Bulletin N° 107 January-February 1958

International Scientific Radio Union

U. R. S. I.

CONTENTS

OBITUARY

Professor Vittorio Gori

Professor Vittorio Gori, Director of the Institute of Posts and Telecommunications, and representative of the Italian P.T.T. Administration in the I.T.U., died in Rome on 31 August last, at the age of sixty-one. It was he who first provided radio communications between Rome and Buenos Aires, Rome and Tokyo, Rome and New York, and Rome and Rio de Janeiro.

To achieve this, he had to solve some very arduous problems, both theoretical and practical. At that time, measure had not yet been taken of their difficulties, even in specialized literature.

In particular, he analyzed the problem of large directive antennas, and performed experiments in connection therewith. His work in the practical sphere, together with his original contributions to the theory of telecommunication, won him high official recognition.

At the same time, he threw himself whole heartedly into university teaching. Having worked with Professor Giancarlo Vallauri at the universities of Pisa and Turin, he was called upon to teach « electrical communications » at Bologna. It was at Bologna University, in 1940, that he became professor of electrical engineering.

In 1951, he became director of the Istituto superiore delle Poste e Telecommunicazioni and of the School of Telegraphy and Telephony. In the following years he became president of the Fondazione Ugo Bordoni for progress in telecommunication, and also took charge of the Centro radioelettrico sperimentale Guglielmo Marconi.

Professor Gori who was Official Member of Commission I of U.R.S.I. took an active part in the organization of the General Assembly hield in Venice in 1938.

He was also the founder of the review *Note — Recensioni — Notizie* published by the Istituto superiore delle Poste e Telecommunicazioni.

INTERNATIONAL COUNCIL OF SCIENTIFIC UNIONS (I. C. S. U.)

Origin

Better known under the name of abbreviation I.C.S.U., this organization was founded in 1919 ; at that time it was denominated « International Research Council » and its aims were to coordinate international activities in the various fields of exact and natural sciences, to initiate the formation of international associations and unions judged useful to the progress of science, and to direct international scientific activity in fields where no international body existed.

It has to be noted that at that time the word « international » was construed to mean « inter-allied », which was rather restrictive.

On the other hand the Unions adhering to the Council did not appreciate the words « initiate » and « direct » included in the aims of the Council.

Both reasons of dissatisfaction were abolished in modifying in 1931 the International Research Council into the International Council of Scientific Unions whose aims were to constitute a truly international federation of scientific Unions, in which the Council had to fulfil the duties proper to a federal parliament in regulating such interests of the Unions as are common to all, while fully respecting their individual autonomy, each within its own domain.

In 1946 Unesco (United Nations Organization for Education, Science and Culture) was formed as one of the specialized agencies of the United Nations.

Unesco and I.C.S.U. differ fundamentally. I.C.S.U. is a non-governmental organization ; its adhering members are on the one hand (with few exceptions) national academies or research councils (national members) ; on the other hand, the international scientific unions (scientific members) ; all members with seats in the General Assembly. Unesco is an inter-governmental organization, whose adherents are its Member-States.

It was clear from the beginning of Unesco that this organization and I.C.S.U. had a number of overlapping interests and activities. A formal agreement was therefore drawn up between the two organizations, whereby Unesco recognized the Unions « as providing a natural and appropriate form for the international organization of science » and the Council « as their co-ordinating and representative body ».

Present set-up

The International Council of Scientific Unions has two chief objectives : to co-ordinate and facilitate the activities of the international scientific unions in the field of the exact and natural sciences ; and to act as co-ordinating centre for the national organizations adhering to the Council.

Unions

At the moment thirteen Unions are adhering to I.C.S.U. ; they are the following :

International Astronomical Union,
International Union of Biological Sciences,
International Union of Pure and Applied Chemistry,
International Union of Crystallography,
International Geodesic and Geophysic Union,
International Geographical Union,
International Union of History and Philosophy of Science,
International Union of Theoretical adn Applied Mecanics,
International Union of Pure and Applied Physics,
International Scientific Radio Union,
International Mathematical Union,
International Union of Physiological Sciences,
International Union of Biochemistry.

National Members

There are 42 national members which may fulfil two different but frequently overlapping roles. On the one hand they help to guide the general policy of the Council ; on the other, they may have direct contact with the Unions, through the National Committees.

Administration

The Council meets every three years in General Assembly with seats for national members and for the Unions : each national member having one vote and the Unions two or three whether they are specialized or general unions. A reasonable balance is thus assured between the power of national academies and the international scientific Unions.

Between meetings of the General Assembly, the business of the Council is carried out by the Executive Board and the Bureau.

The Bureau, counting of the President, the Retiring President, two Vice-Presidents, the Treasurer, the Secretary General and two ordinary members, is elected by the General Assembly. The Bureau is responsible to the Executive Board and to the General Assembly for the conduct of the current affairs of the Council ; it meets at least twice yearly.

The Executive Board is composed of the Bureau and of representatives of the Unions. It meets annually.

Activities

The Council exists primarily for the benefit of the Unions ; there are, however, a certain number of tasks which lie on the borderline between two or more Unions. They are two ways in which I.C.S.U. copes with these tasks as they arise in international scientific life : either by the creation of Special Committees, or in the formation of Joint Commissions between Unions.

Special Committees

At present, there are four in number : the Special Committee for the International Geophysical Year (C.S.A.G.I.), the I.C.S.U. Abstracting Board, the Special Committee for Antarctic Research (S.C.A.R.) and the Special Committee for Oceanographic Research (S.C.O.R.).

Amongst organizations set up by the Council, the Federation of Astronomical and Geophysical Permanent Services should also be mentioned.

Joint Commissions

The Joint Commissions in which U.R.S.I. is particularly interested are the Joint Commission on Radio-Meteorology (U.R.S.I.

I.G.G.U. and I.U.P.A.P.), the Joint Commission on Solar and Terrestrial Relationship (I.A.U., I.G.G.U. and U.R.S.I.); it is the senior of the Joint Commissions, and the Joint Commission on the Ionosphere (U.R.S.I., I.A.U., I.G.G.U. and I.U.P.A.P.), one of the most active Joint Commission and one of the most fruitful.

Finances

Besides yearly grants from Unesco, of which nearly the total amount is ditributed to the Unions and organizations under the aegis of the Council, the latter disposes of subscriptions paid by the members.

The subscriptions of the national members vary according to six categories which are at the free choice of the members and according to the number of Unions to which the country adheres. The contribution of the Unions (scientific members) is 2 per cent of their own proper income.

Bureau

For the period 1955-1958 the Bureau of the Council is as follows :

President : Dr L. V. Berkner (U.S.A.).

Vice-Presidents : R. F. P. Lejay (France);
Sir K. S. Krishnan (India).

Treasurer : Eng. E. Herbays (Belgium).

Secretary General : Sir Harold Spencer Jones (United Kingdom).

Members : Professor W. E. Engelhardt (U.S.S.R.);
Professor A. Stoll (Switzerland).

XIIth GENERAL ASSEMBLY

Attendance

The attendance to the XIIth General Assembly amounted to 730 including 158 ladies. 232 participants, including 41 ladies, came from abroad.

Proceedings

Part 1 of Volume XI (Proceedings of Commission I) is out of press. Copies have been forwarded to National Committees which have informed the Secretary General of their requirements (Letter N° 386 of the Secretary General, October 1957, and *Information Bulletin*, N° 106, p. 18).

Supplementary copies are available at the Secretariat General at the price of B. F. 100, or $ 2, or 14/6 shillings per copy (postage included).

Bibliography

« Twelfth General Assembly of International Scientific Radio Union », J. Howard Dellinger, Chairman, General Academy of Sciences, Washington, D.C., U.S.A., Vol. VII., N°6, Nov.-Dec. 1957.

NATIONAL COMMITTEES

New scale of subscription

The following National Committees should be added to the lists published in N° 105 and 106 :

Austria : category 2 (250 $).
Germany : category 5 (2000 $).
Japan : category 5 (2000 $).
Netherlands : category 3 (500 $).
Union of South Africa : category 2 (250 $).
U. S. S. R. : category 6 (4000 $).

