

# International Scientific Radio Union

## U. R. S. I.

### INFORMATION BULLETIN

published with the financial help of the United Nations  
Educational, Scientific and Cultural Organization (U. N. E. S. C. O.)

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Published by the General Secretariat of U. R. S. I.  
42, Rue des Minimes, BRUSSELS



## IN MEMORIAM

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We regret to announce the death on June 14th. of this year, at the age of 71, of Prof. Dr. G. J. ELIAS of the Technical University of Delft, from which he had retired the year before, after 34 years as professor of the theory of electricity. Prof. Dr. Elias was one of the oldest members of the Dutch National Committee of which he was honorary member.

With his outstanding qualities he played an important part in the formation of several generations of engineers, who followed his fine lectures on the theory of networks, of electromagnetic fields and on other aspects of electricity e. g. discharges in rarefied gases, propagation of electromagnetic waves, non-linear phenomena in networks. These lectures which have almost become classic, contained much that was original.

Since the papers of this modest scientist were usually published in a Dutch periodical (*Tijdschrift van het Nederlandsch Radio-genootschap*), his activities were not as well known as they might have been abroad).

As early as the year 1923 he had published a paper on the structure of an ionized layer, which led to the well known « double  $e$ -function » mathematical expression. Much theoretical and practical work on ionospheric propagation was carried out by him and his collaborators ; not only were experiments suspended during the war but, as the larger part of the technical equipment had been rendered unfit for use, it had to be completely reconstructed when the war was over. With unflagging energy Prof. Elias supervised this reconstruction, at the same time embarking upon a study of non-linear phenomena, which resulted in a number of publications by him and others. With Prof. Elias a remarkable teacher, a great scientist and a fine man has been taken from us.

## INFORMATIONS

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### **Circular letter to all Associated Editors of U. R. S. I. Information Bulletin**

27th. July, 1951.

With reference to our previous correspondence on the matter, some of our Associated Editors, made suggestions which seem interesting to be considered and which could be followed in order to give more interest to our Bulletin.

It seems, henceforth, that the time has come to draft a working programme summarizing the recommendations of the Publication Committee during the last General Assembly (See Bulletin n° 65, p. 7) and also the suggestions made by Associated Editors.

In order to follow these recommendations and suggestions, Associated Editors are kindly requested to send regularly to the General Secretariat of U.R.S.I. (both in English and in French, if possible) :

1) summaries of activities of their respective National Committees both on the scientific and administrative viewpoint (minutes of meetings, results of research, etc. etc. ;

2) short reports on work carried out in the field of research programs set up by our various Commissions at the last General Assembly (See the resolutions voted in Zurich — Bulletin n° 66, p. 3) ;

3) the list, with full specification, of stations, observatories and laboratories making researches in accordance with the programs mentioned in 2.

Provisional lists of ionospheric sounding stations have already been published (Bulletins n° 67 and 68). Some National Commit-

tees have not yet given information concerning such stations, other Committees ought to complete the information published.

\* \* \*

The Dutch National Committee (See Bulletin 67, p. 22) suggested that each National Committee of U.R.S.I. should collect, every year, per Commission, the titles of all the publications published in that field by their countrymen, if necessary with a summary ; these lists should be sent to the General Secretariat for publication.

The National Committees were consulted on this matter and the comments made can be summarized as follows :

(i) Some National Committees remarked that national bibliographies are given in the reports submitted to our General Assemblies.

(ii) Other Committees suggested that such bibliographies should be duplicated with bibliographies published in some countries by journals specialized in abstracting.

(iii) The National Committees in favour of the proposals made by the Netherlands National Committee are fearing that some studies published in journals having a smaller spreading would not be mentioned in the abstracting journals.

It is to be noted that the International Council of Scientific Unions is considering the setting up of an International Science Abstracting Service which should aim to analyse all the scientific journals.

The conclusion which seems most suitable consists to ask by the channel of their Associated Editors, the National Committees in favour of the Netherlands proposal, to draft regularly such bibliography and to send it to the General Secretariat for publication in the Information Bulletin.

