
U. R. S. I.

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MEMBER COMMITTEES OF URSI URSI COMMISSIONS

Lists of names and addresses, based on information available on 18 August 1970, were published in Bulletin No. 176, pp. 67-92. A list of corrections, changes of address etc. will appear in Bulletin No. 178 (March 1971) and will take account of information available in Brussels on 6 February 1971.

Committees which have not already notified the Secretary General of any such changes *are invited to do so before this date.*

A. S. POPOV GOLD MEDAL CONTEST 1971

The Praesidium of the Academy of Sciences of the USSR has announced the Contest for the A.S. Popov Gold Medal which is awarded for distinguished scientific work and inventions in the field of radio engineering and electronics.

The Medal is awarded either to a Soviet or a foreign scientist for the best original scientific work or a series of works of great scientific value, and for distinguished discoveries or inventions.

The papers can be submitted by research and educational institutes, design offices, and scientific societies, or by academicians, corresponding members and foreign members of the Academy of Sciences of the USSR.

For the A.S. Popov Gold Medal Contest the following papers are to be submitted : (a) scientific publications (series of papers), discoveries or inventions in triplicate; (b) a testimonial of the scientific value and the importance of this work for the progress of science and engineering; (c) a brief biographical note on the author with a list of his main scientific papers and inventions.

The papers with the inscription "For the A.S. Popov Gold Medal Contest" should be addressed to the Academy of Sciences of the USSR, Moscow B-71, Lenin Prospekt 14, Division of General Physics and Astronomy.

The deadline for submitting papers is February 1971.

GLOBAL ATMOSPHERIC RESEARCH PROGRAMME (GARP)

The following publications have been received since the preparation of the list given in *URSI Information Bulletin* No. 175, p. 25.

GARP Publications Series :

No. 5. Problems of Atmospheric Radiation in GARP (July 1970).

GARP Special Reports :

No. 1. Report of Planning Conference on GARP : Brussels, March 1970 (April 1970).

No. 2. Report of Interim Planning Group on GARP Tropical Experiment in the Atlantic : London, July 1970 (August 1970).

By arrangement between ICSU and WMO, copies can be purchased from WMO, Case Postale No. 1, CH-1211 Geneva 20, Switzerland.

DÉCALAGE DE FRÉQUENCE POUR 1971 FREQUENCY OFFSET FOR 1971

ABSTRACT

For 1971 the offset for the UTC system will be -300×10^{-10} .

Pour l'année 1971, le décalage relatif de fréquence à adopter pour l'émission de fréquences étalon et de signaux horaires, coordonnés dans le système international TUC reste fixé à -300×10^{-10} . En d'autres termes, les signaux des secondes seront préparés par un intervalle qui sera égal à $(1 + 300 \times 10^{-10})$ seconde, la seconde étant celle définie par la Conférence Générale des Poids et Mesures en octobre 1967.

30 septembre 1970.

B. Guinot,
Directeur
Bureau International de l'Heure.

DÉFINITION DE LA SECONDE

Le Comité International des Poids et Mesures, à sa session du 6-8 octobre 1970, a approuvé les Recommandations (voir ci-dessous) et le rapport du Comité Consultatif pour la Définition de la Seconde (session de juin 1970) ⁽¹⁾.

Il faut attendre maintenant la décision des représentants des Gouvernements qui se réuniront en Conférence Générale des Poids et Mesures en octobre 1971.

Proposition d'adoption d'une Echelle de Temps Atomique International

Recommandation S1 (1970)

Le Comité Consultatif pour la Définition de la Seconde,

considérant

- 1° le désir général de synchroniser ou de coordonner l'ensemble des émissions de signaux horaires diffusés dans le monde;
- 2° le besoin d'une référence de temps uniforme pour l'étude de la dynamique des systèmes et, en particulier, pour l'étude des mouvements des corps célestes naturels et artificiels;
- 3° l'utilité d'une échelle de temps aussi uniforme que possible pour servir de base à la comparaison des étalons de fréquence opérant en des lieux et à des instants différents;

recommande l'adoption d'une Echelle de Temps Atomique International.

Proposition de définition du Temps Atomique International

Recommandation S2 (1970)

Le Comité Consultatif pour la Définition de la Seconde propose de définir le Temps Atomique International (TAI) comme suit :

⁽¹⁾ Il est à noter que quelques modifications mineures ont été apportées aux Recommandations depuis leur publication dans le *Bulletin d'Information de l'URSI*, n° 176.

“ Le Temps Atomique International est la coordonnée de repérage temporel établie par le Bureau International de l’Heure sur la base des indications d’horloges atomiques fonctionnant dans divers établissements conformément à la définition de la seconde, unité de temps du Système International d’Unités. ”

Poursuite des recherches sur les étalons atomiques de fréquence et sur les méthodes d’évaluation du Temps Atomique International

Recommandation S3 (1970)

Le Comité Consultatif pour la Définition de la Seconde,
considérant que le nombre des étalons primaires de fréquence et leur exactitude sont à peine suffisants pour contrôler le maintien d’une durée constante de l’intervalle unitaire de l’Echelle de Temps Atomique International,

recommande aux organismes compétents d’entreprendre ou de poursuivre activement les recherches en vue d’une réalisation plus exacte de la seconde du Système International d’Unités.

Recommandation S4 (1970)

Le Comité Consultatif pour la Définition de la Seconde,
considérant que l’expérience acquise n’est pas suffisante pour que l’on puisse dès maintenant fixer les règles de pondération des indications des horloges atomiques contribuant à l’établissement de l’Echelle de Temps Atomique International,

recommande que cette question soit étudiée activement.

Mise en pratique du Temps Atomique International

Le Comité Consultatif pour la Définition de la Seconde propose les règles suivantes pour la mise en pratique de l’Echelle de Temps Atomique International pendant les quelques années à venir :

1^o La durée de l’intervalle unitaire de l’Echelle de Temps Atomique International est déterminée par le Bureau International de l’Heure (BIH) de façon qu’elle soit en accord étroit avec la durée de la seconde du Système International d’Unités rapportée à un point fixe de la Terre au niveau de la mer.

2° La durée de l'intervalle unitaire de l'Echelle de Temps Atomique International est maintenue aussi constante que possible. Elle est fréquemment comparée à la durée de la seconde du Système International d'Unités telle qu'elle est obtenue à l'aide des étalons primaires de fréquence de divers établissements. Les résultats de ces comparaisons sont portés à la connaissance du BIH.

3° La durée de l'intervalle unitaire de l'Echelle de Temps Atomique International n'est changée intentionnellement que si elle diffère de façon significative de la durée de la seconde spécifiée en 1°. Ces ajustements n'auront lieu qu'à des dates convenues à l'avance et annoncées par le BIH.

4° L'origine de l'Echelle de Temps Atomique International est définie conformément aux recommandations de l'Union Astronomique Internationale (XIII^e Assemblée générale, Prague, 1967), c'est-à-dire que cette échelle s'accorde approximativement avec le TU2 à 0 heure le 1^{er} janvier 1958.

5° Le procédé par lequel le Temps Atomique International est actuellement porté à la connaissance des usagers, c'est-à-dire par la publication mensuelle des écarts des échelles locales, est considéré comme satisfaisant.

Le Comité Consultatif pour la Définition de la Seconde note que ces recommandations et propositions vont dans le sens des demandes approuvées par le Comité Consultatif International des Radiocommunications (CCIR) à sa 12^e Assemblée Plénière (New Delhi, 1970) et par l'Union Radio-Scientifique Internationale (URSI) à sa 16^e Assemblée générale (Ottawa, 1969, Résolution I.4).

ELECTROMAGNETIC STUDIES OF SEA ICE

by P. GUDMANDSEN

1. LIAISON BETWEEN URSI AND SCAR

The Scientific Committee on Antarctic Research (SCAR) has established a small group to study the problems of the pack ice zone. Among the questions to be studied in physical sciences are :

- (a) Distribution of the gross physical characteristics of the ice cover in time and space (thickness, percentage ice cover, presence and orientation of leads, spacing and orientation of pressure ridges, general surface roughness, flow size).

