

INTER-UNION COMMISSION

ON

SOLAR AND TERRESTRIAL RELATIONSHIPS

The Commission held its meetings in the University of Hamburg on 24 August 1964, prior to the Twelfth General Assembly of the International Astronomical Union. The President of the Commission was in the Chair.

MEMBERSHIP AND ATTENDANCE

At the time of the meeting, the membership was as follows:

IAU	IUGG	URSI
C. W. Allen (U.K.), <i>President</i>	Mrs N. P. Benkova (U.S.S.R.)	G. M. Allcock (N.Z.)
J. F. Denisse (France)	T. Obayashi (Japan)	D. K. Bailey (U.S.A.),
R. Giovanelli (Australia)	W. O. Roberts (U.S.A.)	<i>Secretary</i>
E. R. Mustel (U.S.S.R.)	E. J. Vassy (France)	R. Coutrez (Belgium)
		A. H. Shapley (U.S.A.)

However, replacements were due among both the IAU and the URSI members. It was anticipated that during the IAU Assembly, J. F. Denisse would be replaced by M. Waldmeier (Switzerland).

The Corresponding Members at the commencement of the meeting were E. N. Parker, M. Waldmeier and Mrs H. Dodson-Prince.

The Commission had lost by death since its inaugural meeting: Prof. J. Bartels (Inaugural Member), Prof. M. A. Ellison (Corresponding Member).

The following attended the meeting:

Members: Allen, Coutrez, Giovanelli, Mustel, Roberts, Vassy.

Corresponding or retiring members: Mrs Dodson-Prince, Link, Waldmeier.

By invitation: de Jager, Fleischer, Kaplan, Mohler, Mme Pick-Gutmann, Piccardi.

APPOINTMENTS AND REPLACEMENTS

The election of a president for the ensuing six years was discussed. It was considered that because of the reorganizing possibilities in the coming years it would be unwise to change the President at the present moment. The Constitution does not require a change since the IUCSTR has only been in existence for three years. The former President (Allen) was therefore re-elected. The Secretary (Bailey) was also re-elected.

The circumstances relating to change of membership since the Inaugural Meeting (1961) are (i) that all four of the IUGG earlier members Bartels, Haurwitz, Link, and Nicolet were replaced in 1963 by Mrs Benkova, Obayashi, Vassy and Roberts, (ii) none of the four members of URSI were replaced. The non-replacement of the URSI members contravenes the Constitution and some effort has been made by the Parent Union IAU to get URSI to make a replacement. The IAU replacement Waldmeier for Denisse will be made during the 1964 Assembly.

The following were elected as Corresponding Members: Link, Nicolet, Michard and Bigg (Sydney). The following were withdrawn from the list of Corresponding Members: Waldmeier, Parker.

ACTIVITIES

The President gave a brief survey of the activities of the IUCSTR since its inauguration in August 1961. Reference was made to the Inauguration, Constitution and History (*Trans. IAU*, **11B**, pp. 469–474, 1962). The Tokyo meetings in September 1963 have not been fully reported. The informal discussion of 4 September on 'Influences of sunspot cycle on phenomena at the bottom of the atmosphere' was summarized in the Tenth Report on Solar-Terrestrial Relations, 1964, p. 327. There was also a discussion on 5 September on 'Ionizing radiations, both photon and corpuscular, with special reference to their origin in the Sun' which was held jointly with the Inter-Union Committee of the Ionosphere. There is no printed record of this discussion.

REVIEW REPORT

The Tenth Report on Solar-Terrestrial Relations was published as Vol. **12**, no. 5, of *Planetary and Space Science*, in May 1964. Circulation to Members of the Commission and those on the Roster of Active Workers was delayed but a distribution was mailed in August 1964. Satisfaction with the Tenth Report was expressed and it was recommended that further reports be issued.

ROSTER OF ACTIVE WORKERS

A Roster of about 150 Active Workers in the field of solar-terrestrial relations has been set up. These workers were invited to contribute to the Hamburg Meeting and were sent the Tenth Report on STR.

SPARMO

Prof. de Jager explained the activities of the Solar Particle and Radiation Monitoring Organization. It was recommended that SPARMO be recognized as a body attached to the Federated Astronomical and Geophysical Services (FAGS). It was also recommended that the IAU and IUGG be asked to co-sponsor SPARMO on FAGS.

SOLAR-TERRESTRIAL PHYSICS SYMPOSIUM

A proposal was made at the URSI Assembly of 1963 that a symposium on Solar-Terrestrial Physics be held at Belgrade in 1966. Although proposed by URSI the clear intention was that this symposium should be inter-union in nature and that the IAU and IUGG be asked to co-operate. This proposal was discussed with particular emphasis on the need for co-operation between Unions and other bodies interested in this wide field of study. It was recommended that the IUCSTR and with it the IAU, co-operate in the running of this symposium. The names of Prof. Allen and Prof. Mustel were proposed as IAU representatives on the organizing committee.

WORKING GROUP ON SOLAR-TERRESTRIAL PHYSICS

The meeting to discuss solar-terrestrial physics was held separately. Those attending were from the Working Group appointed by ICSU (Allen, Kaplan), from the IUCSTR (Roberts, Mustel, Giovanelli, Coutrez, Vassy, Waldmeier, Dodson-Prince) and by invitation (Fleischer, Mohler, Pick, Piccardi). It was thought that a mixed attendance would be well suited to this meeting which was expected to be of an exploratory nature. Prof. Allen acted as Chairman.