\* \* \*

It is obvious that this programme as it is given here will have to be completed or modified in accordance with comments eventually sent to the General Secretariat.

*The Secretary.*

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### **Ionospheric Souding Stations**

Hereunder complete data concerning the Swiss Station of Schwarzenburg (Bull. n° 68, March-April 1951, p. 21) :

SCHWARZENBURG, SWITZERLAND

Geographic latitude : 46°49.6' N.

Geographic longitude : 7°20.6' E (Greenwich).

Automatic recording.

Frequency band : 1-25 MHz.

Peak power of pulses : 10 kW.

Pulse duration : 100 microseconds.

Recurrence frequency : 50 per second.

Sweeping duration : 30 secondes.

Delta vertical aeriels.

Normally measurement made every hour.

Used time : 15° E (GMT + 1 hour).

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## NATIONAL COMMITTEES

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### ERRATUM

Bulletin n° 68, p. 6, third line ; read : Dr. Hiroyuki Uyeda.

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## COMMISSIONS

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### Commissions I and II

**Activities of the « Istituto Elettrotecnico Nazionale  
Galileo Ferraris », (Torino)  
in accordance with U. R. S. I.'s program**

#### COMMISSION I

Systematic measurements have been carried out on the thermistor errors at high frequencies, 0.1 to 10 Mc/s, in view to find the possibilities to use them as variable resistance standards of high value, for impedance measurements. The results will be published in « *Alla Frequenza* ».

On May 15, an experimental transmission service of standard frequencies and time signals was started ; this service is framed in accordance with C.C.I.R. study programs. The transmissions are taking place one day on the week, on Tuesday, from 09.00 to 12.00 and from 14.00 to 17.00 C.E.M.T. The carrier wave frequency is 5 Mc/s. A time distribution of modulation frequencies (440 and 1000 c/s) and of time signals (having the form suggested by C.C.I.R.) was adopted. Each emission lasts five minutes, they are as follows t. s., 440 c/s, t. s., 1000 c/s, with a periodicity of 20 minutes. At the beginning of each time signal periode an audio announcement is made to identify the transmission. The power output on the carrier wave is 300 W. The geographic coordinates of the emitting station are 45°03'08" N ; 7°40'57" E.

#### COMMISSIONS I AND II

During the nights of May 17-18, 21-22 and 24-25, with the cooperation of the National Bureau of Standards and using the WWV transmissions a preliminary group of experiments was made for measuring the velocity of the time signal propagation

on short waves at great distances. The Laboratoire National de Radioélectricité, the National Physical Laboratory and the Central Laboratorium of the Dutch Post, Telegraphs and Telephone Department collaborated to the observations and measurements. These experiments were suggested at the VIIIth. General Assembly of U.R.S.I. in Stockholm but owing to various difficulties they had been delayed. The results are already very interesting, particularly for the possibility they show to reach a practical accuracy of one or two tenths of millisecond and they encourage to continue the tests as soon as some improvements will be brought to the measuring set. A complete report to be published is in course of publication.

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## INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS

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### Joint Commission on Radio-Meteorology

Brussels Meeting — August 1951

The Commission met in Brussels on 16, 17, 18 August 1951.  
The following Members were present :

Chas. R. BURROWS (*President*),  
Edw. G. BOWEN,  
Wm. E. GORDON (*Secretary*),  
Jean LUGEON,  
Harald NORINDER,  
André PERLAT,  
P. A. SHEPPARD,  
Jean VOGÉ.

The following administrative and organizational decisions were reached.

1. It was agreed that the Joint Commission should direct its attention, as opportunity arose, to the theoretical and experimental determination of those properties of the troposphere which affect radio propagation.

2. It was agreed that the Joint Commission should foster the development not only of those aspects of meteorology required for radio science but also radio techniques which can be used as aids in meteorology.

3. As of 1951 it appears that the following phases of radio-meteorology need attention :

(a) factors controlling temperature and humidity profiles,

(b) temporal and spacial variations of temperature and humidity of a random nature,

(c) radio climatology,

(d) reflection and scattering from particles and other inhomogeneities,

(e) gaseous absorption,

(f) instrument for measuring temperature, humidity, total water vapor content, drop size, drop density, etc.,

(g) radar investigation of clouds and precipitation,

(h) storm detection and analysis by spherics.