- (b) Utilization of remote-sensing technology to survey characteristics of the pack ice (roughness, temperature, salinity, snow cover).
- (c) Micro- and macro-meteorology of a surface composed of varied amounts of melt water on the surface of floes and sea water and its interaction with the macro-meteorology of the air mass above the surface.

Since some of these questions are of interest to some members of URSI Commission II, a liaison has been established between Commission II and SCAR in order that activities by URSI members related to these matters may be known to SCAR, and that these activities may be directed towards solving problems in connection with the SCAR studies.

Extensive work on remote-sensing technology has already been reported in the literature and elsewhere. However, in view of the fact that sea ice is highly variable and that the properties of sea ice are very complex, it appears that more work concerning measuring techniques and interpretation will be needed before full utilization of this technology can be obtained. The following list of problems may be useful in describing the electromagnetic aspects which require further studies.

2. — ELECTROMAGNETIC PROBLEMS IN RESEARCH ON SEA ICE

2.1. — *Dielectric properties of sea ice.*

Measurements should be undertaken of the dielectric properties of snow and sea ice at frequencies used for remote sensing, i.e. 30 MHz - 100 GHz and at infrared frequencies. These should include measurements of the complex permittivity, the anisotropic absorption and the influence of surface properties on emissivity and reflectivity.

The measurements should comprise laboratory measurements on natural and artificial sea ice as well as *in situ* measurements on ice. The measured properties should be related to temperature, salinity, water content, depth in the floe, the age of the floe, and other relevant parameters.

2.2 — *Remote sensing of sea ice.*

Remote sensing of sea ice may be carried out by means of (a) radio echo sounding, (b) side-looking imaging radar techniques, (c) radar back-scatter measurements, and (d) radiometer techniques. These techniques should be further developed with respect to method, equipment, and interpre-

tation. Remote-sensing experiments should be coordinated with simultaneous measurements on the ground of the relevant dielectric and other properties for a proper evaluation of the remote-sensing data.

2.3. — *Wave propagation in inhomogeneous, anisotropic ice structures.*

Theoretical studies of wave propagation in inhomogeneous, anisotropic media may be of importance for the understanding and the interpretation of the remote-sensing techniques. Model experiments in the laboratory may prove very valuable if they are based on a sound analogy of the sea ice properties.

3. — COOPERATION WITH SCAR

Members of Committees of URSI and other individuals who are carrying out work related to the subjects listed in para. 2, and who are interested in contributing to the cooperation between URSI and SCAR, are requested to contact one of the liaison officers : F. Eklund, Institute for Telecommunication Sciences, Office of Telecommunications, Boulder, Colorado 80302, USA; P. Gudmandsen, Technical University of Denmark, DK 2800 Lyngby, Denmark, in order to establish contact with the SCAR study group.

**LA NOUVELLE INSTALLATION DE SONDAGES
IONOSPHERIQUES DE L'INSTITUT ROYAL
METEOROLOGIQUE DE BELGIQUE (IRM)
A DOURBES**

par L. BOSSY

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Depuis le mois de septembre 1970, l'IRM dispose d'une installation de sondages ionosphériques dont l'élément essentiel est une DIGISONDE 128 développée, construite et mise en ordre de marche à Dourbes par le Lowell Technological Institute Research Foundation (Bibl, 1968). Une description détaillée de cette ionosonde linéaire est en préparation pour être publiée

dans " Air Force Cambridge Research Laboratories, Scientific Papers Series " par Bibl, Reinisch et Büchau.

L'exploration de la bande de fréquences de 250 kHz à 16 MHz par pas de 25, 50 ou 100 kHz garantit une connaissance précise de la fréquence opérationnelle. Pour chaque fréquence, un nombre d'impulsions qui peut être choisi est émis et la sortie du récepteur est échantillonnée suivant 128 altitudes virtuelles équidistantes. Un procédé original d'intégration et de digitalisation forme les valeurs médianes de l'amplitude et de la phase pour chacun des 128 domaines d'altitudes. Pour chaque fréquence, ces 128 amplitudes complexes sont enregistrées sur bande magnétique ainsi que l'heure, le jour, l'année et tous les paramètres opérationnels du sondeur, comme le demande la Recommandation III.6 adoptée à la XVI^e Assemblée générale de l'URSI en 1969. Le format d'enregistrement et sa qualité sont tels que les bandes sont directement lisibles par les ordinateurs récents.

En vue de leur analyse immédiate, aussi bien que pour un contrôle opérationnel, les ionogrammes horaires sont imprimés, en parallèle avec leur enregistrement sur bande magnétique. Le DIGICODER, en conjonction avec un fac-similé MAGNAFAX 850, engendre un ionogramme contenant les informations numériques relatives aux amplitudes des échos.

Deux programmes différents permettant une sélection indépendante des paramètres opérationnels (domaine d'altitudes, résolution en altitude, gain du récepteur, durée d'impulsion et taux de répétition, début et fin du balayage de fréquences, incrément de fréquence, nombre d'impulsions par fréquence ou opération sur fréquence fixe) donnent au chercheur suffisamment de latitude pour des études spéciales. Pour le moment, grâce à ce procédé, nous alternons toutes les 10 minutes les ionogrammes " normaux ", qui couvrent le domaine d'altitudes de 55 km à 630 km et les ionogrammes " E " utiles pour des études spéciales de la région E où l'échantillonnage a lieu tous les 1.5 km avec une résolution en fréquence de 25 kHz.

La DIGISONDE de l'IRM permet également un contrôle à distance de tous ses paramètres opérationnels. Ce mode d'opération sera introduit dans les prochains jours au moyen d'un système SAIT dont l'élément central est un ordinateur CII 10010 possédant une mémoire de 8K. Ce contrôle opérationnel de la DIGISONDE sera la première tâche du système SAIT; mais la fonction principale de ce dernier sera de conditionner et d'analyser en temps réel les données numériques prétraitées telles qu'elles proviennent de la DIGISONDE.

Les méthodes et les programmes pour le système SAIT sont actuellement en préparation de manière à enregistrer en temps réel : f_{min} , f_{tE} , f_{tF} et h' en fonction du temps.

La DIGISONDE et le système SAIT constituent un ensemble d'une très grande souplesse opérationnelle qui, simultanément, élimine une grande partie du temps et du travail normalement requis pour la réduction et la compression des données. Ceci permet au chercheur de se concentrer sur les problèmes réels de la physique de l'ionosphère. Les informations sur l'amplitude et la phase des échos fournies par la DIGISONDE ouvrent de nouvelles possibilités de recherches : absorption en fonction de la fréquence, corrélation entre la forme des échos et les conditions ionosphériques, analyse de la hauteur de phase, mesure de l'angle d'incidence. Enfin, l'utilité d'un tel ensemble de sondage ionosphérique digital pour les services de prévision et d'alerte est évidente.

Bibl, K. — Data processing in ionospheric measurement systems, *Bulletin d'Information de l'URSI*, n° 169, 33, 1968.

THE NEW DIGITAL IONOSPHERIC SYSTEM OF THE ROYAL METEOROLOGICAL INSTITUTE OF BELGIUM (IRM) AT DOURBES.

by L. BOSSY

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Since September 1970, IRM has been operating a new digital ionospheric sounding system the heart of which is a DIGISONDE 128 developed, built and put into operation at Dourbes by the Lowell Technological Institute Research Foundation (Bibl, 1968). A detailed description of this linear ionosonde is being prepared by Bibl, Reinisch and Büchau for publication in the "Air Force Cambridge Research Laboratories, Scientific Papers Series".

