do so much to set up Lunch will play their part - on time. Little remains, so far as Ditton Park festivities go, save a few t's to cross and i's to dot; simple actions yet well-meant, such as these good wishes for Christmas and New Year from,

Yours sincerely,

The Editor