4. The following resolutions were passed unanimously :

A. The Joint Commission on Radio-Meteorology, recognizing the need for wide dissemination of the results of spherics observations, recommends that the W.M.O. take steps for their regular publication and distribution. It was agreed that U.R.S.I., U.G.G.I., and I.U.P.Á.P. be advised of this recommendation.

B. Considering the urgency expressed by the C.C.I.R. concerning the study of the relationship between atmospheric radio noise level and thunderstorm activity, the Joint Commission on Radio-Meteorology will plan a symposium on this subject to be held at the earliest possible time.

C. Considering the fact that the work of the Joint Commission on Radio-Meteorology is not completed and the importance of the work in progress, the Commission recommends to the International Council of Scientific Unions that this Commission be continued.

5. It was agreed to ask U.R.S.I. to publish the proceedings of this meeting in its Bulletin and to supply reprints for circulation and to request Unesco to provide funds for this publication.

6. It was agreed that the type of symposium held in Brussels was eminently satisfactory. The President was requested to organize the next symposium along the same lines.

7. It was agreed that the next meeting of the Commission be convened in three years at an appropriate time and place.

The scientific sessions were attended by the members listed above and the following :

L. J. ANDERSON,  
J. BERTRAND,  
R. BUREAU,  
P. V. GROSJEAN,  
H. HATAKEYAMA,  
E. HERBAYS,  
J. S. MARSHALL,  
L. PONCELET,  
R. RIGBY,  
R. RIVault.

The scientific sessions included active discussions of the following topics. The names of the discussion leaders are indicated :

P. A. SHEPPARD : Meteorological Processes Controlling the Refractive Index of the Atmosphere.

E. H. NORINDER : Thunderstorms.

J. LUGEON : Spherics.

J. S. MARSHALL : Precipitation Echoes.

E. G. BOWEN : Radar Observations of Natural Rain.

L. J. ANDERSON : Attenuation of Microwaves by Atmospheric Gases and Rainfall.

W. E. GORDON : Statistical Fluctuation in the Atmosphere.

\* \* \*

*Attention of the National Committees is drawn on resolution 4.*

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### **Joint Commission on Ionosphere**

Copies of the Proceedings of the Second Meeting have been sent to the National Committees for distribution to the members of their Commission III and to those interested in ionospheric work. It has to be noted that the proceedings are not an U.R.S.I. publication.

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## Joint Commission on Physics Abstracting

The second meeting of the Joint Commission on Physics Abstracting was held in Paris on 3 and 4 July 1951 ; a delegate of U.R.S.I. was present at the sessions.

The following resolutions were adopted :

1. The Commission was informed of the cooperation already established between *Science Abstracts* and the *Bulletin Analytique* and expressed its satisfaction and its gratefulness to the Chief Editors of both reviews.

2. It was agreed that for what concerns the French non-periodical publications, the Chief Editor of the *Bulletin Analytique* should provide *Science Abstracts* with any desirable information, while the Chief Editor of *Science Abstracts* should do the same for such publications published in the United Kingdom.

3. The Commission recommended that, through its constituting Unions, the editors of periodical reviews be invited to see that titles of articles should be as explicit as possible.

4. The Joint Commission on Physics Abstracting took good note that the Bureau of I.C.S.U. accepts an International Abstracting Service as a normal permanent scientific activity of the Council. After full discussion of the implication of this decision, the Commission decided unanimously to ask the Council of I.C.S.U. to dissolve the present Joint Commission and to constitute a Board, for the International Abstracting Service. On this Board, which would be small, would be represented :

(a) the Council of I.C.S.U.,

(b) the Abstracting Journals admitted as members (initially *Science Abstracts* and the *Bulletin Analytique*).

A secretary should be designated by I.C.S.U.

The Commission found desirable dispositions to be taken in order to keep the Unions informed of the activities of the Service.

