

CCIR MEETINGS AT GENEVA, 1962

(a contribution from two of the delegates)

Life in the mid-20th century would be unthinkable without the multitudinous means of communication with which we are all familiar and on which we depend such as telephones, telegraph facilities, radio broadcasting services, television and so on. All these services involve two sets of individuals or organizations: those at the transmitting and receiving ends of the circuits. Some degree of standardisation of equipment, for example, must be agreed and co-operation in other ways is essential if the service is to operate properly.

Co-operation of this kind is not difficult to arrange inside one country, but it raises much greater problems where international communication systems are involved. Some central authority is obviously necessary to make decisions on all the matters which affect the operation of these systems and this authority is the International Telecommunications Union (ITU) which has its headquarters in Geneva and is recognized by almost all governments.

The I.T.U. acts through a number of consultative committees on which all the governments are represented and the committee with which members of RRS have long had many contacts is the International Radio Consultative Committee (CCIR). The duties of this committee are to study technical radio questions and operating questions and to issue recommendations on them. In practice these broad terms of reference include such things as transmitting and receiving equipment, broadcasting, television, space communications, propagation of radio waves and time signals. These diverse subjects have been divided up in such a way that each is the responsibility of one of 14 Study Groups. Study Groups V and VI deal with problems of tropospheric and ionospheric propagation respectively. During April and May both these Study Groups spent three weeks considering documents which had been submitted by numerous administrations and producing a much smaller number of recommendations, resolutions or study programmes which in turn will be considered and perhaps adopted at the Plenary Meeting of CCIR at New Delhi in February 1963.

At the recent Geneva meeting members of the RRS staff were included in the UK delegation. Mr. Lane on Study Group V and Mr. Horner and Dr. Minnis on Study Group VI.

In Study Group VI over 100 documents had been received and these were dealt with in eight Sub-Groups, the meetings of which were attended by any of the 100 delegates who were particularly interested. In practice the Sub-Group meetings seldom included more than a dozen delegates and most of the work of drafting new documents was done by the chairmen of the Sub-Groups, which included both the RRS delegates, and a few others who were prepared to work long hours and often late at night in order to complete the work by the date of the final meeting.

Some idea of the problems discussed in SG.VI can be gained by looking at a small sample of them. H.F. radio communications depend largely on having predictions of future conditions in the ionosphere since these vary with time of day, season, and solar activity. These predictions are at present made independently at a number of establishments in different countries, including the UK (RRS), and arrangements have been proposed which will result in a single set of predictions which will be produced with the agreement of CCIR and which will be used in all countries. The new predictions will probably use contour maps of ionospheric parameters which will be prepared on a large digital computer at the Central Radio Propagation Laboratory in the U.S.A. The index, which is necessary to enable solar activity to be represented numerically in the preparation of these F2-layer predictions will be the ionospheric index I_{F2} which was developed at RRS some years ago.

The signal/noise ratio must be higher than a minimum value if efficient communications are to be possible. Hence methods of calculating or predicting the field strength of both the signal and the noise are essential. For many years the measurement of noise field strength has been a major item of research at RRS and both the original and the revised noise level contour maps issued by CCIR have been produced mainly through the joint efforts of RRS and CRPL staff.

Meetings of CCIR Study Groups are concerned solely with the problem of getting through the work in time. There are no officially arranged social functions. The American Delegation did, however, give a cocktail party one evening for the Sub-Group chairmen and secretariat of the CCIR. This gave us a chance to meet some of the people behind the scenes in Geneva who contributed to the smooth working of the meetings. Telephone operators from France, interpreters and translators from Russia, Switzerland and Spain - and even one from England. The senior staff of CCIR themselves are representative of many countries, Switzerland, England, China, Czechoslovakia, France, Russia.

