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#### 10a. SOUS-COMMISSION DE CINEMATOGRAPHIE DES PHENOMENES SOLAIRES

PRÉSIDENT: Dr W. O. Roberts, High Altitude Observatory of the University of Colorado, Boulder, Colorado, U.S.A.

MEMBRES: Gnevyshev, McMath, Rösch, Severny, Waldmeier.

An historic goal of the Sub-Commission has been the co-operative preparation of a high-quality, continuous, unbroken 24-hour cinematographic record of solar flare activity covering a substantial period of time. The Sub-Commission meeting at Moscow entrusted to a special working committee the preparation of the first example of such a film, covering a span of 14 days or longer during the IGY. The working committee now has such a film, but for a period in the IGC-59, under preparation, as indicated in the report appended. It is hoped that a viewing of the film will be possible at the eleventh General Assembly, thus culminating a first approach to a long-standing objective of the Sub-Commission.

A second working committee of the Sub-Commission has also actively pursued objectives defined during the tenth General Assembly. This committee, under the chairmanship of J. Rösch, has conducted an inter-comparison of coronal intensity data observed simultaneously at different coronal observatories, and has exchanged preliminary findings with participating observatories. A detailed report from the working committee is planned for the eleventh General Assembly.

The centralization and exchange of solar data endorsed at the Moscow meeting has been accomplished in effective measure at the IGY World Data Centers and otherwise. Much of this material will appear in the *Annals of the IGY*, and other Data Center publications. The centralization of films has been carried on in a limited way. In certain instances participating

institutions have made available original films or positive copies to the World Data Centers for preparation of IGY summary publications. In other instances World Data Centers have facilitated the direct exchange of films between participating observatories and research groups using solar data. The World Data Centers have continued to collect and to make widely available the post-IGY data collected under the IGC-59 and under auspices of the Comité International de Géophysique covering subsequent years. The rapidly increasing geophysical interest in data relating to activity variations justified further examination and increase of the observational coverage. This subject will be examined in further reports to be presented during the eleventh General Assembly at Berkeley.

At the Berkeley meeting there will also be a report listing the stations currently participating in co-operative solar flare patrols by cinematic means. Observatories in a position to join in co-operative exchange of solar activity films or data therefrom, during coming years, are invited to communicate to the President their intention to participate. The President will in turn communicate this information to the appropriate World Data Centers and to the Reporter for Solar Activity of the Comité International de Géophysique.

M. A. Ellison and Mrs H. W. Dodson-Prince have called particular attention to the inadequacy of flare patrol coverage between 21<sup>h</sup> 00<sup>m</sup> and 06<sup>h</sup> 00<sup>m</sup> U.T.

#### SUGGESTIONS AND RECOMMENDATIONS

Recommendations and suggestions for discussion at the Berkeley meeting have been made to the President, as follows: (a) M. Waldmeier has recommended that cinematographic pictures to be made in the years ahead should use a larger solar diameter of about 60 mm (on 35 mm film) to assist in reliable investigation of fine details of structure and in reliable photometry. Such films, of course, would be restricted to selected regions of activity. Other solar observers have reported on the desirability, for certain studies, of high-resolution images on 70 mm film or other large sizes of cinematic film. However, the high cost of such film is an obvious problem.

(b) W. O. Roberts and M. Waldmeier have made special note of the great potentialities as well as the interesting results already attained from the use of cinematic techniques at high resolution, and especially of the developing prospects for such cinematic studies from telescopes of substantial size carried by means of high altitude balloons to levels of the Earth's atmosphere at which seeing difficulties and atmospheric scatter are greatly reduced.

(c) M. Waldmeier has called attention to needs for programs for time-lapse study of slowly-varying features of the Sun, with pictures at intervals of the order of five minutes.

(d) R. McMath and his colleagues have called attention to the great importance of extending the detailed study of flares and other solar disk phenomena to wave-lengths outside the center of the H $\alpha$  line (or other strong lines). Moreton, of the Lockheed Solar Observatory, has underscored the interesting features of the solar disk visible in cinematic records at high resolution taken at time intervals of five seconds or less in the violet and red wings of the H $\alpha$  line. Such films occasionally reveal rapidly-moving bright and dark features, following solar flares, that are propagated at high speeds to large distances from the responsible active region. These subtle features can also be seen in films of adequate resolution and contrast taken in the center of the H $\alpha$  line.

(e) M. A. Ellison, speaking for the Comité International de Géophysique, urges that the Sub-Commission express strong interest in improvement of solar radio noise emission data from swept-frequency instruments. It seems that a 24-hour patrol is probably now in force, and its comparison with disk cinematography should be highly valuable.

W. O. ROBERTS  
*President of the Sub-Commission*

## APPENDIX

The Working Committee for a Continuous Flare Film, consisting of H. Smith (chairman), R. Giovanelli, M. N. Gnevyshev, and J. Rösch, submits the following report:

The four members of the committee met in Moscow in August 1958. This preliminary discussion clarified the aims of the trial 14-day movie, and nominated Sacramento Peak Observatory as clearing house for first-phase editing. In October 1958, H. Smith and R. Giovanelli visited the World Data Center in Boulder, Colorado, U.S.A., to examine records of cinematographic flare patrol operation throughout the world. This investigation disclosed numerous gaps in patrol coverage during 1957, since many IGY patrols were not operative until mid-1958. Critical examination of the data available in September 1957 and May 1958, (period of unusually high solar activity), indicated that frequent gaps and inhomogeneous cinematograms would severely limit the quality of the trial movie.

During IGC-59, however, several new Lyot *H $\alpha$*  cinéheliographs were operating. At the suggestion of W. O. Roberts the month of July 1959 was studied carefully. (This period of intense solar and geophysical activity has been commended by COSPAR as the object of intensive inter-disciplinary research). Records at the World Data Center in Boulder revealed nearly complete ciné coverage during that month, with much overlap by stations regularly producing highest quality pictures. With approval of the other members of the committee, H. Smith began gathering copies of original observations to produce a continuous movie of the interval 6–20 July 1959. The edited film may be ready for showing at the eleventh General Assembly in Berkeley, provided response from solicited observatories is prompt and nearly complete.