5. The Committee recommended to I.C.S.U. that a grant of not less than \$ 2000 should be paid to the Board for 1952.

6. The Commission asked its Secretary to beg the Unions constituting the Joint Commission to strongly act, through their National Committees, in order that the editors of periodical jour-

nals should forward as rapidly as possible and with the best conditions their journals to the General Abstracting Service.

*We draw the attention of National Committees on these recommendations and particularly on recommendations 3 and 5.*

**International Union of Theoretical and  
Applied Mecanics (I. U. T. A. M.)**

I.U.T.A.M. organizes from September 18th. to 19th. in the Ile de Porquerolles (France) an international symposium on non-linear vibrations. Prof. Dr. Balt. van der Pol, President of Commission IV accepted to represent U.R.S.I. on this meeting.

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## **C. C. I. R.**

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We publish hereafter the C.C.I.R. documents mentioned in Bulletin n° 69, p. 32-33.

We remind that document 108 was published in Bulletin n° 66 (Nov.-Dec. 1950, p. 31).

Doc. 105

*Subject.* — Recommendation 18

### **International Scientific Radio Union**

(Original language : French)

#### **STANDARD FREQUENCY AND TIME SIGNAL TRANSMISSIONS**

The attention of the U.R.S.I. National Committees was drawn to the importance of the problems connected with standard frequency and time signal transmissions by the publication of Recommendation 18 in the *U.R.S.I. Bulletin* and by the letters from the Chairman of C.C.I.R. Study Group 7 to the Chairman of the relevant U.R.S.I. Commissions : (I) measurements and standardization, (III) ionosphere and propagation, (IV) atmospherics. As most U.R.S.I. members belong to countries whose Administrations are members of Study Group 7, no special reports were made for U.R.S.I. other than the documents and communications which were discussed at the General Assembly in Zurich in September 1950 and which are mentioned below.

However, as regards the use of the time signals transmitted by WWV, the receptions by the Observatory of Zi-Ka-Wei, near Shanghai (China) are worth noting. This Observatory has been regularly recording these signals (during breaks in the modulation) since December 1949, over the night path (between 0800 and 1400 U. T.) on 10 Mc/s and at times on 15 Mc/s, the other carrier frequencies being, however, inaudible.

It is remarkable that at the same hours the reception of the Annapolis NSS time signals on 9.425, 12.63 and 17 Mc/s was poor.

MSF cannot be heard in China with its present schedule.

At the Zurich Assembly, the questions of interest to Study Group 7 were discussed chiefly by Commission I ; Commission III, however, dealt with some aspects of the problem.

Commission I studied the influence of the Doppler effect and the simultaneous reception of several transmissions, together with the reception areas of the existing transmitters. The following resolution was adopted by the General Assembly :

« All National Committees should examine the reception in their own territories of the present standard frequency transmissions, from the standpoint of the use of these transmissions for frequency standardizing purposes, and with the object for proposing a time-sharing of programmes in the future.

The possibilities of sharing programmes on a zone reception basis, and taking account of ionospheric propagation conditions, have been examined in a preliminary manner and are considered to present great practical difficulties. »

Commission III emphasised the importance of the existing transmissions for the study of propagation. However, the simultaneity of the transmissions creates difficulties in the case of field strength recordings.

The Joint Commission on the Ionosphere at its Brussel meeting set up a special committee for the solar eclipse of 25 February 1952 ; Commission III has given further study to the experiments that might be organized on that occasion, in which standard frequency transmissions might play a notable part.

Doc. 136

## **International Scientific Radio Union**

*Subject.* — Question 5  
Question 7, Section 3  
Question 9  
Recommendation 6

(Original language : English)

Comments of the U.R.S.I. on : Documents 108, 124, 136, 141, 144 of the Washington Meeting of C.C.I.R. Study Groups 6 and 10 (March, 1950).

**COMMENT ON DRAFT RECOMMENDATION,  
NON-LINEAR EFFECTS IN THE IONOSPHERE**

Document 108

It was agreed that :

(i) the Chairman of the Working Party (Mr. Picault) should collect all available references to work on wave-interaction and that this bibliography be then circulated by U.R.S.I. to Members of Commission III ;

(ii) efforts should be made to secure international cooperation for further experiments on wave-interaction ;

(iii) further investigation should be made of the reports received concerning cross-modulation phenomena in the decametric wave band.