The scanning of the frequency band from 250 kHz to 16 MHz in discrete steps of 25, 50 or 100 kHz guarantees accurate knowledge of the operational frequency. On each frequency a selectable number of pulses is transmitted and the receiver output is sampled in 128 consecutive equidistant height gates. A new digitizing and integration scheme generates median values of amplitude and phase for each of the 128 height ranges. For each frequency, these 128 complex amplitudes are recorded on magnetic tape together with

time, day, year and all the operational parameters of the sounder — in accordance with Recommendation III.6 adopted at the XVI General Assembly of URSI in 1969. The recording format and quality make the tapes directly readable by all modern computers.

For on-line evaluation, as well as for operational control, the hourly ionograms are printed out in parallel with their recording on magnetic tape. The DIGICODER, in conjunction with the MAGNAFAX 850 facsimile printer, generates an analog ionogram presentation while retaining the numerical information on the echo amplitudes.

The flexibility required for special studies by the researcher is given by two different programmes with independent selection of the following operational parameters : height range, height resolution, receiver gain, pulse width and repetition rate, start and end of the frequency sweep, frequency increments, number of pulses per frequency, or fixed frequency operation. At present, using this versatility, we alternate, at intervals of 10 minutes, between “normal” ionograms covering the height range from 55 km to 630 km, and “E”-ionograms which provide for special E-region studies with 1.5 km height samples and 25 kHz frequency resolution.

The DIGISONDE at IRM is designed to permit also the remote control of all its operational parameters. This mode of operation will be applied in the near future by means of a SAIT system, the main element of which is an ordinator CII 10010 with a memory of 8K. While operational control of the DIGISONDE will be one task of the SAIT system, its main function will be to further process and analyze on-line the flow of preprocessed digital data as it comes from the DIGISONDE. Methods and programme for the SAIT system are presently being prepared to record on-line : f_{min} , f_{tE} , f_{tF} and h' as functions of time.

The DIGISONDE and the SAIT system form an ensemble which has great operational flexibility and which, at the same time, eliminates much of the effort and time normally required for data reduction and compression. This enables the researcher to concentrate on the real problems of the physics of the ionosphere. The amplitude and phase information provided by the DIGISONDE gives the possibility of developing new types of research, for example : absorption as a function of frequency, echo pulse shape correlated with ionospheric conditions, phase-height studies, and measurements of the angle of incidence. The application of this digital ionospheric sounding system to world-wide warning and forecasting services is evident.

Bibl, K. — Data processing in ionospheric measurement systems, *URSI Information Bulletin*, No. 169, 33, 1968.

INTERNATIONAL URSIGRAM AND WORLD DAYS SERVICE (IUWDS)

The International Ursigram and World Days service is a permanent scientific service of the International Union of Radio Science (URSI), with the participation of the International Astronomical Union and the International Union of Geodesy and Geophysics. IUWDS adheres to the Federation of Astronomical and Geophysical Services of the International Council of Scientific Unions. The IUWDS coordinates the international aspects of the world days programme and rapid data interchange; this programme includes the issue of world-wide solar and geophysical alerts for coordination of effort on various disturbance phenomena. It subsequently publishes summary records of solar and geophysical indices and events.

Separate copies of the International Geophysical Calendar described in the following article are available, upon request, from IUWDS Regional Warning Centers, the STP World Data Centers, or the IUWDS Secretary, Dr. P. Simon, Observatoire, 92 Meudon, France, or IUWDS Deputy Secretary, Miss J. V. Lincoln, WDC-A Upper Atmosphere Geophysics, NOAA, Boulder, Colorado 80302, USA.

SCIENTIFIC PROGRAMS INVOLVING THE INTERNATIONAL GEOPHYSICAL CALENDAR

by A. H. SHAPLEY

Chairman, IUWDS

The International Geophysical Calendar is issued annually as a guide to geophysicists and scientists in related fields in the conduct of their programs of observation and data analysis, in particular for programs which cannot be carried out continuously. It is a mechanism for general international coordination of work in geophysics. The calendar provides a basis for the systematic sampling of geophysical conditions on various

time scales and for a useful concentration of effort by observers in various countries and various scientific disciplines. Regional or global geophysical modeling and the detailed study of particular short-lived phenomena is enhanced because the amount of raw data in existence, as well as analyzed data in World Data Centers, tends to be greater on days and intervals marked on the calendar.

The calendar is prepared by the International Ursigram and World Days Service (see preceding article) in association with many other international scientific groups and spokesmen for the various specific programs. The disciplines which make use of the calendar are meteorology, atmospheric electricity, geomagnetism, aurora, airglow and ionospheric studies. Also involved are the fields of solar activity, and of balloon, rocket and satellite measurements in cosmic rays, aeronomy and interplanetary science. Summaries of the program recommendations in each field are printed on the reverse side of the calendar which is widely distributed to geophysical stations and scientists. Users interested in particular details are referred to these explanations and to the other sources indicated below.

For meteorology, the recommendations for concentrating efforts on certain days and intervals come from the World Meteorological Organization in concert with the IAMAP of the IUGG. They recommend the carrying out of intensified observations on Regular Geophysical Days (RGD), each Wednesday. Thus stations with limited resources concentrate efforts on RGD as regards maximum altitude rawinsondes and the specialized measurements provided by meteorological rocket-sondes, ozone-sondes and radiometer-sondes. Further the WMO-IAMAP recommend a more thorough sampling during the World Geophysical Intervals which last two weeks each quarter; the WGI are usually shifted by one month from one year to the next so that the resulting data will have less of a seasonal bias. The recommended programs calls for the carrying out of RGD-type observations during the WGI on Mondays and Fridays as well as on the RGD, Wednesday. The details of the recommendations appear in *Annals of the IQSY*, Vol. 1, pp. 226-228 (MIT Press, 1968). The selection of dates is coordinated each year with the President of the WMO Commission for Atmospheric Sciences : at present, Dr. J. S. Sawyer, Meteorological Office, London Road, Bracknell, Berkshire, England. Meteorologists are also reminded, through the calendar, of other special observation periods such as the Field Years for the International Hydrological Decade. The IUWDS is in touch with the Joint ICSU-WMO Organizing Committee for the Global Atmospheric Research Program, and will call attention to

special GARP intervals, when they are decided, in order to help enhance the interdisciplinary aspects of this international effort.

The recommendations for work on atmospheric electricity are obtained through the Joint Committee on Atmospheric Electricity of the International Association of Meteorology and Atmospheric Physics and International Association of Geomagnetism and Aeronomy, whose Secretary is Mr. Hans Dolezalek, 1812 Drury Lane, Alexandria, Virginia 22307, USA. On RGD each Wednesday, as a first priority, they call for carrying out, for six hours each day, any non-continuous measurements or special data reduction of continuous measurements of atmospheric current density, ion number densities, conductivities, space charges, etc. The beginning time of the six-hour shift progresses from week to week. These and other details of the recommended program are stated in the calendar explanations. The World Data Center for Atmospheric Electricity, 7 Karbysheva, Leningrad K-18, USSR, is the collection point for data and information on measurements.

In geomagnetism, it has always been a leading principle for standard observatories that operations should be as continuous as possible and the great majority of stations undertake the same program without regard to the calendar. However, special efforts are recommended for particular periods in the case of geomagnetic micropulsations so as to improve the cooperation among observatories in the analysis of different types of micropulsations. This work, coordinated by Dr. V. Troitskaya, Chairman of the IAGA Working Group on Micropulsations, calls for the conduct of quick-run registrations of pulsations during four specified weeks. The program is further described on page 79 of the *IAGA Transactions of the General Scientific Assembly, Madrid, Spain, 1969*. In addition, stations equipped for making normal geomagnetic observations, but which cannot carry out such observations and reduction on a continuous schedule, are encouraged to do so on Regular World Days, Wednesdays, with data to be shared with the World Data Centers. This suggestion has come from the ionospheric community and has been accepted by Dr. M. Sugiura of IAGA Commission IV.