Presidents and Secretaries of National Committees

Australia :

Président : Sir John P. V. MADSEN, Radio Research Board, c/o Electrical Engineering Department The University, Sidney N. S. W.

Secretary : Dr D. F. MARTYN, Radio Research Laboratories, Camden, N. S. W.

Austria :

Chairman : Prof. Dr F. STEINHAUSER, Direktor der Zentralanstalt für Meteorologie und Geodynamik, Hohe Warte 38, Wien XIX.

Secretary : Prof. O. BURKARD, Institut für Meteorologie und Geophysik, Universität Graz, Halbärtgasse 1, Graz.

Belgium :

President : Mr. le Prof. DACOS, 196, Rue des Vennes, Liège.

Secretary : Mr. le Prof. A. DORSIMONT, Laboratoire des Télécommunications, Ecole Royale Militaire, Bruxelles 4.

Canada :

President : Dr. J. S. MARSHALL, Physics Department, McGill University, Montreal 2, Qu.

Corresponding-Secretary : Mrs. J. M. Ann MARSHALL, Radio and Electrical Engineering Division National Research Council, Ottawa, Ont.

Czechoslovakia :

President : Mr. le Prof. Dr. Ing. J. STRANSKY, Narodni Komitét pro vedeckou radiotechniku pri narodni rade badatelské, Ecole Polytechnique, Husova, 5, Praha I.

Denmark :

President : Professor J. RYBNER, Professor of Telecommunications Royal Technical University of Denmark, øster Voldgade, 10, opg G, Copenhagen K.

Secretary : Eng. F. HEEGAARD, Statsradiofonien, Radiohuset Rosenørns Allé, 22, Copenhagen V.

Finland :

President : Prof. V. YLÖSTALO, Professor of Radio Technique, Finland Institute of Technology, Helsinki.

Secretary : Dr. P. MATTILA, The State Institute for Technical Research, Albertinkatu, 40-42, Helsinki.

France :

President : Mr. B. DECAUX, Ingénieur en Chef du Laboratoire National de Radioélectricité, 196, Rue de Paris, Bagneux (Seine).

Secretary : Mr. J. VOGE, Ingénieur au Laboratoire National de Radioélectricité, 196, Rue de Paris, Bagneux (Seine).

Germany :

President : Dr. W. DIEMINGER, Direktor, Institut für Ionosphärenforschung in der Max. Planck Gesellschaft, Lindau über Northeim (Hannover).

Secretary : Dr. Ing. H. T. FLEISCHER, Fernmeldetechnisches Zentralamt der Deutschen Bundespost, Rheinstrasse, 110, Darmstadt.

Greece :

M. L. CARAPIPERIS, 89, rue Patission, Athènes.

India :

President : Sir K. S. KRISHNAN, Director, National Physical Laboratory of India, New Delhi, 12.

Secretary : Shri M. H. ZINJANI, Under Secretary, Department of Scientific Research and Technical Education ; Ministry of Education and Scientific Research, New Delhi.

Italia :

President : Mr. le Prof. M. BOELLA, Istituto Elettrotecnico Nazionale « Galileo Ferraris », Corso Massimo d'Azeglio, 42, Turin 308.

Secretary-Treasurer : Dr. Alvaro DONADIO, Consiglio Nazionale delle Ricerche, Piazzale delle Scienze, 7, Rome.

Japan :

President : Dr. Issac KOGA, Electrical Engineering Department Faculty of Engineering, University of Tokyo, Tokyo.

Morocco :

President : Mr. le Dr. J. LIOUVILLE.

Secretary : Mr. A. HAUBERT, Institut Scientifique Chérifien, Rabat, 41, Rue de la République, Rabat (privé).

Netherlands :

President : Prof. Ir. L. D. H. TELLEGEN, Geulberg 1, Nuenen.

Secretary : Ir. P. L. M. VAN BERKEL, Dr. Neher Laboratorium P. T. T., Leidschendam (Z. H.).

New Zealand :

President : Dr. M. A. F. BARNETT.

Secretary : Mr. G. J. BURTT, Secretary, Radio Research Committee Dominion Physical Laboratory, Private Bag, Lower Hutt.

Norway :

President : Dr. Leiv HARANG, Norwegian Defence Research Establishment Division of Telecommunications, Kjeller near Oslo.

Secretary : Eng. F. LIED, Secretary, Norwegian Defence Research Establishment, Kjeller near Oslo.

Poland :

President : Dr. Janusz GROSZKOWSKI, Vice-Président, Polska Akademia Nauk, Warsaw.

Secretary : Mr. l'Ing. K. BOCHENEK, Polska Akademia Nauk, Palaz Kultury i Nauki, Warsaw.

Portugal :

President : Mr. le Prof. H. AMORIM FERREIRA, Serviço Meteorologico Nacional, Largo de Santa Isabel, Lisboa.

Spain :

President : Général du Génie Excmº Sr D. Carlos Marin DE BERNARDO, Chef de Transmission de l'Armée.

Secretary : Mr. J. M. TORROJA, Serrano 123, Madrid.

Sweden :

President : Dr. H. STERKY, Director General, Royal Board of Swedish Telecommunications, Stockholm.

Secretary : Eng. S. GEJER, Director of Department, Royal Board of Swedish Telecommunications, Brunkebergstorg, 2, Stockholm 16.

Switzerland :

President : Dr. W. Gerber, Direction Générale des P. T. T., Speichergasse 6, Berne.

Secretary : Dr. N. SCHAETTI, c/o Paillard, Yverdon.

Union of South Africa :

The Secretary-Treasurer, South African Council for Scientific and Industrial Research, P. O. Box 395, Pretoria, Tvl.

United Kingdom :

President : Mr. J. A. RATCLIFFE, Cavendish Laboratory, Free School Lane, Cambridge.

Secretary : Dr. C. D. MARTIN, Assistant Secretary, The Royal Society, Burlington House, London W. 1.

United States :

President : Mr. H. W. WELLS, Carnegie Institution of Washington Department of Terrestrial Magnetism, 5241, Broad Branch Road, N. W., Washington 15, D. C.

Secretary : Dr. J. P. HAGEN, Naval Research Laboratory, Washington 25, D. C.

Executive Secretary : Mrs. Alice MACINTYRE, U. S. A. National Committee of U.R.S.I., National Research Council, 2101, Constitution Avenue N. W., Washington 25, D. C.

U. S. S. R. :

President : Academician A. I. BERG, Academy of Sciences of Moscow, Moscow K. 9.

Yugoslavia :

Secretary : Mr. le Prof. Ing. Al. DAMIANOVITCH, 6, Stevana Sremca, Beograd.

Austria

APPOINTMENT OF A NATIONAL COMMITTEE

A National Committee has been appointed under the name of « Radiowissenschaftliche Kommission bei der Österreichischen Akademie der Wissenschaften ».

Prof. Dr. F. Steinhauser, Direktor der Zentralanstalt für Meteorologie und Geodynamik, has been elected as President of the Committee.

The list of Official Members appointed by the Committee is given on p. 17.

Belgium

MEMBERSHIP

Members : F. Dacos (*President*),
A. Dorsimont (*Secretary*),
P. Baudoux,
M. Cogneaux,
J. Cnops,
Ed. Divoire,
Ed. Gillon,
E. Lahaye,
Ch. Manneback,
J. Marique (*Vice-President*),
M. Nicolet.

Associated Members : G. Bonnet,
R. Coutrez,
R. Pastiels,
Capitaine en 1er IFM Charles (Assistant Secretary).

Switzerland

NATIONAL COMMITTEE MEMBERSHIP

Honorary Presidents :

Prof. Dr. J. Lugeon, Directeur de la Station Centrale Suisse de Météorologie, Krähbühlstr. 58, Zurich 44;

Prof. Dr. F. Tank, Sternwartstr. 7, Zurich 6.

President : Dr. W. Gerber, Direction générale P. T. T., Speichergasse 6, Berne.

Secretary : Dr. N. Schaetti, c/o Paillard S. A., Yverdon.