**COMMENT ON PARTIAL REPORT ON C. C. I. R.  
QUESTION 7, SEC. 3, DOCUMENT 124**

Agreement was expressed with the following conclusions stated or implied in C.C.I.R. Document 124 on the above subject. ((i) to (iv) below).

(i) There seems extremely low probability that maximum usable frequencies for long-distance radio transmission by means of normal E layer reflections should ever exceed 30 Mc/s.

(ii) Values of maximum usable frequency for the F1 layer are seldom likely to equal or exceed 30 Mc/s.

(iii) At times of high sunspot number, the maximum usable frequency of the F2 region considerably exceeds 30 Mc/s although it never becomes comparable with 300 Mc/s.

(iv) Most of the long-distance ionospheric propagation experienced at frequencies exceeding 30 Mc/s is due to sporadic ionisation at the level of the E region.

Observations of long-distance ionospheric transmission at frequencies around 100 Mc/s involve measurements at distances of the order of 1000 to 2000 km from powerful transmitters on the comparatively rare occasions on which such transmission is possible. It is considered that the U.S.A. is favourably placed for

such a study, in that there are many powerful transmitters throughout the U.S.A. on frequencies ranging from 50 to 200 Mc/s suitable for these observations and, furthermore, that there also exists a well organised band of amateurs operating in the various frequency bands who are familiar with long-distance ionospheric propagation at these frequencies.

**COMMENT ON DRAFT RECOMMENDATION  
REGARDING C. C. I. R.  
QUESTION 9, DOCUMENT 136**

The recommendation regarding C.C.I.R. Question 9 has been considered by U.R.S.I. and the following comments are submitted for the consideration of C.C.I.R.

(a) It is suggested that a more appropriate wording of the opening paragraph of Document 136 is as follows :

« that results of subjective methods of noise measurements for a particular type of service may readily be interpreted for that service, but are difficult to translate for use with other types of service ».

(b) In the absence of knowledge of the required parameters for the specification of noise, the evaluation of subjective effects from the results of objective measurements cannot at present be made.

Document 136 would appear to suggest that such a transformation may generally be achieved.

(c) A completely objective method of specifying a noise field applicable to all types of service would involve a large number of parameters ; some of these might be applicable to a number of types of service, but others would vary greatly in importance according to the type of service under consideration. For example, many parameters measured by existing methods have some application to an amplitude — modulated service but little relevance to frequency or pulse types of modulation.

(d) Existing knowledge is not sufficient to permit specification of the parameters which are important for each type of service, and it is by no means certain that subjective effects may be ade-

quately defined by a small number of parameters, suitable for practical application.

(e) Considerable further research is required before it will be possible to define the relevant parameters and to specify the characteristics of equipment suitable for measuring these parameters.

(f) The attention of the National Committees of U.R.S.I. has been drawn to the requirements outlined in C.C.I.R. Document 136 and to the need for further research on the topics discussed therein.

### COMMENTS ON REPORT ON C. C. I. R. QUESTION 5, DOCUMENT 141

From its study of C.C.I.R. Document 141 on this subject the Working Party concluded that the following studies should be of immediate interest :

(i) Extended series of vertical incidence measurements of height, reflection coefficient and polarization over as large a range of wave-lengths and geographical areas as possible.

(ii) Concurrent measurements at oblique incidence.

(iii) Interpretation of vertical incidence data in conjunction with rocket, meteor observations.

(iv) Interpretation and correlation of vertical incidence data with known or assumed upper atmosphere physical characteristics of well-known types.

(v) Extensive study of theoretical problems from the viewpoint of simplification in terms of approximations known to be valid as a result of corroborative experiments.

(vi) Further study of wave interaction with particular emphasis on the determination of the longest wave-length at which this phenomenon may be observed.

(vii) Measurements at very long range and very long wave-length in an effort to determine the method whereby these waves are propagated to long distance.