The calendar marks four one-week intervals around new moon, a time when auroral and airglow observatories in any case operate with their full capacity. These intervals are thus intended not so much for the attention of optical observers, but rather to help concentrate the efforts of workers using other techniques (e.g. ionosondes, incoherent scatter sounding, balloons, rockets, satellites) to make progress in understanding the mechanism of aurora and particularly low-latitude aurora. This program

is coordinated by the Chairman of IUCSTP Working Group 8 on Low Latitude Aurora, Dr. G. Weill, Institut d'Astrophysique, Centre National de la Recherche Scientifique, 98 bis boulevard Arago, Paris 14^e, France.

Workers in ionospheric studies make rather extensive use of the calendar, both for observation schedules and for selected data exchange through the World Data Centers. Several groups and individual spokesmen have contributed to the recommendations, notably Mr. W. R. Piggott, Radio and Space Research Station, Slough, Bucks, England, who is the Vertical Soundings Consultant of the URSI Committee on Solar-Terrestrial Physics. The detailed recommendations for vertical soundings, incoherent scatter observations, drifts and absorption measurements and other more specialized ionospheric programs are summarized in the calendar explanations. A fuller discussion of the recommendations (which should be checked with the 1971 specifications in the calendar explanations) has appeared in the ionosphere chapters of *Annals of the IQSY*, Vol. 1 (MIT Press, 1968). For ionospheric workers as well as other geophysicists, the calendar indicates the dates with unusual meteor shower activity, separately for the northern and southern hemispheres. These are provided by Dr. Peter Millman, National Research Council, Ottawa, Canada. These are provided both for the convenience of radio and radar workers studying the effects of meteors on the high atmosphere and also to alert other observers to the likelihood that apparently unusual or unexplained phenomena may be a consequence of the unusual meteor shower activity.

The days of solar eclipses are treated as "World Days" by most types of geophysical stations in the eclipse zones and their conjugate areas. During the eclipse interval, in general, the standard measurements are intensified and, of course, many stations make special experiments. The World Data Centers tend to receive an unusual number of inquiries regarding data for eclipse days taken at geophysical stations in the eclipse zone and also at solar activity observatories anywhere in the world. The calendar thus serves to remind stations who may not have specific eclipse programs of the scientific importance of achieving good observational coverage on those days. Maps of the eclipse tracks are normally published in *STP Notes*; a map of the conjugate track for the March 1970 total eclipse (Parish and Roederer) appeared in *STP Notes* No. 7, p. 119, and such maps can be supplied on request for other eclipses by the Deputy Secretary, IUWDS.

As regards balloon, rocket and satellite measurements in the fields of cosmic rays, aeronomy and interplanetary science, the use of the calendar is more indirect. Experimenters should be aware that there is a tendency

for more (or more detailed) data to be obtained by collateral ground-based techniques on the days marked on the calendar, and thus they may want to schedule their own experiments accordingly if there is no other reason for choice. In particular, the IQSY Aeronomy Working Group recommended a concentration of rocket experiments, designed to measure ionospheric parameters, on the Quarterly World Days which appear on the calendar (*IQSY Notes* No. 3, p. 62, June 1963). Further, the scheduling of satellite telemetry could take account of the calendar so as to provide ground experimenters with better coverage of collateral space measurements.

The International Geophysical Calendar is the servant of the scientific community. Each year, about January, the IUWDS officers make a preliminary draft of the calendar for the next year, based on the concepts of the current year. This draft is circulated to the spokesmen for the various programs and the leaders of the various URSI, IAGA, COSPAR and IUCSTP commissions or working groups. On the basis of the replies received, a *Planning Edition* is printed in limited quantity, about March, and is circulated again, with special emphasis on making necessary or desirable changes in the "Recommended Scientific Programs". The planning edition is also taken to the COSPAR and any other appropriate international scientific meetings for further discussion and modification by these groups or by program spokesmen attending these meetings. Finally the *Operational Edition* is printed in large quantity about September and given broad circulation according to a world-wide mailing list including all the leading scientific journals and information publications. Additional individual copies are available from IUWDS Regional Warning Centers, the World Data Centers or the IUWDS Secretaries. The IUWDS officers welcome comments on this coordination mechanism and undertake to satisfy the needs of all international activities in solar-terrestrial and geophysical sciences.

International Geophysical Calendar for 1971

(See other side for information on the use of this Calendar)

JANUARY

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

FEBRUARY

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14	15	16	17	18	19	20
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28						

MARCH

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28	29	30	31			

APRIL

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MAY

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30	31					

JUNE

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27	28	29	30			

JULY

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AUGUST

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SEPTEMBER

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OCTOBER

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31						

NOVEMBER

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DECEMBER

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1972 JANUARY

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30	31					

- 12 Regular World Day (RWD)
- 13 Priority Regular World Day (PRWD)
- 10 Quarterly World Day (QWD) also a PRWD and RGD
- 6 Regular Geophysical Day (RGD)
- 25 Day of Solar Eclipse

- * Micropulsation Interval Day
- 9-10 World Geophysical Interval (WGI)
- 3 Day with unusual meteor shower activity Northern Hemisphere
- 15 Day with unusual meteor shower activity Southern Hemisphere
- 24-25 Airglow and Aurora Period

Note: International Hydrological Decade Field Year, April 1, 1971 - Sept. 30, 1972.

STORAGE AND RETRIEVAL OF DATA IN THOSE PHYSICAL ENVIRONMENTAL SCIENCES WHICH ARE CLOSELY RELATED TO METEOROLOGY

Note by Secretary General URSI. — The text reproduced below has been received from the Executive Secretary of ICSU. Member Committees of URSI which wish to submit comments on the types of data listed are requested to send them to URSI so as to reach Brussels *not later than 15 January 1971.*

The WMO Executive Committee has established a Panel of Experts to act as a focal point for all WMO activities relating to data storage and retrieval. The Panel has been asked specifically to consider the scope of the WMO storage and retrieval service, and in particular the extent to which it should cater for users' requirements for data in those physical environmental sciences which are closely related to meteorology.

At its first session the Panel suggested that, in addition to the meteorological data normally exchanged over the WMO Global Telecommunication System (current observational data from the surface and upper air; satellite-derived data in image and quantitative form; analyses, prognoses and means for various levels in the atmosphere, etc.) the following should be included :

Data for the study of water and energy budgets, such as potential evaporation or potential photosynthesis (e.g. stream-flow data, evaporation, sunshine data, global and net radiation) :

- (a) Remote-sensed data relating to aeronomy, agriculture, environmental pollution, hydrology and oceanography, particularly if such information is collected by sensors carried on meteorological platforms and is used in association with meteorological data;
- (b) Snow and ice data, at least on a regional scale;
- (c) Sea temperature down to the thermocline;
- (d) Data to support the International Biological Programme and the Man and the Biosphere Programme as well as other programmes arising out of the present concern in the management of the physical environment;
- (e) Air trajectory information (for world water balance and agroclimatological calculations);

(f) Data to support the WMO Programme on the Interaction of Man and his Environment.

In drawing up this list the Panel recognized that it did not have full information from research institutions or other potential user groups as to what information they might wish WMO to archive.

The Secretary General of WMO has asked the Secretary General of ICSU to review critically the data types listed above, and add any other type(s) of data which he considers could with advantage be included in the WMO data storage and retrieval service.

The Secretary General of WMO wishes it to be made clear that this enquiry is being made solely in order to provide concrete information for consideration by the Panel so that the WMO system may be designed to meet most efficiently and most economically users' requirements for data from meteorology and closely allied disciplines.

In view of the recent increase of interest by a wide range of Agencies, Organizations, Institutes, etc. in environmental sciences and in global monitoring of parameters for controlling the state of the environment, difficulties arise with regard to decisions on the field of competence of each interested body. Any suggestions received from you will therefore be submitted to WMO on the understanding that their submission does not necessarily imply that the collection of such data is automatically within the field of competence of WMO.