Chairman of Commission I : Prof. Dr. H. König, Bureau fédéral des poids et mesures, Wildstr. 3, Berne.

Chairman of Commission II : W. Klein, Ing., Direction générale P. T. T., Speichergasse 6, Berne.

Chairman of Commission III : Prof. Dr. R. MERCIER, 1, Chemin du Grey, Lausanne.

Chairman of Commission IV : Prof. Dr. J. LUGEON, Directeur de la Station Centrale Suisse de Météorologie, Krähbühlstr. 58, Zurich 44.

Chairman of Commission V : Prof. Dr. M. WALDMEIER, Directeur de l'Observatoire Astronomique Fédéral, Schmelzbergstr. 25, Zurich 6.

Chairman of Commission VI : Prof. Dr. E. BALDINGER, Weidengasse 35, Basle.

Chairman of Commission VII : Dr. N. SCHAETTI, c/o Paillard S. A., Yverdon.

Members :

Prof. E. BAUMANN, Institut für technische Physik ETH, Gloriastr. 35, Zurich 7.

Prof. R. DESSOULAVY, 45, Avenue Vulliemin, Lausanne.

Prof. Dr. W. DRUEY, Büelweg 5, Winterthur.

Dr. F. LÜDI, Phys., Oetwil a. d. Limmat.

Dr. A. A. RUSTERHOLZ, Gladbachstr. 114, Zurich 44.

Prof. Dr. R. SÄNGER, Sternwartstr. 7, Zurich 6.

Dr. H. THIEMANN, Chemin du 1er Août, Vesenaz-Genève.

Prof. H. WEBER, Institut für Fernmeldetechnik ETH, Sternwartstr. 7, Zurich 6.

United Kingdom

MEMBERSHIP

1958-1961

Chairman : Mr. J. A. RATCLIFFE

Ex officio :

Director of Radio Research (D.S.I.R.)

Physical Secretary, Royal Society

Foreign Secretary, Royal Society

Dr. R. L. SMITH-ROSE (Vice-President of the Union)

Royal Society (4) :

+Professor H. M. BARLOW

°Sir Charles DARWIN

+Professor A. C. B. LOVELL

°Mr. J. A. RATCLIFFE

Institution of Electrical Engineers (2) :

°Sir Noël ASHBRIDGE

+Dr. R. L. SMITH-ROSE

Physical Society (2) :

°Sir Edward APPLETON

+Professor H. S. W. MASSEY

Meteorological Office (1) :

°Dr. A. C. BEST

Radio-Research Board (1) :

°Dr. W. J. G. BEYNON

Ministry of Supply (1) :

°Dr. D. H. BLACK

British Joint Communications-Electronics Board (1) :

The Chairman (Colonel E. J. C. HARRISON).

Royal Society od Edinburgh (2) :

°Professor E. G. CULLWICK

+Professor R. V. JONES

Post Office, Chief Engineer's Branch (1) :

°Captain C.F. BOOTH.

British Broadcasting Corporation (1) :

+Mr. W. Proctor WILSON

National Physical Laboratory (1) :

°Dr. L. ESSEN

° To retire 31 December 1960.

+ To retire 31 December 1963.

COMMISSIONS

Official Members

AUSTRIAN NATIONAL COMMITTEE

Official Members appointed by the Austrian National Committee

Commission I : Prof. Dr. Josef Fuchs, Wien V, Ramperstorfferstrasse 2.

Commission II : Oberbaurat Dipl. Ing. Anton, Post- und Telegraphen-direktion für Oberösterreich und Salzburg, Linz, Huemerstrasse 4.

Commission III : Prof. Dr. Otto Burkard, Institut für Meteorologie und Geophysik, Universität Graz, Halbärtgasse 1.

Commission IV : Prof. Dr. Josef Fuchs, Wien V, Ramperstorfferstrasse 2.

Commission V : Prof. Dr. Josef Hopmann, Universitäts-Sternwarte Wien XVIII, Türkenschanzstrasse 17.

Commission VI : Prof. Dr. König, Institut für Hochfrequenztechnik, Wien IV, Gusshausstrasse 25.

Commission VII : Prof. Dr. König, Institut für Hochfrequenztechnik, Wien IV, Gusshausstrasse 25.

COMMISSION I

The name of the U. S. R. R. Official Member mentioned in Bulletin N° 105, pp. 39 and 42, should read : M. E. Zhabotinski.

COMMISSION II

The membership of Commission II published in N° 105, p. 42, should be modified as follows :

Secretaries :

Fr. DU CASTEL, Laboratoire National de Radioélectricité, 196, Rue de Paris, Bagneux (Seine), France.

Dr. J. A. SAXTON, D.S.I.R., Radio, Research Station, Ditton Park, Slough, U. K.

COMMISSION V

The Official Member for Morocco (N° 106, p. 24) is, Mr. A. HAUBERT, Institut Scientifique Chérifien, Avenue Biarnay, Rabat.

COMMISSION VI

M. T. STELMAKH mentioned as the U. S. S. R. Official Member in N° 106 p. 28 should be replaced by Prof. V. A. ILYIN.

Commission I

On Radio Measurements and Standards

Joint Calibration of Equipment of the International Broadcasting Organization (O.I.R.) and the European Broadcasting Union (E.B.U.)

Joint calibration of the equipment used for magnetic field-strength measurements by the O.I.R. and the E.B.U. was successfully carried out in Prague between 7 and 10 October, 1957. This work was performed in conformity with the decision adopted at the Helsinki meeting of representatives of the Technical Commissions of the O.I.R. and the E.B.U. regarding joint study of the ionospheric propagation of long and medium waves.

Mr. Geringer, chief of E.B.U. Checking Centre, took part in the measurements on behalf of the E.B.U. For the O.I.R., besides workers of the Technical Centre, Czechoslovak specialists also participated in the measurements.

(Source : *O.I.R. Information.*)

ERRATUM

Information Bulletin N° 106, p. 29. « Power measurement at Centimetre Wavelength » read « Resolution 3 » instead of « Resolution 1 ».

Commission II
On Radio and Troposphere

Radar « Angels » caused by Birds

According to a communication made by Mr. W. G. Harper of the United Kingdom Meteorological Office, the unexplained echoes known as « angels », which are often received by high-power centimetric radars, are probably due to birds. Widespread displays have been reported out to 80 miles and it was thought that birds could not be responsible for displays apparently spread uniformly over wide areas ; it is widely held that radar « angels » are primarily of meteorological origin. Using a 10-cm p. p. i. display radar, of 500 kW peak power and 2 μsec. pulse length, Mr. Harper claims to have found substantial evidence that even the densest of these displays of « angels » may be caused by birds.

(Source : *British Communications and Electronics.*)

Commission III
On Ionospheric Radio

Addendum to the Report of Sub-Commission IIId on Magneto-ionic Nomenclature [1]

(Prepared by Professor L. G. H. Huxley)

Since all three systems of electrical units, gaussian (e.s.u.), electromagnetic (e.m.u.) and rationalised m.k.s. units, continue to be employed by physicists and engineers, it is an advantage to derive and present the formulae of electromagnetism in a general

---

[1] Professor Huxley was invited to preparet this report by Commission III at the Boulder Assembly. — Editor.

form independent of any particular system of units but from which the specific formulae in any chosen system of self-consistent units may be readily obtained.

In order to discuss electromagnetic phenomena in this general manner it is necessary to employ three parameters whose precise values are determined by the system of units that is ultimately adopted. These parameters, denoted by the symbols ε_0, μ_0 and γ, enter electrical theory as follows (rationalised formulation) :

$F = q_1 q_2 / 4\pi\varepsilon_0 \; K_e r^2$ — Coulomb law for point charges

$(\varepsilon = \varepsilon_0 K_e)$

$F = m_1 m_2 / 4\pi\mu_0 K_m r^2$ — Ditto for magnetic poles

$(\mu = \mu_0 K_m)$

$\chi = \gamma\mu_0 K_m \, i = \gamma\mu i =$ Strength of equivalent magnetic shell where K_e and K_m have the value unity in a vacuum.