COMMENTS ON C. C. I. R.  
RECOMMENDATION 6, DOCUMENT 144

Commission III of U.R.S.I.,

considering :

(a) that, since the adoption by U.R.S.I., at its VIIIth. Reunion, (see Proceedings of the General Assembly, U.R.S.I., Vol. VII, p. 189) of Recommendation N° 6 of the Vth. Plenary Assembly of C.C.I.R., which deals under a different title with many of the features of the above subject, it has become evident that some cases of confusion still exist both with regard to interpretation of  $h'f$  traces and with regard to the use of the terminology symbols and conventions contained in the five annexes to C.C.I.R. Recommendation N° 6 ;

(b) that there is a growing need for revision and clarification of these annexes in the light of the accumulated experience with their use (the meeting of the C.C.I.R. Study Group N° 6 has already given some thought to revision, as well as recognised the ultimate requirement for some new and less subjective way of obtaining pertinent information from ionospheric measurements) ;

(c) that, with our ever increasing knowledge and understanding of the ionosphere, these matters cannot in the foreseeable future be regarded as finally fixed or complete ;

(d) that improved prediction services depend upon the provision of highly accurate and dependable information for scientific study and analysis, since improved predictions must ultimately rely upon a clear understanding of the physical processes involved ;

recommends :

(i) that every effort be made to improve the quality and accuracy of observations as rapidly as the technique can be developed or applied, in order to encourage the scientific analysis that is needed ;

(ii) that at the same time the problems be re-examined in order to bring them into line with most recent experience and requirements for such information ;

(iii) that until such time as these matters are re-examined, the C.C.I.R. Recommendation N° 6 continue to represent the views of U.R.S.I., but subject to the following :

- I. That the provisions of paragraph 4 of C.C.I.R. Recommendation N° 6 not construed as precluding the interchange of monthly mean values of ionospheric characteristics, and that in fact, mean values should be interchanged whenever the quality of the observations permit this ;
- II. That it be emphasised that the provisions of Recommendation N° 5 of C.C.I.R. Recommendation N° 6 represent only minimum standards and in particular that Recommendation N° 5 (*d*) be not construed as suggesting that it is sufficient to record layer heights to the nearest 10 km and frequencies to the nearest 0.1 Mc/s, when it is both desirable and possible to be more accurate ;
- III. That the five annexes to C.C.I.R. Recommendation N° 6 be replaced by the revised versions appended herewith <sup>(1)</sup>.

L. V. BERKNER (*Chairman*),  
D. K. BAILEY,  
F. LIED,  
H. LINDQUIST,  
D. LEPECHINSKY,  
A. H. SHAPLEY,  
K. MAEDA,  
Y. AONO.

Doc. 185

*Subject.* — Question 44  
(Original language : English)

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Doc. 199

## **International Scientific Radio Union**

*Subject.* — Question 9

(Original language : English)

### **THE STUDY OF EXTRA-TERRESTRIAL RADIO-NOISE**

As is well-known, a study on sun radiation and galactic noise measurements is being made in various countries.

Very high frequencies, though allotted to specific services laid down in the Atlantic City Radio Regulations, are used for different purpose in different countries, one of the consequences of which is that for the benefit of the said study various frequencies are in use.

The Netherlands PTT Administration has already contacted adjacent countries in order that an effort be made to reach a regional arrangement on the assignment and use of VHF in general and for the study on sun radiation in particular.

This effort runs, as far as the latter is concerned, parallel to the wish of U.R.S.I. expressed at the Conference lately held at Zürich, to have a number of frequencies assigned to it by the I.T.U. for this special purpose.

The U.R.S.I. Conference requested its Sub-Committee Va to take the matter up with the C.C.I.R., and now submits the following Resolution to the 6th. Plenary Assembly of C.C.I.R.