GEODYNAMICS PROJECT

At its General Assembly in September 1970, ICSU approved the establishment of the Inter-Union Commission on Geodynamics with the following Terms of Reference :

The Geodynamics Project is an international programme of research on the dynamics and dynamic history of the earth with emphasis on deep-seated foundations of geological phenomena. This includes investigations related to movements and deformations, past and present, of the lithosphere, and all relevant properties of the earth's interior and especially any evidence for motions at depth. The programme is an interdisciplinary one, co-ordinated by the Inter-Union Commission on Geodynamics (ICG) established by ICSU at the request of IUGG and IUGS, with rules providing for the active participation of all interested ICSU Unions and Committees.

The principal task of the Geodynamics Commission is to promote and co-ordinate international and interdisciplinary research and co-operative programmes related to the Geodynamics Project. Many aspects of the

Geodynamics Project will have inherent technological and economic advantages; the Geodynamics Commission will seek and encourage programmes that have these advantages, especially for the developing countries.

There will be two stages in the Project :

1. Programme development in 1971;
2. Active research during the period 1972-1977.

INTERNATIONAL SYMPOSIUM ON INFORMATION THEORY

NOORDWIJK, JUNE 1970

This International Symposium was sponsored by the IEEE, URSI and NERG (Dutch Radio and Electronics Society).

All the sessions were held in the Hotel Huis ter Duin at Noordwijk, Netherlands. There were over 371 participants from 22 countries. As usual the United States had a large delegation (138), but the Netherlands (50) and Germany (45) were also strongly represented. France (24), Sweden (19), Italy (18), United Kingdom (15), Canada (11) and the USSR (10) also sent relatively large delegations.

Professor Stumpers (Co-Chairman of the Symposium) welcomed the delegates and referred to the loss through the death of a member of the Organizing Committee, Prof. H. Renyi, whose works in mathematics, statistics and information theory were well known. Then the meeting went on to the presentation of the Marvyn J. Kelly Award to Dr. van Duuren "for fundamental contributions to data communications". Dr. Wellinger, Director of Region 8 of IEEE, spoke on the significance of the award, which had been given to such famous scientists as Nyquist, Shannon and Rice. Dr. Powers gave a good survey of the work of Dr. van Duuren who is best known for his original invention of a system of error correction by means of automatic retransmission. Dr. van Duuren expressed his thanks and gave a lecture on new results in these ARQ systems.

The second half of the opening Plenary Session was given to the keynote address by Prof. Manfred Schroeder entitled "Speech Coding and the Human Ear".

In the afternoon, the Symposium was divided into four business sessions : Coding I (Mathematical Theory), Recognition I (Methodology), Estimation I, and Quantum and Fluctuating Channels, during which 42 papers were presented.

On Tuesday, the morning session was presided over by Dr. P. E. Green, Co-Chairman of the Symposium. Three invited papers were given : Applications of Communication Theory to Space Communications by G. D. Forney, Application to Data Communications over Telephone Facilities by R. W. Lucky, and Number Theory and Coding by J. van Lint. The last speaker mentioned that application of a theorem of S. P. Lloyd had shown that no perfect binary 4 error correcting codes were available below a codelength of 10^{470} . The “smaller” values of n were then excluded by computer.

The Tuesday afternoon session was taken up by the sessions on Coding II (Block Codes), Recognition II (Images and Speech), Communications I and Random Processes I in which 40 papers were presented.

On Tuesday evening, Mr. Fischer (Public Relations Officer attached to the Director of the Delta Works) gave a very interesting address, with slides and a film, on the control and partial closure of the sea arms in the southern part of the Netherlands. On Wednesday, a trip was made by boat to Hellevoetsluis to visit this part of the Delta Works. Fine weather favoured this trip and many delegates used the opportunity to renew old acquaintances and to discuss scientific problems. In the evening a special session was chaired by Prof. T. M. Cover on new developments and open problems. For this session 12 papers were chosen from a number submitted, in accordance with prior arrangements, the previous day.

On Thursday morning, sessions were held on : Coding III (Probabilistic Decoding), Language, Sense and Sound, Communications II and Random Processes II. These sessions included 38 papers. On Thursday afternoon 30 papers were presented on Capacity, Coding II (Convolutional Codes), Detection and Radar, and Communications III (Feedback Systems).

On Thursday night at the banquet, Dr. P. E. Green acted as Master of Ceremonies. Prof. V. I. Siforov spoke on behalf of URSI, and also thanked the organisers on behalf of all the foreign participants. Prof. Schouten made an after-dinner speech on “A Mathematical Theory of the Digestive Channel”, a facetious parallel to the famous Shannon paper, enlivened by many anecdotes.

The Friday morning session was concerned with Basic Problems, Source Coding, Signal Design, Filtering, Spatial Problems, and Estimation II. In this session 40 papers were presented. On Friday afternoon a visit was organised to the Research Laboratories of the European Organisation for Space Research (ESTEC) in Noordwijk.

Abstracts of all the papers were printed in the Technical Programme (96 pages) which was distributed to all participants before the meeting.

Many delegates were accompanied by their ladies, and Prof. J. L. Massey gave a special lecture, designed to introduce information theory to them, which attracted great interest.

The fine summer weather, the excellent location of the Hotel Huis ter Duin on the beach, the being together of all the participants at the sessions and also in the evening — all these contributed to a very successful Symposium.

The programme included 190 papers, but the titles of only the longer ones presented are listed here :

- On the Non-Existence of Perfect 2- and 3-Hamming Error Correcting Codes over $GF(q)$. J. H. van Lint (Netherlands).
- The Nearest Neighbour Rule with a Reject Option. M. E. Hellman (USA).
- Robust Estimation of Signal Amplitude. R. D. Martin (USA).
- An Innovation Approach to Nonlinear Estimation in White Gaussian Noise. P. A. Frost and T. Kailath (USA).
- A Distributed Parameter State Variable Model for Time-Variant Channels. R. R. Kurth (USA).
- On the Minimum Distance Structure of Cyclic Codes. R. T. Chien and C. R. P. Hartmann (USA).
- An Edge-Parameterising Preprocessor for Visual Pattern Recognition. D. J. Quarmby (UK).
- Rapidly Converging Second Order Algorithms for Adaptive Equalisation. T. J. Schonfeld and M. Schwartz (USA).
- Adaptive Hybrid Sequential Decoding. F. Jelinek and J. Cocke (USA).
- A New Approach to Optimal Multiplexing Theory. B. Dejon and E. Hänsler (Switzerland).
- A Strong Lower Bound on Free Distance for Periodic Convolutional Codes. D. J. Costello Jr. (USA).
- The Geometry of Incoherent Reception. N. M. Blachman (USA).
- On the Capacity of a Continuous Memoryless Channel with Feedback. T. T. Kadota (USA) and M. Zakai and J. Ziv (Israel).
- A New Viewpoint on Communication Channel Capabilities. J.J. Metzner (USA).
- On Interpolation of Components of Diffusion Markov Processes. A. N. Shirayev (USSR).
- The Source Coding Game. T. Berger (USA).

F. L. Stumpers.

ICSU ABSTRACTING BOARD (ICSU AB)

JULY 1970

The ICSU AB at its annual meeting in Columbus (Ohio) in July 1970 agreed to go ahead with a plan for the first stage of a world system for abstracting and indexing services for science and technology.

The Abstracting Board's members include eleven of the world's major abstracting and indexing services from France, Germany, USA, USSR and United Kingdom.

The first stage plan defines guidelines for cooperation among the member services of the Abstracting Board in the acquisition, selection, and exchange of documents for coverage by the services. It is aimed primarily at eliminating much of the duplication in journal acquisition that exists among the world's principal abstracting and indexing services.

Under the plan, the member services from each scientific discipline would assume the responsibility for acquiring and selecting articles for coverage from the most productive journals in their discipline. Articles in these journals that are of potential interest to other disciplines would be forwarded in microform, along with the author's abstract and a standard computer-readable bibliographic description, to the appropriate other services, either directly or through a central redistributing unit. Responsibility for acquiring and selecting articles for coverage from a substantial number of journals that are primarily devoted to scientific fields outside those covered by the member services will be allocated among the member services according to the languages of the journals, with articles of potential interest routed to the appropriate services for coverage.