ε_0, μ_0 and γ are not independent but must satisfy the relationship $\gamma^2\varepsilon_0\mu_0 = 1/c^2$ in any self-consistent system of units, where c is the speed of light in a vacuum, expressed in the relevant units of length and time.

Thus, if so desired, γ may be eliminated in favour of c.

The values of ε_0, μ_0 and γ appropriate to the three systems of units in common use are tabulated below.

TABLE

System	ε_0	μ_0	γ	γ^{μ_0}	c (approx.)
e.s.u. } unrationalised	$1/4\pi$	$1/4\pi$	$4\pi/c$	$1/c$	3×10^{10}
e.m.u. } unrationalised	$1/4\pi c^2$	$1/4\pi$	4π	1	3×10^{10}
m.k.s. rationalised	$10^7/4\pi c^2$	$4\pi \times 10^{-7}$	1	$4\pi \times 10^{-7}$	3×10^8

It may be remarked that the quantities called magnetic induction are physically different in the generalised and m.k.s. units on the one hand and the e.s.u. and e.m.u. on the other and this is a source of confusion. The former is $B = \mu_0 K_m H = \mu H$ and the latter, here denoted by B' is $B' = K_m H$; that is to say $B = \mu_0 B'$.

Similarly the nomenclature « electric displacement » is used in two different senses ; $D = \varepsilon_0 K_e E$ and $D' = K_e E$.

Examples of generalised formulae

Faraday-Neumann law of electromagnetic induction :

$$emf = -\gamma \frac{d}{dt}(\text{magnetic flux}) = -\gamma \frac{d}{dt}\int \vec{B}.\vec{dS}$$

in e.m.u. this becomes :

$$emf = -\frac{d}{dt}\int \vec{B'}.\vec{dS} \text{ emu } (B' \text{ in } \textit{gauss})$$

and in rationalised m.k.s. units :

$$emf = -\frac{d}{dt}\int \vec{B}.\vec{dS} \text{ volts } (B \text{ in } \textit{weber}\, m^{-2})$$

Lorentz Force :

$$\vec{F} = \gamma e(\vec{V} \times \vec{B})$$

whence :

$$\text{emu} ; \vec{F} = e(\vec{V} \times \vec{B'}) \text{ dynes } (V \text{ cm. sec}^{-1})$$

$$\text{mks} ; \vec{F} = e(\vec{V} \times \vec{B}) \text{ newtons } (V \text{ m. sec}^{-1})$$

Maxwell's Field equations :

$$\text{curl } \vec{E} = -\gamma \frac{d\vec{B}}{dt} ; \qquad \text{div } \vec{D} = \rho$$

$$\text{curl } \vec{H} = \gamma\left(\frac{d\vec{D}}{dt} + \vec{J}\right) ; \quad \text{div } \vec{B} = 0$$

Poynting Vector :

$$\vec{P} = (\vec{E} \times \vec{H})/\gamma$$

Gyro-angular frequency :

$$\vec{\Omega} = -\gamma e \vec{B}/m$$

Inductance. — Formulae for mutual and self inductance contain the factor $\gamma^2\mu$.

Magneto-ionic formula for the complex refractive index. — The formula for $(\mu - ic\varkappa/\omega)^2$ given in the report remains unchanged but the quantities ω in the list of symbols now become :

$\omega_0^2 = Ne^2/\varepsilon_0 m$; $\omega_H = -\gamma\mu_0 eH/m$; $\omega_L = -\gamma\mu_0 eH_L/m$;
$\omega_T = -\gamma\mu_0 eH_T/m$.

The appropriate values of ε_0, μ_0 and γ for the three systems of units in most general use are listed in the table above.

Commission VII

On Radioelectronics

Conference on Semi-Conductors

(International Union on Pure and Applied Physics)

ROCHESTER, AUGUST 18-22, 1958

The aim of the conference will be to treat some of the fundamental concepts of electronic processes in semiconductors, including both the theory underlying these concepts and also those experiments which shed light on them. Both surface and volume effects will be considered. The term « semi-conductors » will be interpreted broadly to include not only semiconducting elements and compounds but also other crystals where similar concepts of energy bands, impurity states, and carrier transport are of prime importance.

Some of the topics which should be covered include : energy bands ; energy levels and capture cross-sections of impurities and imperfections ; interactions of photons, phonons and electrons with the crystal lattice, or with imperfections ; charge carrier transport, recombination, and trapping ; galvanomagnetic phenomena; magnetic resonance ; the stoichiometry, purity, and perfection of crystals ; and other topics which lead to a better understanding of electronic processes in semiconductors and related crystals.

The Conference is to be patterned after the 1954 International Conference on Semiconductors at Amsterdam sponsored by I.U.P.A.P.

Prompt publication is planned. The Proceedings will appear as an issue of an appropriate journal.

N. B. — The 1958 Conference on Semiconductors will be held the week prior to the Conference on Electron Properties of Materials at Low Temperatures at Geneva, New York. It is expected that a number of foreign scientists will attend both conferences.

Conference Chairman : John BARDEEN.

Conference Secretary : Malcolm H. HEBB, General Electric Research Laboratory, P. O. Box 1088, Schenectady (N. Y.), U. S. A.

IONOSPHERIC STATIONS

Morocco

The ionospheric sounding station in Casablanca has been transferred to Rabat. The soundings were interrupted from January 20th to February 3rd, 1958.

The coordinates of the new location are :

Geographic coordinates { 33°55′42″ N / 6°50′13″ W

Geomagnetic coordinates { 38.6° N / 69.9°

They are somewhat different from the coordinates of the « Laboratoire Ionosphère » in Rabat, the station being located about 10 km from the laboratory.

Yugoslavia

First Yugoslavian ionospheric Observatory

A Yugoslavian newspaper mentioned recently the opening, on February 22, 1958, of the first yugoslavian ionospheric station, the only one existing at present in the Balkans.

The station is provided with a panoramic sounder, with which continuous systematic observations will be made at each hour in diurnal and nocturnal conditions. This sounder has been devised and built entirely in Yugoslavia. The information obtained will be compared with that of the Geomagnetic and Astronomical Observatory in Belgrade and of the Meteorological Service.

Dr. P. Vujevic, Chairman of the I.G.Y. National Yugoslavian Committee, Prof. A. Damianovitch, Secretary of the U.R.S.I. National Yugoslavian Committee and Eng. A. Dolinar, Associate Director of the Institute Nikola Tesla, which were the promoters of this realization, were present at the inaugural ceremony.

Publications

Bulletin d'Informations Ionosphériques et Géophysiques, published by C.N.E.T., Laboratoire National de Radioélectricité, Bagneux, France, Vol. 1, N° 102, 1958. Stations : Casablanca, Dakar, Arta-Djibouti, Poitiers, Tananarive (Jan. and Feb. 1956).

C. C. I. R.

Interim meetings of Study Groups

The following C.C.I.R. Study Groups will be held on the summer of 1958 in Switzerland :

I : (Transmitters). — Chairman : Col. J. LOCHARD (France) (August, 6-22).

II : (Receivers). — Chairman : Mr. P. DAVID (France) (August, 7-20).

III : (Fixed Service Systems). — Chairman : Dr. H. C. A. VAN DUUREN (Netherlands) (July 29-August 14).

V : (Tropospheric Propagation). — Chairman : Dr. R. L. SMITH-ROSE (United Kingdom) (July 28-August 6).

VI : (Ionospheric Propagation). — Chairman : Dr. D. K. BAILEY (United States) (July 23-August 7).

VII : (Standard Frequencies and Time Signals). — Chairman : Mr. B. DECAUX (France) (August, 22-29).

IX : (Radio Relay Systems). — Chairman : Mr. H. STANESBY (United Kingdom) (August, 18-29).

I. G. Y.

Activities of World Warning Agency

Summary of A.G.I. Warn Decisions and Geomagnetic Disturbances for the Period June 1957-January 1, 1958

During this first six months of the I.G.Y. eighteen geomagnetic disturbances, thirteen beginning suddenly, were recorded :

Six storms were outstanding (A-index for the most severely disturbed 24-hour period greater than 80 ; five of the six greater than 100 and one of these five greater than 200) ;

Five storms were moderate (A-index for the severest portion between 35 and 55) ;

Seven storms were minor (severe portion A-index less than 25 or length of disturbance less than 24 hours).