It is impossible to escape the cosmopolitan atmosphere in Geneva - not only in CCIR but elsewhere in the city where for example the International Labour Office and the International Red Cross have their headquarters. Even a day spent on the paddle steamer which makes the voyage from Geneva to the other end of Lac Lemman involves going from Switzerland to France and back again several times as the boat calls at the numerous villages - French and Swiss - which lie on the lake shore.

Geneva is a good centre for making excursions into the Swiss Alps or across the frontier into the French Jura or to Mont Blanc which is one of the sights of Geneva, in spite of its distance. But memories of CCIR are memories of documents and more documents - white, pink, green and yellow. Only about 70 white ones survived to be read again at Delhi but even so it is easy to sympathise with General Ferrié who once regretted that although Marconi had invented "telegraphie sans fils" he had not at the same time paid some attention to "telegraphie sans papier".

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The work of Study Group V of CCIR is largely concerned with the effect of the troposphere on ground-to-ground communication systems, and much time in the Interim Meeting was spent in revising existing documents on these problems in the light of information obtained since the Plenary Assembly at Los Angeles in 1959. However, it was evident from many of the 112 papers considered that the influence of the troposphere on space communication is a subject of growing interest to the Study Group. Partly because of this, many delegates felt that the Group's Study Programmes should be revised before the next Plenary Assembly.

Special attention was given to the preparation of revised propagation curves for use in the planning of broadcasting and mobile services, and the particular problems of point-to-point circuits were discussed. This latter field is of interest to Study Groups V and IX (Radio Relay Systems) and Study Group V is now examining methods of predicting the performance of radio-relay circuits. A report was prepared in Geneva on the sharing of frequencies between satellite and terrestrial relay systems in the frequency band 1-10 Gc/s.

The importance of further work on the correlation between the physical characteristics of the troposphere and radio propagation was emphasized during the discussions. For example, study programmes were amended to include the effects of refraction, scattering and absorption on space communication systems. In addition, the subject of non-optical links and scatter propagation provoked, as usual, much spirited discussion in which the delegates of the U.S.A. and France in particular took opposing views. In this field, many of the arguments will no doubt be resumed, on a more fundamental level, during the 1963 meeting of the International Scientific Radio Union (U.R.S.I.).

The meetings of Study Group V, between 26th April and 4th May, were marked by warm, sunny weather, and it required considerable will-power to remain confined indoors (often until 6.30 p.m.) when through the window one could catch a glimpse of distant Mont Blanc and the Lake of Geneva a few yards away. However, there were compensating features, particularly the occasional opportunity of having an informal discussion on topics of mutual interest with colleagues from other countries. Many points of difficulty evident in the conference hall were subsequently dispelled over a "bière speciale":

RADIO RESEARCH AT DITTON PARK VI

1945-55

The end of the second World War meant that the Services needed less help from the laboratories at Ditton Park, so that it was time to consider a revised programme of research more suited to the estimated demands of the future. The Radio Research Board were aware of the need for a broadening of the fields of investigation and felt that such a change required a complete re-shaping of the structure of the organization. Increasing numbers of outstations were needed, both at home and overseas, for further propagation studies, and general research on ideas developed for specific wartime needs demanded more laboratory space.

Accordingly, in 1946, a report was submitted to the Lords of the Committee of the Privy Council for Scientific and Industrial Research. In this the Board recommended that the Department should have a self-contained Radio Research Establishment under its own director. The annual cost was estimated at £225,000. The report was approved, and work was begun to implement their plan.

This scheme listed fifteen major items of scientific activity which covered fields of work summed up under seven headings thus:-

- (a) Detailed ionospheric studies, and the provision of a service of information about ionospheric conditions.
- (b) Propagation studies of radio waves having frequencies from 10 kc/s to 3×10^6 Mc/s.
- (c) The improvement and development of radio measurement techniques, particularly power and impedance measurements above 600 Mc/s.
- (d) The study of all types of random disturbance giving rise to radio frequency noise.
- (e) The study of the fundamental aspects of generation and detection of electromagnetic oscillations at the highest available frequencies.
- (f) The study of the properties and structure, both physical and chemical, of materials used in telecommunications.
- (g) Provision of means for the 'fullest useful dissemination of information on all aspects of radio'.