Dr. Byron Riegel, President of the ICSU AB said that the design, implementation and operation of a world system for abstracting and indexing services was a primary long-range goal of the Board. Cooperation among the member services in journal acquisition and document selection is a first important step toward this goal.

Dr. Riegel pointed out also that such cooperation would substantially reduce the costs of document acquisition and selection for each of the member services and for the world scientific abstracting and indexing complex as a whole. Each of the member services will have to acquire and process far fewer journals. While services covering the same discipline in different languages will each continue to acquire the core journals of that

discipline, they will no longer need to acquire a substantial number of journals devoted primarily to other disciplines.

The arrangement also will contribute importantly to the completeness of coverage of the abstracting services in each of the disciplines, Dr. Riegel said. Each service in effect will be able to draw information from the aggregate journal coverage of the member services which is estimated to be about 35,000 journals.

The first steps toward implementing the plan will be agreement upon common definitions of subject coverage, selection procedures, and forms for bibliographic citations among the member services, and studies of the degree of overlap that now exists in the journals abstracted by the member services. The plan also calls for a detailed inventory of the computer-readable records produced by the various member services; this will facilitate the identification of the degree of compatibility and convertibility among these records and the analysis of the indexing approaches used by member services with the ultimate aim of the direct exchange of abstracts and index entries among the services.

The member services of the ICSU Abstracting Board are Astronomy and Astrophysics Abstracts, Bibliographie des Sciences de la Terre, Bibliography and Index of Geology, Biosciences Information Service of Biological Abstracts, Bulletin Signalétique, Chemical Abstracts Service, Chemischer Informationsdienst, Science Abstracts, Physikalische Berichte, Referativnyi Zhurnal, Zentralblatt für Mathematik.

The Proceedings of the July 1970 meeting of the ICSU AB, which include the description of the first stage of the plan for a world system for abstracting and indexing services, are available from the ICSU AB Secretariat, 17 rue Mirabeau, Paris 16^e, France. (US \$15.00 plus mailing charges).

UNESCO ACTIVITIES IN THE FIELD OF ENGINEERING SCIENCES AND RESEARCH

PARIS, 14-17 SEPTEMBER 1970

Note by Secretary General. — This is an informal report for information only and the conclusions, etc. may not coincide precisely with those in the official report to be prepared by UNESCO.

A consultative meeting on the above subject was convened by UNESCO. Those invited to be present included representatives of international non-governmental engineering organisations and a number of individual experts who were invited in a personal capacity. ICSU was represented by Professors Boutry and Kasteler (IUPAP), Dr. Morf (IUPAC) and Dr. Minnis (URSI). UNESCO was represented by the Assistant Director General for Science (Prof. Buzzati-Traverso), and by Drs Evstafiev, Chamecki and Shishov of the Department of Technological Education and Research.

Dr. Chamecki referred to the two main aspects of UNESCO's programme : the general promotion of science and education, and the provision of assistance to developing countries. The purpose of the meeting was to arrive at a basic philosophy in respect of the promotion of engineering because, in comparison with the support of the basic sciences, UNESCO's efforts in the past had lagged behind. The discussion of aid to developing countries was not within the terms of reference of the meeting.

After the presentation of the background papers prepared by several organisations and consultants, it was agreed that all the specific projects and proposals could be placed in one or more of the following general fields :

1. Materials.
2. Heat and mass transfer (including the dynamics of fluids and thermodynamics).
3. Electrical engineering.
4. Electronic and telecommunications engineering.
5. Instrumentation, automatic control, information processing.
6. Environmental engineering.
7. Bio-engineering.

At a later stage of the meeting it was recommended that priority be given to branches of engineering which contributed :
either (1) directly to the solution of major problems of society such as pollution of the air and water supplies, excessive noise, etc.,
or (2) to the welfare of mankind by reducing effects which hinder industrial, economic and social progress. The advantages of better materials; increased efficiency of power production and distribution; improved reliability; means of increasing safety and reducing physical and mental effort, were stressed.

The conclusions of the meeting were that effort should be concentrated on a major programme and a number of cooperative programmes (see below). Other topics which had been recommended, but which had been

excluded from these programmes, would receive preference in the routine UNESCO programmes.

1. — MAJOR PROGRAMME.

Heat and mass transfer and some aspects of rheology, with particular reference to :

- (a) unsteady flow techniques for the transfer of heat and mass, and the associated measurement devices;
- (b) heat exchangers (including those using turbulent flow, and air as the coolant);
- (c) multiphase flow;
- (d) control of the exhaust gases of internal combustion engines;
- (e) rheology (including soils and complex liquids).

2. — COOPERATIVE PROGRAMMES.

Information systems and automatic control with particular reference to :

- (a) measurement and instrumentation (including applications to high-pressure flow in long pipe-lines);
- (b) pattern recognition (including the mechanism for sensing taste and smell);
- (c) automatic control theory and stability problems;
- (d) system analysis;
- (e) power and process control;
- (f) automation of machinery, assembly and inspection;
- (g) communications, transport and traffic control;
- (h) models and simulation techniques (including applications to ecology, and to urban and transport systems);
- (i) operational research.

3. — ROUTINE PROGRAMMES.

3.1. — *Material Sciences* :

- (a) utilisation of waste;
- (b) materials for biological applications;
- (c) lasers, optical fibres;
- (d) high temperature materials;
- (e) superconducting materials;

- (f) formation of metal alloys;
- (g) welding techniques;
- (h) catalysis;
- (i) properties of vapours and gases.

3.2. — *Energy Sciences* :

- (a) superconductivity and its applications;
- (b) plasma dynamics (including fusion and low temperature plasmas);
- (c) high temperature processes;
- (d) control of noise;
- (e) steam and Sterling cycles for motor cars;
- (f) fluidized bed combustion.

3.3. — *System Sciences* :

- (a) control of high-voltage DC systems (circuit breakers);
- (b) ergonomics, safety and reliability.

The detailed implementation of the recommendations made by the meeting will require further study by UNESCO. It is understood that consideration will be given to :

- (a) direct support for certain international centres, universities and other research groups;
- (b) provision of advanced training facilities;
- (c) formation of liaison groups;
- (d) provision of assistance to and collaboration with non-governmental organisations;
- (e) development of information services and the flow of information;
- (f) advice on specific problems requiring attention.

The need for continued developments in telecommunications systems and in the effective use of the electromagnetic spectrum was admitted to be important. However, it was agreed that the International Telecommunication Union already had a full understanding of and long experience in dealing with the problems in this field. Moreover there were satisfactory contacts between, on the one hand, ITU and its technical committees and, on the other, the appropriate non-governmental organisations that could offer scientific and technical advice.

C. M. Minnis.

ICSU 13 GENERAL ASSEMBLY

MADRID, 24-29 SEPTEMBER 1970

The Officers of ICSU for the period 1970-1972 are as follows :

President : Prof. V. A. Ambartsumian (USSR).
Secretary General : Prof. F. A. Stafleu (Netherlands).
Treasurer : Prof. N. B. Cacciapuoti (Italy).
Past President : Dr. J. M. Harrison (Canada).

The following Resolutions of the Assembly have been extracted from the Report of the Executive Secretary dated 6 October 1970.

SPECIAL COMMITTEE ON PROBLEMS OF THE ENVIRONMENT (SCOPE).

The General Assembly ratifies the action taken by the Executive Committee to establish SCOPE and to provide all possible facilities, financial and otherwise, to activate it. It approves specifically the recommendation of SCOPE, endorsed by the Executive Committee, to add three more members to SCOPE so as to include a representative of India, of South East Asia and of Africa, and authorizes the Officers to make these appointments on the recommendation of SCOPE. It also expresses the hope that National Members will consider, as soon as possible, how best to organize or re-organize their own committees for the IBP, the Unions, SCOPE and the proposed MAB programme, which is being planned by UNESCO.