In this same interval sixteen periods of Alert totalling 72 days were declared. Fifteen of the eighteen geomagnetic disturbances occurred during nine of the Alerts. During the other seven Alert periods no geomagnetic activity of storm intensity occurred.

Seven Special World Intervals totalling 16 days were declared during the six month period. Five of the seven Intervals were begun prior to the start of disturbances while two were complete failures.

The lists of geomagnetic disturbances, periods of Alert and Special World Intervals are given below :

Geomagnetic Disturbances

	Started		U.T.	Ended		U.T.	A	B
1	June	30	04XX	July	01	23XX	104	115
2	July	02	0857		03	15XX	36	44
3		05	0041		05	23XX	43	43
4		22	0418		23	06XX	19	23

	Started		U.T.	Ended		U.T.	A	B
5	August	03	1558	August	04	08XX	14	—
6		06	04XX		07	01XX	23	24
7		12	18XX		13	13XX	26	—
8		29	1910		30	12XX	28	—
9		31	1815	September	01	15XX	30	—
10	September	02	0315		04	06XX	95	106
11		04	1300		07	05XX	117	201
12		13	0048		15	06XX	143	143
13		21	1005		25	14XX	109	135
14		29	0020	October	01	05XX	75	81
15	October	14	00XX		15	02XX	36	36
16	November	06	1821	November	07	12XX	16	—
17		26	1455		27	12XX	39	51
18	December	31	02XX	January	01	11XX	30	43

A = A-index for high Greenwich day (0000-2400 U.T.) during disturbance.
B = A-index for most severe 24-hour period of disturbance.

Periods of Alert

	Started 1600 U.T.		Ended 1600 U.T.		Duration in Days	Geomagnetic Storm Began	
1	June	28	July	06	8	June	30
						July	02
							05
2	July	16		20	4	No storm	
3		21		24	3	July	22
4		25		27	2	No storm	
5	August	02	August	07	5	August	03
							06
6		23		25	2	No storm	
7		28	September	06	9	August	29
							31
						September	02
							04
8	September	09		15	6		13
9		18		23	5		21
10		27	October	02	5		29
11	October	14	October	20	6	October	14

	Started 1600 U.T.	Ended 1600 U.T.	Duration in Days	Geomagnetic Storm Began
12	21	23	2	No storm
13	November 12	November 15	3	No storm
14	24	27	3	November 26
15	December 15	December 21	6	No storm
16	26	29	3	No storm

The August 12, November 06 and December 31 storms were not covered by periods of Alert.

Special World Intervals

	Started 0001 U.T.	Ended 2359 U.T.	Duration in Days	Geomagnetic Storm Began
1	June 30	July 03	4	June 30, 04XX U.T. (115) July 02, 0857 U.T. (44)
2	August 24	August 24	1	No storm
3	29	30	2	August 29, 1910 U.T. (28) (1)
4	September 02	September 04	3	September 02, 0315 U.T. (106)
5	12	13	2	13, 0048 U.T. (143
6	October 22	October 23	2	No storm
7	November 26	November 27	2	November 26, 1455 U.T. (51)

The A-index for the most severe 24-hour period of the disturbance is given in parentheses after the date of the storm.

(1) Duration less than 24 hours.

I.G.Y. News

Rockets and Satellites: Radio tracking system

(Extracted from the *U.S. National Academy of Sciences, I.G.Y. Bulletin* of August 1957)

This report, one of a series on the U.S. Participating Committee-I.G.Y. Earth Satellite Program, deals with radio tracking of the satellites. The Academy's I.G.Y. Committee assigned responsibility for the scientific radio tracking program to the Naval Research Laboratory, developer of the Minitrack system.

Once an earth satellite has been launched, the next major task will be to find it. The small satellite will not be observable by optical means except during periods just before sunrise or just after sunset, when the satellite is illuminated by the sun against a dark background sky. Optical observation is further restricted to clear weather.

A radio transmitter carried in the satellite is expected to make the satellite observable by day or night, in poor or clear weather. Moreover, a radio receiving antenna will have a larger beam-width, or field of view, than an optical system depending on detection of sunlight reflected from the satellite. Therefore, the satellite will be found more easily by radio techniques.

The prime purpose of radio tracking will be to prove that the satellite is in fact orbiting and to obtain orbital data for the computation of preliminary ephemerides. Only by means of such ephemerides will the precision cameras to be used in the optical system be able to track the satellite. Moreover, radio observations of the satellite, although less precise than those by optical means, will have significant scientific value. In addition to providing information on the precise relative distances between the tracking stations, radio observations will be more closely spaced and more frequent than the optical observations. This characteristic of the radio data will be especially valuable if the satellite is shortli ved ;

it is also expected to be important for disentangling perturbations due to gravitational anomalies.

Minitrack system

The particular system which N.R.L. has developed is accurate enough to measure change of position as well as position. This means the satellite can be « tracked » in addition to being found by its radio signal. And, since the transistorized satellite-borne transmitter is necessarily of minimum size and weight, the overall system has been named Minitrack. The Minitrack transmitter will normally be operated at power levels in the range of 10-80 Milliwatts, depending on the particular on-board experiments being carried. The mercury cell batteries are expected to furnish power about three weeks.

The transmitter uses transistors with crystal control for frequency stability.

The satellite signal is transmitted at a frequency of 108.00 megacycles. While ionospheric effects are quite large for frequencies to about 30 megacycles, these effects, although greatly reduced, are still significant at 108 megacycles ; indeed, they constitute the basic limitation on the accuracy of the Minitrack system. On the other hand, these effects are not entirely detrimental. The displacement which the ionosphere imposes upon the radio image of the satellite gives a crude measure of the number of ions between the satellite and the receiving station. Ionization in the atmosphere will also affect the Doppler shift of radio signal frequency caused by motion of the satellite transmitter relative to the ground receiver. This presents another possibility for obtaining approximate data on the ionosphere.

Minictrack determines the angular position of the satellite by employing a radio phase comparison technique. Unless the satellite happens to be located in a bisector plane between a pair of receiving antennas, the radio signal from the satellite will have to travel a slightly different distance to each of these antennas. The relative phases of the received signals are dependent upon the difference in these distances and therefore upon the angular position of the satellite with respect to the plane bisecting the pair of antennas.

Minitrack stations

The field of view, or antenna beamwidth, of the Minitrack array of receiving antennas will be 100° on a north-south direction and 10° in an east-west direction. This fan-shaped intercept pattern was especially designed for the Minitrack stations which string from north to south, approximately along a 75th meridian « picket fence », at the following locations : Blossom Point, Maryland ; Savannah, Georgia ; Havana, Cuba ; Mt. Cotopaxi, near Quito, Ecuador ; Lima, Peru ; Antofagasta, Chile ; Santiago, Chile.

Coolidge Field, Antigua Island, was chosen as the site of an eighth station, so that observational data would be available soon after launching. The ninth station is to be located at San Diego, California, for a favorable observation of the satellite on its first orbit. A tenth station, to be located at Woomera, Australia, will extend observations longitudinally. If all the equipment is operating properly, there is better than a 95 % chance that the satellite will be observed by at least one of the radio tracking stations during each orbit.

Other radio tracking systems

Two less elaborate radio tracking systems have been developed for construction and operation by radio amateurs or by professional or student groups. One of these, also developed by N.R.L., is essentially a simplification of the prime Minitrack system and has been designated Minitrack Mark II. The second system, called Microlock, has been developed by the Jet Propulsion Laboratory of the California Institute of Technology. These two systems, and the opportunities for their use by interested groups in the U.S. and other countries, will be discussed in future issues of the « Bulletin ».

Broadcast of I.G.Y. Warning Messages in the United Kingdom

(Information supplied by the Royal Society)

In order to assist the I.G.Y. programme, the British Broadcasting Corporation started, on 15 July 1957, to broadcast warnings of solar activity daily at 23,03 hrs. in the Home Service, after the News and before the Weather Forecast. These broadcasts will continue until the end of the I.G.Y.