It was implicit in this report that the direct connection which had long existed between the Radio Research Station and the National Physical Laboratory should cease to exist. In fact RRS staff continued to work at Teddington for several years after this re-organization of 1948; they were however now members of the newly formed Radio Research Organization whose first director, appointed in the January of that year, was Dr. R.I. Smith-Rose.

At this time a number of outstations had already been set up, and more were to follow. The ionospheric observatory at Hillhead, Scotland, had existed for some time; in the Southern hemisphere, at Port Stanley, Falkland Islands, RRS personnel took over in 1947 an ionosonde station which had formerly been maintained and operated by the Royal Navy. The next year a similar installation commenced operation in Singapore, for measurements in the equatorial region, while in March 1948 the operation of small low-powered apparatus at Port Lockroy in Grahamland provided the first ionospheric observations ever to be made in Antarctica. Nearer home, sites at Sunnymeads and Winkfield were being used for directional measurements.

By the end of 1948 a search had begun for a suitable site where a new laboratory could be built. This was to be capable of combining the facilities of the National Physical Laboratory with those of the site at Ditton Park, although it was realised that certain outstations would have to continue.

During the late '40s and early '50s research on radio noise, which had so long been part of the station's activities under the heading of 'atmospherics', was extended to include the investigation of an extra-terrestrial noise source. Observations were made of solar noise emitted in parts of the radio frequency spectrum from 30 to 155 Mc/s, and these were correlated with the behaviour of signals received on 18 Mc/s and 191 kc/s. Later a paper by Burgess and Fowler dealing with solar activity and ionospheric effects during 1948 was published in the *Wireless Engineer*. Terrestrial noise, too, continued to be investigated on an extended scale, as is evident from the publication of papers by Horner, describing improvements to equipment and dealing with the reception of atmospherics at high frequencies.

The fact that V.H.F. fields could exist at distances well beyond the normal line-of-sight limit from a transmitter had been remarked by Marconi in a paper in 1933; but little work had been done on the subject before the second World War. However, as a result of anomalous propagation effects noticed during the operation of powerful military V.H.F. equipment several workers were considering possible mechanisms in the lower atmosphere by which such transmission of energy could take place. Experimental reception of V.H.F. signals was undertaken, first at Teddington, then at Ditton Park and papers by Saxton treated beyond-the-horizon propagation of metre waves both theoretically and, in conjunction with Luscombe and Bazzard, experimentally.

The recommendations that the properties of materials be studied resulted in work by Burgess on the experimental and theoretical behaviour of semi-conductor materials, and Saxton and Lane published an account in the *Proceedings of the Royal Society* of the dielectric properties of certain liquids. It was becoming increasingly evident from the diversity of the work that the proposed new laboratory buildings should be begun as quickly as possible.

A search for a suitable site had gone on for some time, disused airfields appearing, at first, particularly suitable. Unfortunately these superficially attractive areas were found to have disadvantages in the form of nearby noise sources or, less obviously, systems of wiring and other metallic obstructions buried just below the ground's surface. After an extensive investigation a conclusion was reached similar to that when, years before, a site having a more suitable earth conductivity was sought.

Ditton Park had its faults; but taking all things into consideration it was as good a site as was likely to be found. It should be remembered that as well as the scientific properties of the area, questions having regard to staff travel and accommodation had also to be considered. Eventually it was decided to build in the West Park of Ditton Park, and work began in May 1954. Meantime the amount of laboratory space had been gradually increased by the erection of wooden buildings in the vicinity of Watson-Watt's earlier construction put up in 1928, and connected to it by a corridor. Further huts were also erected on other parts of the site. This was the station as it was seen by the Duke of Edinburgh when he visited RRS in October 1954.