### Draft-Resolution

The C.C.I.R.

considering,

(a) that study on the sun radiation and galactic noise measurements is being made in various countries all over the world ;

(b) that this study is often impeded by very bad interferences from radio transmitters, and is, therefore, in urgent need of a number of clear very high frequencies ;

(c) that at present in different countries different frequencies are being used for the purpose ;

(d) that it would be advisable to use the same frequencies throughout the world, also from a point of view of economical frequency allocation ;

(e) that the scientific and radio technical observations made in favour of said study is highly important from the point of view of international radiocommunications ;

resolves,

to request the I.F.R.B.

(a) to assign on a world wide basis the following exclusive frequencies for the benefit of the study on sun radiation and galactic noise measurements :

40 Mc/s, 80 Mc/s, 200 Mc/s, 320 Mc/s, 640 Mc/s, 1280 Mc/s and 3000 Mc/s ;

(b) to fix the guard-band of these frequencies at 10 to 20 kc/s, 15 to 25 kc/s, 140 kc/s, 500 kc/s, 1 Mc/s, 2 to 3 Mc/s and 2 to 3 Mc/s respectively.

Doc. 228

### International Scientific Radio Union

*Subject.* — Question 9

(Original language : English)

#### DRAFT RECOMMENDATION

At the U.R.S.I.-Congress at Zürich the Commission V of the U.R.S.I. for radio-astronomical questions charged a sub-commission with the task to start the co-ordination of the observing stations for radio-solar-noise on a world-wide basis. This has been done

since. The final conclusion arrived at in the Plenary Assembly in Zürich was that an effort should be made to reserve certain frequencies in the V.H.F. and U.H.F.-bands for the reception of solar and galactic noise for scientific and radio-technical purposes.

The proposed frequencies and bandwidths for international use are :

40 Mc/s	with a bandwidth of	10 to	20	kc/s
80 Mc/s	» »	»	» 15 to	25 kc/s
200 Mc/s	» »	»	»	140 kc/s
320 Mc/s	» »	»	»	500 kc/s
640 Mc/s	» »	»	»	1 Mc/s
1280 Mc/s	» »	»	» 2 to	3 Mc/s
3000 Mc/s	» »	»	» 2 to	3 Mc/s

It is very important for the study of this subject that all radio-noise observatories use the same wave-lengths. On behalf of the sub-commission Va I therefore propose the following Recommendation to the C.C.I.R. :

The C.C.I.R.,

considering,

(a) that it is very important for the study of radio-propagation via the ionosphere to have sufficient possibilities to study extra-terrestrial radio-noise in the different countries ;

(b) that it is therefore necessary to reserve frequencies, internationally agreed upon, for the undisturbed reception of extra-terrestrial radio-noise

recommends,

that the I.F.R.B. allocates the following frequencies and bandwidths :

40 Mc/s	with a bandwidth of	10 to	20	kc/s
80 Mc/s	» »	»	» 15 to	25 kc/s
200 Mc/s	» »	»	»	140 kc/s
320 Mc/s	» »	»	»	500 kc/s
640 Mc/s	» »	»	»	1 Mc/s
1280 Mc/s	» »	»	» 2 to	3 Mc/s
3000 Mc/s	» »	»	» 2 to	3 Mc/s

exclusively for the study of the phenomena of solar-and galactic-radio-noise.

## STUDY GROUPS 5 AND 6

Resolution Adopted by Study Groups 5 and 6

June 8, 1951, (doc. 273), on

### The Reservation of Frequencies for the Study of Extra-terrestrial Radio-Noise

The C.C.I.R.

considering,

(a) that study on solar radiation at radio frequencies and galactic radio-noise is being made in various countries throughout the world ;

(b) that this study is often impeded by very bad interference from radio transmitters, and is therefore in urgent need of the reservation of a number of clear frequencies ;

(c) That at present different frequencies are used in different countries for the purpose ;

(d) that it is advisable to use the same frequencies throughout the world, from the point of view of economical frequency allocation, and that such frequencies should therefore be internationally reserved ;

(e) that scientific and technical observations made in such study are highly important from the point of view of international radio services ;

resolves,

1. to bring to the attention of the various administrations the desirability of assigning immediately one particular exclusive frequency in each of several parts of the radio spectrum, as follows, or, if this be not feasible, the desirability of seeking regional agreements upon frequencies near these, such frequencies to be reserved for the benefit of international study of solar radiation and galactic radio noise :

40, 80, 200, 320, 640, 1280 and 3000 Mc/s ;

with guard-bands of  $\pm 20, 25, 140, 500$  kc/s and  $\pm 1,3$  and  $3$  Mc/s respectively ;

2. to bring to the attention of the Extraordinary Administrative Radio Conference in preparation for the next Ordinary Administrative Radio Conference the desirability of allocating one exclusive frequency at or near each of those named, with the guard-bands stated, for the purpose stated.