The Home Service broadcast is carried on the following frequencies :

Medium wave	V.H.F.	
330 m (908 kc/s)	93.5 Mc/s	92.1 Mc/s
276 m (1088 kc/s)	92.9 Mc/s	92.5 Mc/s
371 m (809 kc/s)	92.7 Mc/s	93.1 Mc/s
341 m (881 kc/s)	94.1 Mc/s	94.0 Mc/s
285 m (1052 kc/s)	93.7 Mc/s	94.5 Mc/s
206 m (1457 kc/s)	94.3 Mc/s	

The text of the announcement is :

« Now here is a special announcement, issued by the Royal Society for observers who are taking part in the programme of the International Geophysical Year. It is that :

+ a preparatory warning has been received in this country.
+ the preparatory warning is cancelled.
+ a Special World Interval begins at midnight tonight.
+ the Special World Interval continues.
+ the Special World Interval finishes at midnight tonight.

That was a special announcement for observers taking part in the programme of the International Geophysical Year. »

(*Note* : Only one of the statements marked + is used on each occasion.)

Weather at the South Pole

(Extracted from the *U.S. National Academy of Sciences' I.G.Y. Bulletin* of August 1957.)

During the past Antarctic summer, the I.G.Y. Amundsen-Scott South Pole Station observed temperatures ranging generally between 0° and —20° F. By the end of February, the temperature had fallen rapidly to —67°, by the end of March to —87° and, on May 11, to a new world record of —100.4° F.

The record low came after two days of steadily falling temperatures. Highest reading during May was —30.1° F on the 15th, while the average temperature for the month was —68.2° F. (A more recent communication reports that Ronald C. Taylor, using climatological data and empirical relationships, has made

a minimum temperature forecast for the Pole of —112° F, plus or minus 3°).

A few hundred feet above the surface, the temperature increases as much as 50° F, then decreases with height to the tropopause three miles above the polar plateau where the temperature is still slightly higher than at the surface.

The temperature inside the tunnels surrounding and interconnecting the buildings at the South Pole Station lags behind the outside temperature, but at the time the record low was reached this too was already close to —70° F. Moist air from the buildings caused fog in the tunnels, reducing visibility to a matter of yards. Outside, the air was clear. The temperature of the snow on May 11 was —101.5° F. Snow in fine crystal form has been surprisingly frequent but accumulates slowly.

In addition to record low temperatures, the weather during May was characterized also by record high winds. This unique feature resulted in a very high chill factor. The average wind speed during May was 15 knots with peak gusts of 47 knots on the 25th. Upper winds over the South Pole have been variable and quite strong — as much as 130 miles per hour.

(*Note* : A temperature of —102.1° F on 17 September has since been reported from the Amundsen-Scott Station.)

Present status of I.G.Y. Publications

The C.S.A.G.I. Secretariat state, in amplification of Items 47 and 52, that the complete Volume IV of the *Annals of the International Geophysical Year* has now been published. One copy has been sent to each Participating Committee.

Volume IV is subdivided into the following seven Parts :

I. Nuclear Radiation-Techniques for Radioactivity Measurements.

II. Aurora and Airglow (Chapters 1 to 5).

III. Longitudes and Latitudes.

IV. Geomagnetism : Part I.

V. Geomagnetism : Part II.

Meetings of the C.S.A.G.I. Bureau

(The Secretary General contributes)

The C.S.A.G.I. Bureau held meetings in Toronto on 10-11 and 13-14 September and in Washington on 6 September and 1 October 1957.

The 1958 budget estimates were accepted.

The problem of publications was discussed by the Bureau and later (11 September) with a representative of the Pergamon Press, and with the Advisory Committee on Publications (13 and 14 September).

The time and venue of the next meeting of the C.S.A.G.I. Bureau was discussed. (This will be held in Uccle in February 1958). The agenda for this meeting was prepared and it was decided to hold a joint meeting with the A.C.P. in Uccle in February. The A.C.P. were asked to investigate certain outstanding problems connected with publications.

An Advisory Committee on Rockets and Satellites was elected.

Rockets and Satellites Conference

Washington 30 Sept.-5 Oct. 1957

The need for this conference was agreed by the C.S.A.G.I. Bureau at their meeting in June and the offer of the U. S. A. I.G.Y. Committee to hold it in Washington was subsequently accepted. Delegates from abroad numbered 25 and represented participating countries of Australia, Canada, Chile, Cuba, Ecuador, France, India, Iran, Japan, Peru, the United Kingdom and U. S. S. R. C.S.A.G.I. was represented by the President, General Secretary and the Reporter for Rockets and Satellites, who presided over the meeting. The Coordinator also attended.

The conference took the customary form of an opening Plenary Session when participants in this programme of the I.G.Y. described their plans and progress. Working Groups were formed for Rocketry, Satellite launching, tracking and computation; Satellite internal instrumentation; and the Manual. A final plenary session, on 5 October, approved the various resolutions proposed by the Working Groups. During this session the leader of the U. S. S. R. delegation made a statement about the successful launching of a satellite on the previous evening.

In the Rocketry Section, resolutions covered the arrangements for interchanging data on rocket firings ; the interchange of personnel and instruments in order to standardise measurements ; a special world wide rocketry effort in June 1958 ; and, jointly with the Satellite Section, the need for a C.S.A.G.I. Advisory Committee and the desirability of giving attention now to what should be done after the I.G.Y.

In the Satellite Section, resolutions were directed to the following topics, among others : — the facilitation of tracking by any participating country interested to do so ; the nature of information disseminated for each successful launching, the data required at the computing centres and the procedures for exchanging orbital information ; the possibility of ionospheric stations joining the telemetering network ; the question of the desirability of making gravity surveys of sites from which precision optical tracking is to be undertaken, and the interchange of technical information on instrumentation particularly that directed to promoting the participation of radio amateurs around the world.

In his statement at the final plenary session, the U. S. S. R. delegate recalled his comment at the opening session that they were on the eve of a satellite launching but added that he had not expected it until after his return to Moscow. He remarked that it was Soviet policy to reserve comment on such developments until success was assured and now gave details of size, 58 cm diameter ; weight 185 lbs including 70 lbs of batteries ; and distance 560 miles. The battery power would last about three weeks — at least as long as the possible minimum life of the satellite.

During the conference delegates were given the opportunity to visit the Washington Tracking Computation Centre and the Blossom Point Minitrack facility of the Naval Research Laboratory. There were various social gatherings and it was at the one in the Soviet Embassy that the C.S.A.G.I. Reporter gave the news from the Moscow broadcast of the successful launching.

Report from U. S. S. R. Antarctic Expedition for September 1957

(Supplied by U. S. S. R. I.G.Y. Committee, Abstracts)

Magnetic activity showed a sharp increase and was essentially higher than in the same period last year.

Ionosphere was very disturbed particularly 1-5, 12-13, 21-23 and 29-30 September. Extremely unstable conditions were recorded in the last few days of September when all the ionosphere was subject to frequent and rapid changes. These ionospheric peculiarities made a very perceptible impact on radio wave propagation ; and radio signals from Moscow travelling through North and South poles were received in Mirny.

Frequent magnetic disturbances (for more than 7 days) caused repeated total fadings of radio communications with intercontinental stations and with Moscow. Radar equipment could not be relied upon in airflights and for ground services.

Constant contact was maintained with Antarctic stations of U. S. A., Australia, France, Great Britain, Japan and Norway. Mirny was in constant radiotelephone contact with Little America for the exchange of scientific information.

I.G.Y. Bibliography

(Item provided by C.S.A.G.I. General Secretary)

According to a suggestion of the General Editor of C.S.A.G.I. and the recommendation of the Advisory Committee on Publications the General Secretary of C.S.A.G.I. will publish a quarterly I.G.Y. Bibliography. Participating Committees are therefore requested to send their completed «Geophysical Year Bibliography » cards, distributed by the General Editor in July 1956, to the C.S.A.G.I. General Secretary.