It notes with appreciation the help offered to SCOPE by the Royal Society on a purely voluntary basis.

PUBLIC UNDERSTANDING OF ICSU.

The General Assembly directs the Executive Committee to examine as a matter of urgency, the possibility of producing a film on the scientific activities of the ICSU in different disciplines and different countries (together with a small booklet if necessary) with the object of increasing public understanding of the rôle and achievements of the ICSU.

It further directs the Executive Committee to explore the possibility of organizing an “ICSU Day” the world over, when specially organized events could be transmitted by satellite to all countries of the world.

ICSU-UNESCO RELATIONS.

The General Assembly thanks Prof. Buzzati-Traverso for his statement, expresses its appreciation of the continued help received by the ICSU from the UNESCO and its confidence in further co-operation in matters of mutual interest.

UNISIST AND THE IAB.

The General Assembly accepts the recommendation of the Officers that the ICSU Abstracting Board should, until decided otherwise, function as a link between ICSU and UNISIST with such appropriate modification in its statutes as may be approved by the Executive Committee.

INTER-UNION COMMISSION FOR LUNAR STUDIES.

The General Assembly approves the recommendation of the Executive Committee that an Inter-Union Commission for Lunar Studies be established subject to the provision that the cost to ICSU shall not exceed \$1,000 per year.

MADAGASCAR.

The General Assembly recommends that Madagascar be admitted to the Council as a National Member through the Comité National de la Recherche Scientifique et Technique as its national adhering organisation.

SINGAPORE.

The General Assembly recommends that Singapore be admitted to the Council as a National Member through the National Academy of Science as its national adhering organization.

RÔLE AND STRUCTURE OF ICSU.

The General Assembly agrees unanimously to establish an *ad hoc* committee of not more than nine members to examine the rôle and structure of the ICSU and report to the President before 31 December 1971, so that proposals can be circulated to Members early in 1972, and any revision of statutes which may be necessary prepared for submission to an Extraordinary Assembly prior to the General Assembly 1972.

The General Assembly approved the following composition : Messrs Bhagavantam, Brankov, Coulomb, Kotani, Martin, Rees, Solomon, with the President and Secretary General *ex officio*.

GLOBAL ATMOSPHERIC RESEARCH PROGRAMME (GARP).

Having regard to the WMO-ICSU agreement for scientific collaboration on Global Atmospheric Research Programme (GARP) for an indefinite period unless terminated by one of the two parties, the General Assembly accepts the following statement from the Executive Committee of the ICSU and approves the recommendations as amended by the Assembly therein :

(1) The Executive Committee expresses its satisfaction at the progress made by the joint WMO-ICSU programme "GARP" as a result of the decisions taken at the World Conference on GARP, Brussels, March 1970, jointly convened by WMO and ICSU, on the initiative of the Joint Organizing Committee (JOC) and particularly of its Chairman Prof. Bolin and the Director of its planning staff Prof. Garcia, and approves, in principle, a fixed contribution by ICSU to the GARP Implementation Fund for the years 1972-76 contingent upon financial support from interested National Members or other sources.

(2) The Executive Committee recommends to the General Assembly the setting up of an *ad hoc* Working Group consisting of representatives of national adhering organizations to consider to what extent the interested National Members of ICSU could make annual contributions, on a voluntary basis, say for the period 1972-76, to ICSU for the specific purpose of meeting ICSU's present commitment of \$70,000 a year, or possibly more later, to the GARP Implementation Fund.

(3) (a) The Executive Committee approves the setting up of the Tropical Experiment Council (TEC), and the Tropical Experiment Board (TEB), and the Scientific and Management Group proposed by the Interim

Planning Group for the Tropical Experiment in the Atlantic (with such modifications to the documents annexed to the Report on the TE as have already been or may be agreed by WMO and ICSU).

(b) It shall be understood that while ICSU's scientific input into any subprogramme of GARP will be on the same basis as to the whole, ICSU's financial contribution shall be made to the GARP Implementation Fund as a whole (say, at the present level of \$70,000 a year, or more, as feasible) rather than to individual experiments conducted as part of GARP.

(4) The Executive Committee approves the recommendation of the Officers that a Liaison Officer between the JOC and the Officers of ICSU should be appointed by the Officers of ICSU in place of the ICSU Panel on GARP, in view of the fact that GARP is about to enter its operational phase.

(5) The Executive Committee heard with satisfaction the representative of WMO, Dr. Langlo, say that the absence of any financial commitment on the part of ICSU specifically for the Scientific and Management Group would not prejudice the pursuit of the Tropical Experiment in the Atlantic, in as much as money could hopefully be found from other sources than the GARP Implementation Fund to meet the costs of employing a Director and a Deputy Director for the Scientific and Management Group.

14 GENERAL ASSEMBLY.

The General Assembly accepted the invitation from the Suomalainen Tiedeakatemia to hold the 14 General Assembly in Helsinki; it appeared probable that the Assembly would be held during part of the period 12 September to 3 October 1972.

INTERNATIONAL ASTRONAUTICAL FEDERATION REPORT ON ASSEMBLY AT KONSTANZ

4-10 OCTOBER 1970

by Prof. K. RAWER

The Federation (IAF) groups a large number of associations in the different countries that are engaged in the more technical aspects of space

flight and relevant applications. At this Meeting there was particular emphasis on the development of satellites for surveying the Earth's surface, mainly for detecting Earth resources, but sessions were held also on the use of satellites for educational purposes : for example their application to televised courses in the developing countries. Apart from this, problems such as the computation of orbits, propulsion and the future development of spacecraft systems were discussed in some detail.

The impact of questions likely to be of particular interest to URSI was rather small. In most of the contributions where electronic or radio techniques were mentioned, emphasis was on the use of radio as a tool.

At the official Meeting of the IAF the URSI representative, Prof. K. Rawer, presented the good wishes of URSI on the 20th anniversary of the Federation. The announcement was well received that URSI would be willing to look into typical problems of radio science if there should arise in IAF. However, it is not very probable that such questions will be submitted by IAF to URSI because of the rather different orientation of the two bodies.

1971 EUROPEAN MICROWAVE CONFERENCE

STOCKHOLM, SWEDEN, 23-28 AUGUST 1971

CALL FOR PAPERS.

The 1971 European Microwave Conference will be held in Stockholm, Sweden, at the Royal Institute of Technology from 23-28 August 1971.

This international conference will be the second of its kind (succeeding the Conference in London, September 1969) to deal comprehensively with the subject of microwaves. It is being organized by the Royal Swedish Academy of Engineering Sciences in cooperation with IEE Electronics Division, IEEE Region 8 and the Group on Microwave Theory and Techniques, and the Swedish National Committee of URSI.

In addition to short contributed papers, all of which will be orally presented, there will also be invited review papers covering important subjects. Original papers in the following fields are invited :

Microwave : solid state devices,
components, and computer analysis,
integrated techniques,
antennas,
acoustics,
applications.

SUBMISSION OF SHORT PAPERS.

The time for presentation and discussion of papers will be 15 minutes. Authors are requested to submit 3 copies of a typed summary, 300-500 words in length. The author's name, affiliation and complete return address should be clearly stated.

Since papers will be selected on the basis of the summary, it must include a concise statement of which new results have been obtained, supported by illustrations where appropriate. The summary should be forwarded to reach the following address before 1 March 1971 : 1971 European Microwave Conference, Fack 23, 104 50 Stockholm 80, Sweden.

Authors will be notified of the acceptance of the papers by 30 March 1971.

The submission and presentation of the papers should be in English. No simultaneous translation facilities are planned for the Conference.

A tentative conference programme and other relevant information will be mailed, in April 1971, to those who send a request to the address given above.

INTERNATIONAL SYMPOSIUM ON ELECTROMAGNETIC WAVE THEORY

TBILISI, USSR, 9-15 SEPTEMBER 1971

Further to the First Announcement which appeared in *URSI Information Bulletin*, No. 176, the members of the two Committees responsible for the Symposium are listed below.