Approved :

J. H. DELLINGER, Chairman.

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## **WORLD METEOROLOGICAL ORGANIZATION**

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A joint meeting of the W.M.O. and C.C.I.R. on thunderstorm activity held in Geneva, May 30-31, 1951, adopted the following draft recommendations.

### **RECOMMENDATION N° 1 :**

#### **WORLD MAPS OF THUNDERSTORM ACTIVITY**

The meeting held in Geneva, May 1951, considered the problems submitted to the W.M.O. by the C.C.I.R.; the following draft recommendation was agreed upon :

that world maps of thunderstorm activity be drawn up as soon as possible, with the helps of rapidly available data. These maps should include the monthly and annual distribution of days with thunderstorms, giving a picture of the world situation as uniformly consistent as possible.

The C.C.I.R. draws the attention of the W.M.O. to the urgency of the work to be undertaken in this connection.

### **RECOMMENDATION N° 2 :**

Procedure proposed by the meeting concerning a counter of lightning flashes.

(1) The apparatus will be designed by the C.C.I.R. who will specify its characteristics. It is believed that a 6 months test period would be sufficient.

(2) The W.M.O. will receive technical specifications concerning the apparatus from the C.C.I.R.

(3) The W.M.O. will set up the apparatus in the world network, and will collect the data.

(4) The W.M.O. will draw conclusions and will prepare necessary summaries in accordance with the wishes of the C.C.I.R. : diurnal, monthly and yearly variations.

**RECOMMENDATION N° 3 :**

There is great interest in achieving a network for locating at long distance thunderstorm centres with a view to determining thunderstorm activity throughout the world.

It would be desirable to apply calibrating devices to the equipments of the network to give absolute values of radio-noise fields.

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## DOCUMENTATION

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*Investigations into tropic proofing of electrical materials*, 1943-1946, reprinted from the *Australian Journal of Applied Science*, vol. I, n° 1, p. 80-132, 1950, has been sent to National Committees. This publication contains :

- I. *The protection of electronic equipment for use under humid tropical conditions*, by L. G. DOBBIE.
  - II. *The influence of moisture on insulating materials*, by J. S. DRYDEN and P. T. WILSON.
  - III. *Some experiments on the application of organosilicon compounds to glass and ceramic*, by R. J. MEAKINS, Joan W. MULLEY and Vivienne R. CHURCHWARD.
  - IV. *The treatment of glass and steatite ceramic with quaternary ammonium compounds*, by R. J. MEAKINS.
  - V. *The corrosion of copper wires at D. C. potential in contact with electrical insulating materials*, by R. J. MEAKINS.
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## CALENDAR

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Abstract of *Information Bulletin of the International Council of Scientific Unions*, June-July 1951, n° 33.

1952

June, 10-13, Stockholm : Conference and Exhibition on « Instruments and Measurements ».

Summer, I.A.U. : VIIIth. General Assembly, International Astronomical Union.

August, I.C.S.U., Canberra : Joint Commission on the Ionosphere.  
8-9, U.R.S.I., Sydney : Executive Committee, International Scientific Radio Union.

11-22, U.R.S.I., Sydney : Xth. General Assembly, International Scientific Radio Union.

15 Aug., 15 Sept., Istanbul : VIIIth. International Congress of Applied Mechanics.

25 Aug., 2 Sept., Istanbul : IInd. General Assembly, International Union of Theoretical and Applied Mechanics.

October, 1-3, I.C.S.U., Amsterdam : VIIth. General Assembly, International Council of Scientific Unions.

November, Unesco, Paris : Seventh Session General Conference.

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