Recent publication of scientific papers

The U.K. I.G.Y. Committee has drawn attention to the following papers : In *Nature* Vol. 180 (1957) :

Title of Paper	Authors	Pages
Radio Observations of the Russian Earth Satellite	Staff of the Mullard Radio Astronomy Observatory, Cambridge.	879-883
Observations on the Orbit of the First Russian Earth Satellite	Staff of the Royal Aircraft Establishment, Farnborough	937-941

Title of Paper	Authors	Pages
Radar Observations of the First Russian Earth Satellite and Carrier Rocket	Staff of the Jodrell Bank Experimental Station, University of Manchester.	941-942
Further Radio Observations of the First Satellite	University of Illinois Observatory, Urbana, Ill.	943
Further Radio Observations of the First Satellite	Norman Lea, Research Div. Marconi's Wireless Telegraph Co. Ltd, Chelmsford.	943
Further Radio Observations of the First Satellite	Ministry of Supply.	944
Rocket of the First Earth Satellite	Not stated.	944
Radio Pictures of the Sun	Radiophysics Laboratory, Sydney, Australia	944-946
Recent Solar Activity	Dr. M. A. ELLISON, Royal Observatory, Edinburgh.	1173
In *British Telecommunications and Electronics*, Vol. 4, 1957.		
British Radio Observations of the Satellite	A. F. WILKINS, Radio Research Station, Slough.	771-772

Meeting of the Advisory Committee on Publications

1. The Committee met on 28 and 29 November at the Royal Society, London, there being present : Dr. D. C. Martin, Chairman, Professor S. Chapman, Dr. W. W. Atwood, Father S. J. Cardus, Professor G. Laclavère, Mme V. A. Troitskaya representing Professor V. V. Beloussov and Mr. F. W. G. Baker representing Dr. M. Nicolet. By invitation, there were also present Sir Harold Spencer Jones, Dr. W. J. G. Beynon, Sir A. Day and Mr. C. M. Hutt of Pergamon Press.

2. There was a full discussion of the present state of the *I.G.Y. Annals* and the future programme, including the arrangements that would be necessary for editing and managing the publication after C.S.A.G.I. ceases to exist.

3. Among a number of recommendations made, were :

(*a*) All disciplines in the I.G.Y. programme should be represented in the *Annals* by some record of the work accomplished e. g.

processed data or summaries of activity. Post I.G.Y. Symposia should be included.

(*b*) A summary should be published for each day of the I.G.Y. of the degree of activity manifested in geomagnetism, aurora, ionosphere, solar activity, and cosmic rays. C.S.A.G.I. Reporter for World Days and Coordinator should cooperate with Reporters in preparing a draft lay-out to be presented at the next A.C.P. meeting.

(*c*) A re-arrangement of Volumes I and II so that Volume I would contain only the historical accounts of the First and Second Polar Years and the narrative account of the I.G.Y. organisation. Volume II would contain accounts of C.S.A.G.I. and Regional Conferences held before August 1957, the programmes of Participating Committees and the lists of stations. The lists would be on the basis of information received by 31-XII-1957.

(*d*) The C.S.A.G.I. Guide to I.G.Y. World Data Centress hould be reproduced in Volume VII, including information received up to 31-XII-1957.

(*e*) The notification in I.G.Y. News of important papers of operational significance, of which Coordinator should be informed by I.G.Y. Participating Committees.

(*f*) The preparation of an account of the I.G.Y. Antarctic activities for inclusion in *I.G.Y. Annals*.

4. The next meeting of the Advisory Committee on Publications is to be with C.S.A.G.I. Bureau next February. The Chairman of the Committee has said that comments by Reporters and I.G.Y. Participating Committees would be welcome in assisting the A.C.P. to formulate a long term plan for which the C.S.A.G.I. Bureau has asked. Comments should be sent to the Chairman.

INTERNATIONAL CONFERENCE ON SCIENTIFIC INFORMATION

Letter from the Secretary General I.C.S.U. to the Secretaries of all Member Unions and Special Committees of I.C.S.U.

On behalf of the sponsors of the International Conference on Scientific Information, Dr. Wallace W. Atwood, Chairman of the Conference Committee, has invited the International Council of Scientific Unions and each of its constituent unions to officially designate observers to attend the Conference which will be held in Washington, D. C., U. S. A., November 16-21 of this year.

The observers designated may be persons who have been invited to attend the conference as participants (either as members of discussion panels or as authors of papers) or other persons whom it may be considered advisable to designate, because of their special interest in the subject matter of the Conference.

The Conference which is being sponsored by the National Science Foundation, the American Documentation Institute, and the National Academy of Sciences — National Research Council, will be concerned with problems relating to the availability of scientific information, particularly the problems of organizing information for storage and retrieval.

The plans of the Conference as approved by the Conference Committee call for a series of plenary sessions in which authors of selected papers and members of discussion panels will discuss area by area the thoughts expressed in the previously distributed conference papers. Comments of participants (authors and discussion panelists) will not be limited to the content of the conference papers.

In addition to participants, the Conference will be open to registered observers who will have the benefit of the plenary-session discussions in each of the areas of the program agenda and will

have the privilege of submitting written questions to the panels in advance of the Conference. Both participants and observers will receive the papers in advance and papers will not be read at the Conference.

In the near future the Conference Committee will issue a status report containing up-to-date information of conference plans. In March, following the review of conference papers, which must be submitted by February 3, more detailed information will be supplied, together with observer registration forms, which may be filled out and returned.

A registration fee of $ 10.00 has been established for each observer, to meet a portion of the cost of providing him with preprinted papers. While the Committee whishes it were possible to help observers defray their travel expenses, the limited amount of conference funds prohibits this and makes it imperative that such funds as are available be applied toward securing the attendance at the Conference of participants who would not be able to attend without some financial assistance.

4 February 1958.

(*Sgd*) H. Spencer Jones,
Secretary General.

INTERNATIONAL SYMPOSIUM ON PHYSICAL PROBLEMS OF COLOUR TELEVISION

(Paris, July 2-6, 1957)

Proceedings issued in « *Acta Electronica* », Paris, Vol. 2, Nos 1-2, 1957

CONTENTS

P. S. Carnt and G. B. Townsend : « Subjective Visual Effects of A.N.T.S.C. Colour Television Receiver Tolerances ».

K. Hacking : « The Choice of Chrominance Axes for Colour Television ».

T. Jacobs and R. N. Jackson : « An Investigation into the Subjective Effects of some Differences between the Red, Green and Blue Transfer Characteristics of a Colour Television System ».

F. W. de Vrijer : « The Choice of Chrominance Signals in the N.T.S.C. System with a view to the Differential Sensitivity of the Human Eye to Colour ».

Section II. — Image taking and Restitution

Conférence de M. le Professeur Dr. F. Schröter : « Etude comparative des propriétés des tubes électroniques utilisés comme analyseurs d'images en télévision en couleurs ».

L. Heijne : « The Lead Oxide Vidicon ».

Conférence de M. le Dr. Ch. J. Hirsch : « Comparative Study of Electronic Tubes Used for the Reproduction of Color Television Pictures ».

Conférence de MM. les Drs H. A. Klasens et A. Bril : « Phosphors for Colour Television ».

J. C. Francken and R. R. Bathelt : « Measurement and Evaluation of Colour Purity in Colour Tubes ».

Mlle I. Bornemann : « Design Problems of Colour Television Kinescopes ».

P. Toulon : « Le procédé « Dispersion » — Quelques suggestions pour recevoir en couleurs avec un tube « noir et blanc » les transmissions compatibles ».