The Chairman read and explained the terms of reference of the Working Group, viz. 'to consult with the appropriate committees of the Unions, the Scientific Committees of ICSU and the Inter-Union Commissions in order to arrive at a consolidated solution regarding the regrouping of those disciplines which are particularly concerned with solar-terrestrial physics (ionospheric physics, aeronomy, geomagnetism and the like).' It was recognized that many difficulties attended any substantial reorganization, that reference back to all the organizations concerned would be necessary, and that no rapid action could be expected.

The first proposal considered was that one of the existing bodies (the URSI was used as an example) might be reorganized and renamed to the title International Union of Earth Space Sciences. This would have to be done with the understanding that the relevant sections of the IAU, IUGG, URSI, IUPAP and other Committees and Commissions would be transferred to such a Union. There was no strong support from the meeting for such a suggestion.

Another proposal was that the required co-ordination be introduced through symposia. This met with general acceptance although it was uncertain whether it went far enough. The problem of how to co-ordinate the organization and planning had still to be met. The meeting made no further progress on the primary terms of reference of the Working Group.

FUTURE ACTIVITIES OF THE IUCSTR

The discussion turned to the future of the IUCSTR and the possible effect of any external reorganization. However, no current proposals for reorganization were sufficiently definite for the meeting to take a clear stand. It was reminded that the re-election of the IUCSTR President for a further three years was with the intent that he could in this way keep the needs of the Commission in mind when changes were proposed.

The contacts with the non-parent Unions were not found entirely satisfactory as evidenced from the fact that URSI had acted without reference to the IUCSTR on matters that were obviously the concern of the Commission. The Union representatives on the IUCSTR were asked to keep in better touch with their Union Executives in order that the Commission could play its full part with all three Unions.

A proposal to sponsor a discussion on Fluctuating Phenomena was put by Prof. Piccardi. It was decided that if detailed plans for such a discussion were submitted they should be given full consideration by the Commission.

OPEN DISCUSSION ON SOLAR-TERRESTRIAL RELATIONS

About 100 persons attended this open discussion. Since many of these were on the Roster of Active Workers the opportunity was used to give a brief description of the organization and problems of the Commission.

The contributions to this discussion are summarized very briefly. They are ranged under three general headings 1, 2 and 3.

1. *The X-ray and ultra-violet results in flare and SID problems*

Mrs Dodson-Prince: The problems of differentiation of flares with respect to geophysical effects. This work appears fully in the Tenth Report on STR, p. 393, 1964.

Dr Coutrez: SEA's and correlated solar events. This relates the profiles of SEA's with those of flares and compares delay times between bursts at several frequencies.

Dr Hinteregger: Direct X-ray spectral intensity measurements above the atmosphere could be used to compute secondary atmospheric effects, SEA's, etc., instead of using the latter to characterize the solar phenomena.

Dr Bruzek: Proton flares.

Miss McKenna: A correlation between the optical and radio aspects of a class 3 flares. It was shown that deviations in the intensity of the $H\alpha$ radiation over a major spot were synchronous with deviations in the accompanying type IV radio and X-ray emissions.

Dr Moreton: Rapid X-ray enhancements suggest bremsstrahlung in the explosive phase.

Mme Pick-Gutmann: Delays between solar flares and the associated type IV bursts correlate well with importance (as defined by Coroubalos) of bursts on 10 cm wavelength, but poorly with flare importance.

2. *Slowly varying activity centres on the Sun's disk and their effects*

Dr Obayashi (described by Y. Kato): Corpuscular streams related to solar M-regions. This described the 27-day recurrence correlations for the long sequence of 1961-63.

Prof. Kato: A micropulsation index for geomagnetic phenomena. The correlations are analogous to those of K-indices.

Prof. Mustel: Recurrent geomagnetic regions. Correlations resulting from U.S.S.R. observations in the IGY were shown to agree with earlier conclusions (see *Space Science Rev.*, 3, no. 2, 1964).

Dr Hansen: Shows some evidence of a track of avoidance in outer K-corona observations.

Dr Hinteregger: Discusses the problems of energy and transport phenomena arising from the absorption of radiation in the range 170-1700 Å.

3. *The penetration of solar variability to the lower atmosphere*

Dr Roberts: Aerosols and atmospheric blanketing. The delicate balance between aerosol absorption and blanketing can make the atmosphere sensitive to small energy changes.

Dr Link: Fluctuations in terrestrial rotation and solar activity. It is shown that a term B in the terrestrial rotation is correlated with the darkness of the night sky and thereby with solar activity.

Prof. Mustel: Pressure phenomena in the lower atmosphere were analysed in a manner similar to the geomagnetic activity. The correlations with solar plages were also similar.

Prof. Piccardi: Review of recent results relating laboratory measurements of fluctuating phenomena to solar activity.

Dr Barbier: Relations between solar activity and airglow. It is shown that OI 6300 intensity follows the sunspot cycle, but not Na and OH lines. OI 5577 rises after a sudden commencement and has a secondary maximum 45 minutes later.