Throughout 1955 various researches continued in these buildings, to the accompaniment of ever increasing interest in the details of the laboratory now in building and the improved facilities it would provide.

CORRESPONDENCE

35 Walker Road,
Maidenhead,
Berks.

21st May 1962

Dear Friends,

I felt I must write to thank you once again for the very generous cheque with which you presented me when I left the Radio Research Station.

I have bought a plain white Indian rug - something I have always wanted and have never been able to persuade myself I could afford until now. I'm hoping it will give me years of wear with which to remember you by!

I am sorry I did not manage to say goodbye to all of you on my last day. I apologize to those concerned and hope I will be able to make good my apologies at some of the future R.R.S. social functions, which I shall attend - baby permitting!

Regards to you all,

Molly Smith

LETTER TO THE OUTSTATIONS

Ditton Park

15th June, 1962

Dear Colleagues,

It was my duty, and still is, to warn some of you of the date and time of the Johnston Island nuclear explosions. Those of you who have been wondering why I failed in this during the first, unsuccessful, launching may like to know that I was officially given far more wrong information about the timing of the explosion than I passed on to you. In fact I was told on the 4th of June at 0928Z by one organization that the bomb had successfully exploded at 0910Z. I put the telephone down, and was immediately rung up by another organization to say that the explosion would take place at 0930Z - then about $\frac{1}{2}$ minute away. I ignored this, which was just as well because I was phoned at 0933Z by yet another organization to say that the explosion time had been put off until 1000Z. In fact, the only really accurate source turned out to be the B.B.C., who gave correct information on the Light Programme!

Let's hope I'm more successful with warnings in the future.

Best wishes to you all.

Yours sincerely,

The Editor

STAFF NEWS

Welcome to:

Dr. J. R. Wait	National Bureau of Standards,	Exchange visit,
Mr. J. W. Hopley	H. Executive Officer	
Miss G. Hopson	Temporary learner Tracer	
Mrs. J. E. M. Brown	Temporary Part-time Typist Grade II	
Mrs. S. Randolph	Temporary Clerical Assistant	(recommenced duty)
Mr. J. E. Kutylowski	Temporary Instrument Maker	
Mr. I. Matthews	Temporary Labourer - Messenger	

Part-time and Overseas Appointments

Mrs. F. P. Vickers	Temporary Scientific Assistant
Mrs. P. Bazzard	" " "
Mrs. H. H. Thomas	" " "
Mrs. M. V. W. Smith	" " "
Mrs. I. M. Moorat	" " "

Nawami Bin Masood	Labourer Grade V (Singapore)
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Resignations:

Mrs. M. V. Smith	A.E.O.
Mrs. M. Perry	Temporary typist II
Mr. F. J. Fidgeon	Temporary Instrument Maker
Mr. I. D. Clough	Temporary A.E.O.

SPORTS AND SOCIAL CLUB

Tennis Club

A tennis tournament was held on Saturday, 2nd June, on the R.R.S. tennis courts. The main tournament was held on the hardcourt and for those competitors who were 'knocked out' in the first round there was a "Plate" tournament held on the grass court. The weather was fairly kind to us during the early rounds of the tournament but the semifinals and finals had to be played in a slight drizzle. The winners of the main tournament were Mr. & Mrs. Gordon-Smith with Mr. & Mrs. Horner as "runners-up". The "plate" tournament was won by Miss Merrill Reeves and Mr. Peter Smith

M. Williams

Bridge Club

The qualifying round in the D.S.I.R. bridge tournament was held at the N.P.L. on Friday 18th May, and teams from R.R.S., N.P.L., N.C.L., and Road Research took part. R.R.S. put forward two teams consisting of

- (1) A. C. and K. Gordon-Smith, E. N. Bramley and J. Harwood.
- (2) W. C. and K. Bain, B. C. Garner and C. Nicolson.

The two places in the final were won by teams from N.C.L. and from Road Research. The scores for our teams were -2 and -19 I.M.Ps. respectively.

W. C. Bain

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