LOCAL ORGANIZING COMMITTEE :

Prof. L. A. Vainshtein (*President*).
Prof. V. D. Kupradze (*Deputy President*).
Dr. V. V. Shevchenko (*Scientific Secretary*).
Dr. M. I. Tsandekov (*Deputy Scientific Secretary*).
Dr. V. I. Aksenov.
Prof. L. D. Bakhrakh.
Prof. N. G. Denisov.
Prof. M. A. Kolosov.
Dr. G. S. Lantsberg.
Prof. G. I. Makarov.
Prof. V. V. Migulin.
Prof. M. A. Miller.
Dr. M. V. Persikov.
Prof. A. A. Pistol'kors.
Prof. V. I. Siforov.
Dr. P. Ya. Ufimtsev.
Prof. Ya.N. Fel'd.

INTERNATIONAL PROGRAMME COMMITTEE :

Prof. L. A. Vainshtein (*President*), USSR.
Dr. V. I. Aksenov (*Scientific Secretary*), USSR.
Prof. H. M. Barlow, UK.
Prof. M. Boella, Italy.
Prof. K. M. Siegel, USA.
Prof. M. A. Kolosov, USSR.
Prof. V. D. Kupradze, USSR.
Prof. V. V. Migulin, USSR.
Prof. K. Morita, Japan.
Dr. M. V. Persikov, USSR.
Prof. A. A. Pistol'kors, USSR.
Dr. E. Roubine, France.
Prof. L. H. M. Stumpers, Netherlands.
Dr. P. Ya. Ufimtsev, USSR.
Prof. L. Felsen, USA.
Prof. S. Hahn, Poland.

Authors wishing to submit papers are reminded that the Secretary must receive them by 1 January 1971 (Soviet authors) or 1 March 1971 (authors from other countries).

COSPAR WORKING GROUPS

MAY 1970

WORKING GROUP 1. — *Tracking, telemetry and dynamics of satellites.*

Chairman : J. Kovalevsky (France).

Panel 1A — Optical tracking.

Panel 1B — Radio tracking and real time telemetry.

Chairman : K. Rawer (West Germany).

Panel 1C — Dynamics of artificial bodies in space.

Study Group — Lunar laser ranging.

Chairman : C. O. Alley (USA).

WORKING GROUP 2. — *Experiments in interplanetary space and in the magnetosphere.*

Co-Chairmen : I. A. Zhulin (USSR) and N. F. Ness (USA).

Panel 2A — Interplanetary medium.

Panel 2B — Solar wind interactions with the Earth.

Panel 2C — Structure of the magnetosphere.

Panel 2D — Magnetic disturbances and polar substorm.

WORKING GROUP 3. — *Space techniques as applied to astrophysical problems.*

Chairman : H. Friedman (USA).

Vice-Chairman : Z. Svestka (Czechoslovakia).

Panel 3A — Galactic and extragalactic astronomical measurements.

Chairman : H. Friedman (USA).

Panel 3B — Solar flares and forecasts.

Chairman : A. B. Severny (USSR).

Panel 3C — Cosmic dust.

Chairman : C. L. Hemenway (USA).

WORKING GROUP 4. — *Experiments in the upper atmosphere.*

Chairman : L. G. Jacchia (USA).

- Panel 4A — Structure of the upper atmosphere (including the Committee for CIRA).
Co-Chairmen : K. S. Champion (USA) and M. Ya. Marov (USSR).
- Panel 4B — Interactions of the neutral and ionized atmosphere (including International Reference Ionosphere).
Co-Chairmen : S. A. Bowhill (USA) and E. A. Lauter (East Germany).
- Panel 4C — Polar ionosphere (including polar cap and auroral zone phenomena).
Co-Chairmen : W. J. Heikkila (USA) and J. Ortner (ESRO).

WORKING GROUP 5. — *Space biology.*

Chairman : Yu. G. Grigoriev (USSR).
Vice-Chairman : W. Vishniac (USA).

WORKING GROUP 6. — *Applications of space techniques to meteorology and earth surveys.*

Chairman : M. Tepper (USA).

Panel 6A — Satellite supported local observations.

Chairman : P. Morel (France).

Panel 6B — Observations by remote sensing.

Chairman : W. Nordberg (USA).

Panel 6C — Meteorological rocket observations and networks.

Chairman : R. Frith (UK).

Panel 6D — Global systems.

Chairman : R. Garcia (Argentina).

WORKING GROUP 7. — *Space related studies of the Moon and Planets.*

Chairman : A. D. Kuzmin (USSR).

Vice-Chairman : C. Sagan (USA).

CLASSIFICATION OF SOLAR PROTON EVENTS

A system for the classification of proton events has been approved by both IUCSTP and COSPAR at their meetings held in Leningrad in May 1970. The system is designed to define the "size" of a proton event;

it is based on the “hourly average maximum proton intensity”, as detected by satellites, and takes into account also the responses recorded by ground-based riometers and neutron monitors.

The classification of an event is indicated by three digits (Table 1) representing respectively :

- (a) the flux of protons ($E > 10$ MeV) at maximum intensity as measured by a satellite within the earth-moon system;
- (b) the increase in absorption, at 30 MHz, as measured in day light by a high-latitude riometer;
- (c) the increase in the counting rate of a high-latitude sea-level neutron monitor.

TABLE 1. System for Classification of Solar Proton Events

Digit	Proton Flux ($E > 10$ MeV) $\text{cm}^{-2} \text{ s}^{-1} \text{ sr}^{-1}$	Riometer Absorption at 30 MHz dB increase	Sea Level Neutron Monitor % increase
— 3	$10^{-3} - 10^{-2}$	—	—
— 2	$10^{-2} - 10^{-1}$	—	—
— 1	$10^{-1} - 10$	—	—
0	$10 - 10^1$	Not measurable	Not measurable
1	$10^1 - 10^2$	< 1.5	< 3
2	$10^2 - 10^3$	1.5 — 4.6	3 — 10
3	$10^3 - 10^4$	4.6 — 15.0	10 — 100
4	$> 10^4$	>15.0	>100

Further information on the system and on its application over the period 1967-1969 has been given by Smart and Shea (*COSPAR Information Bulletin*, No. 55, pp. 60-65, 1970).

PROJET D'OBSERVATION D'UN ORAGE IONOSPHERIQUE

L'annonce suivante nous a été communiquée par M. C. Taïeb, du Groupe de Recherches Ionosphériques (Paris). M. Taïeb, qui travaille en collaboration avec le Centre de Prévisions de Meudon, est responsable de l'organisation du programme d'observations recommandé par l'Assemblée générale de l'URSI en 1969 (*Bull. d'Inf.*, No. 175, p. 20).

Un orage magnétique s'est déclenché le 6 novembre 1970 à 24.00 TU caractérisé par un SSC, après un sursaut solaire d'intensité 2 et une arrivée de protons. Il s'est terminé le 8 novembre à 03.00 TU. L'alerte a été lancée le 6 novembre à 08.00 et la période du programme intensif d'observations s'est étendue jusqu'au 12 novembre 00.00 TU. Une lettre circulaire sera prochainement envoyée aux stations pour donner quelques informations sur la collecte des données.

PROJECT FOR OBSERVATION OF AN IONOSPHERIC STORM

The following announcement has been received from M. C. Taïeb of the Groupe de Recherches Ionosphériques (Paris) who, with the collaboration of the Forecast Centre at Meudon, is responsible for the cooperative programme of observations recommended by the URSI General Assembly in 1969 (*Inf. Bull.*, No. 175, p. 20).

A magnetic storm began at 24.00 UT on 6 November 1970; the SSC was preceded by a solar burst of intensity 2 and the arrival of protons. The storm ended at 03.00 on 8 November. The alert was issued at 08.00 on 6 November and the period of intensive observations extended to 00.00 UT on 12 November. A circular letter giving information on the collection of the data will shortly be sent to stations.