E. Allard : « Restitution des images colorées de télévision à l'aide de réseaux lenticulaires ».

R. G. Clapp : « The Colorimetry of Sequential Displays ».

E. F. de Haan and H. Zimmer : « A Postfocusing Colour Tube ».

D. V. Ridgeway : « An Experimental Colour Television Projection System ».

J. Pouleau : « Objectif de projection à miroir de grande ouverture numérique pouvant être utilisé en télévision ».

H. E. Holman, G. C. Newton and S. F. Quinn : « The E.M.I. Flying-spot Film Scanner for Colour Television »

A. K. Koustarev : « Courbes de réponse spectrale des dispositifs de prise de vues en télévision en couleurs ».

C. H. Evans and R. B. Smith : « Color Kinescope Recording on Embossed Fils ».

Section III. — Measurements and Results reached in the Restitution of a Coloured Image

P. Neidhardt : « The Definition of Picture Quality in Black-and-White and Colour Television ».

M. L. D'Atri and U. Pellegrini : « Considérations sur la compatibilité et sur la définition d'une image en couleurs comparée avec une image en noir et blanc ».

P. S. Carnt and G. B. Townsend : « Random and Impulsive Noise in Colour Television ».

L. C. Jesty : « The Use of Spot-Wobble (SW), Synchronous Spot-Wobble (SSW) and Sampled Synchronous Spot-Wobble (SSSW) in Television ».

L. C. Jesty : « The Relation between Picture Size, Viewing Distance and Picture Quality with Special Reference to Colour Television and to Spot Wobble Techniques ».

A. Maréchal, P. Croce and K. Dietzel : « Amélioration du contraste des détails des images photographiques par filtrage des fréquences spatiales »

P. Lacomme : « Principe d'un appareil pour la mesure du facteur de transmission des fréquences spatiales des objectifs photographiques ».

H. H. Hopkins : « The Influence of Aberrations in the Image Quality of Optical Systems ».

D. Kelsall : « Interferometric Measurement of Frequency Response, with Automatic Recording ».

K. G. Birch : « A Lens-Testing Apparatus ».

A. M. Goodbody : « Calculation of the Influence of Spherical Aberration on the Frequency Response of a Lens System ».

J. A. MacDonald : « Apodization and Frequency Response in Incoherent Light ».

J. Ch. Vienot : « Etude interférométrique du spectre de Fourier de l'image photographique ».

P. Billard : « Les seuils différentiels de luminance en télévision — Application à la recherche des caractéristiques de luminance optimum d'une chaîne de télévision ».

A. Lohmann : « Verbesserung des optischen Uebertragungsfaktors ».

W. Lukosz : « Zur Uebertragungstheorie des inkohärenten optischen Abbildung vom Standpunkt der geometrischen Optik ».

S. V. Novakovsky : « Calcul de la luminance pour un récepteur de télévision en couleurs ».

R. Taguti and M. Sato : « The Exponential Function for the Uniform Chromaticity Scale ».

Section IV. — Coding systems used for the transmission of Colour Television Signals

Conférence de M. J. Haantjes : « Physical Aspects of Coding Systems Used in colour Television ».

J. Haantjes and K. Teer : « Les problèmes de transmission dans la télévision en couleurs ».

Conférence de M. le Dr. R. E. GRAHAM : « Communication Theory Applied to Television Coding ».

A. L. RORIVE : « Qualités intrinsèques et subjectives des images et théorie de l'information ».

G. VALENSI : « Codage optimum pour la télévision industrielle en couleurs ».

J. PERILHOU : « Recherche de l'économie dans un système de télévision industrielle en couleurs ».

Y. L. DELBORD : « Les dispositifs réducteurs de bande passante et leur application à la télévision en couleurs ».

R. GENÈVE : « Présentation d'images obtenues avec les systèmes N.T.S.C. et double message ».

K. H. POWERS, H. STARAS and G. L. FREDENDALL : « Some Relations between Television Pictures Redundancy and Bandwidth Requirements ».

B. D. LOUGHLIN : « Color Signal Distortions in Envelope Type of Second Detectors ».

D. RICHMAN : « An N.T.S.C. Color Receiver Decoder ».

H. DE FRANCE : « Le système de télévision en couleurs Séquential-Simultané ».

K. BERNATH and H. BRAND : « The Influence of Multipath Propagation on the Spectrum of a Received Television Signal »

CLOSING SESSION

Prof G. A. BOUTRY : « Colour Television Problems of To-Day : An Attempted Survey ».

Allocution de M. le Prof. P. FLEURY, au nom de l'Union Internationale de Physique Pure et Appliquée.

Discours de clôture prononcé par M. H. LONGCHAMBON, Sénateur, Président du Conseil Supérieur de la Recherche Scientifique et du Progrès Technique.

BIBLIOGRAPHY

Cause and correction of some malfunctions of C-2 and C-3 ionosondes, by J. J. PITTS and S. C. GLADDEN, N.B.S. Report 5517.

Letter symbols and their application in the scaling of ionospheric vertical soundings, by S. C. GLADDEN, N.B.S. Report 5523.

Instructions for ionospheric vertical sounding station operation by Ionospheric Soundings Review and Research Group, N.B.S. Report 5516.

Survey of Scientific Institutions of Egypt, issued by the Middle East Science Cooperation Office, Cairo.

Foreword: This Survey of Scientific Institutions of Egypt is intended to help the many scientists and research workers throughout the world who are interested in the development of science in that country. It is hoped that as a result of it scientists in other countries may find it easier to establish personal contacts with their colleagues in Egypt. It is hoped also that similar contacts will be facilitated between institutions. Thus this Survey comprises a part of our program of promoting international scientific cooperation.

The institutions listed are concerned with teaching and research not only in the fields of pure science but also in engineering, agricultural or medical sciences. With the exception of various scientific societies, all these institutions are of governmental nature.

The information has been derived from a variety of official publications. It must be realised, that nowhere have these data been previously assembled in the present form. The Survey may therefore contain certain inaccuracies of detail as well as certain omissions.

It should not be forgotten that profound changes have been taking place in Egypt in the last few years. For this reason a number of institutions newly created or reorganised may not yet have reached their final structure and may still be in a process of evolution. It is impossible to embrace in static form a subject which is essentially dynamic. Our readers are requested to help us by pointing out errors or omissions and supplying additional relevant information for publication in a subsequent edition.

The amount of information given for any institution has been necessarily limited, the object of the Survey being simply to give a general view of the subject. In particular it should be realised that no attempt has been made to give a complete list of individual scientists. In University departments for instance, only the names of professors and assistant professors have been indicated.

Qualifications and fields of interest, have, however, been mentioned whenever possible, and an index of names is given at the end.

The Survey has been prepared with the assistance of Dr. Mohamed Shahat. It should be taken as representing the state of affairs in November of 1956, although as information has become available a few changes have been made on the basis of subsequent developments.

International Electrotechnical Commission N° 50(20) — Second edition of the *International Electrotechnical Vocabulary* — Group 20 : Scientific measuring instruments.

I.E.C. Publication 50(20) which has just been issued, contains Group 20 : Scientific and industrial measuring instruments, of the Second Edition of the International Electrotechnical Vocabulary which will contain 22 groups when complete. It contains some 345 terms and definitions in French and English, together with the equivalent terms in German, Spanish, Italian, Dutch, Polish and Swedish. Indices are provided for each of the eight languages used.

The terms and definitions are divided into the following sections : General terms ; detecting instruments ; measuring instruments ; special recording instruments ; integrating instruments ; measuring devices and accessory apparatus ; constructional elements ; characteristic terms ; instrument transformers.

Publication 97 — First Edition. — *Recommendations for fundamental parameters for printed wiring techniques.*

I.E.C. Publication N° 97 : Recommendations for fundamental parameters for printed wiring techniques, which has just been issued, lays down the nominal spacings between the centres of holes used for fixing and connecting the components to the printed wiring board, the nominal diameter of the holes and gives preferred thicknesses of the laminated plastic boards used for printed wiring. Some indications concerning components for use with printed wiring are also given.

Central Documentation Centre set up in Japan

Japan's first central documentation centre for science and technology was set up recently in Tokyo to meet the growing needs of industry and research. A semi-official organization, supported both by government and private funds, J.I.C.S.T. — the Japan Information Centre of Science and Technology — will be open to the public from next April. Its services will include the collecting of foreign and domestic publications on science and technology, publishing of abstracts and bibliographies, answering scientific and technological questions, and translating individual articles on request (Unesco).

U. R. S. I.

MATTER INDEX
FOR « INFORMATION BULLETIN » N° 101-106