COMMISSION 21: LIGHT OF THE NIGHT-SKY (LUMINESCENCE DU CIEL)

Report of Meetings, 20 and 24 August 1970

PRESIDENT: M. Huruhata.
SECRETARY: J. L. Weinberg.

Business Meeting

The President asked Commission members and guests to stand in memory of Commission members who passed away since the Prague meeting:

S. Chapman
J. Dufay
C. T. Elvey
C. Hoffmeister
A. Lebedinskij.

1. THE DRAFT REPORT

The Draft Report of Commission 21 was approved without change. The President thanked Commission members for forwarding information which enabled him to prepare the Report. F. E. Roach suggested that a full report be prepared and circulated to members in advance of future meetings. The abbreviated version required for publication in the Transactions would be condensed from this full Report.

2. OFFICERS AND MEMBERSHIP

The officers for the next triennium were nominated and approved by Commission members.

3. MISCELLANEOUS

After some discussion, it was agreed that the Commission should sponsor two colloquia: on integrated starlight and diffuse galactic light, and on zodiacal light. Heidelberg was suggested as a possible site for the starlight meeting in the summer of 1972, and Tenerife as the site for a zodiacal light meeting in 1973. Details of the locations and times of these colloquia will be handled by the Commission officers after contacting the membership.

J. L. Weinberg was asked to form a committee of Commission 21 to evaluate the use of modern techniques of star counting in a renewed effort to map the Milky Way. The committee will prepare a report and will submit its recommendations to the Commission at its 1973 meeting.

Commission 21 emphasis in recent years on geophysical problems was questioned, and it was agreed that greater emphasis should be placed on astronomical aspects of the light of the night sky. Present and anticipated research programs discussed in the sessions for scientific papers suggest that this change has already taken place.

Scientific Meeting

One session was held for presentation of scientific papers. At the request of the President, the meeting was chaired by F. E. Roach. The papers, in outline:

1. H. Elsässer: On the Problem of the Absolute Night-Sky Brightness.

Comparison of the results of Elsässer and Haug (*Z. Astrophys.* **50**, 1960) and of Weinberg (*Ann.*

https://doi.org/10.1017/S0251107X00020101 Published online by Cambridge University Press

Astrophys. **27**, 1964) suggests that differences heretofore ascribed to calibration errors (Roach and Smith, NBS Tech. Note 214, 1964) instead arise from different corrections for atmospheric scattering (elongations, ε, less than 60°) and for star background (ε greater than 60°).

2. R. Dumont and F. Sanchez: Some Results and Present Research Subjects at Observatorio del Teide (Tenerife) about Zodiacal Light and Green Airglow Photometry.

During years of high solar activity, local fluctuations of up to 50% were observed in the brightness of zodiacal light. Evolution of the isophotes suggest that solar streams affect the spatial distribution of zodiacal dust. The zodiacal light at the north ecliptic pole (at 5000 Å) was found to have a total brightness of 70 S_{10} (vis) units and a brightness in polarized light between 9.7 and 12.6 S_{10} (vis). Results were also presented on the symmetry of zodiacal light polarization with respect to the Sun/anti-Sun axis and on the 5577/5200 line/continuum covariance in the nightglow.

3. J. L. Weinberg: A Coordinated Program of Satellite and Ground-Based Observations of the Zodiacal Light.

Description was given of two satellite experiments scheduled for 1972/73 (see *Trans. IAU* **XIVA** (Reports 1970), page 204). Also described was a planned ground-support program which will relate the satellite observations to concurrent observations from the ground and to earlier observations obtained in Hawaii. Interest was expressed by other observers in participating in a network of ground-support stations.

4. R. H. Giese: Current Model Calculations Concerning Zodiacal Light as seen from Space Probes.

Results were presented of theoretical models of zodiacal light as seen from space probes. Mixed-component and off-ecliptic models are also being calculated.

5. N. Kovar: Proposed Manned Spacecraft Observations of the Zodiacal Light and F-Corona.

A description was given of photographic experiments to be carried out from lunar orbit and from the Earth-orbiting Skylab. Programs at the University of Houston involve extensive calculations of Mie scattering functions and of zodiacal light and F-Corona models.

6. R. Robley: Remarques sur la couleur du Gegenschein.

Four-color (B, V, J, R) observations of the Gegenschein at Pic-du-Midi between 1965 and 1968 suggest that the Gegenschein is a little bluer than the Sun.

7. R. G. Roosen: The Gegenschein and Interplanetary Dust Outside the Earth's Orbit (read by J. L. Weinberg).

Photoelectric observations from McDonald Observatory in March 1969 and February 1970 are used in a search for the Earth's shadow in the Gegenschein. The absence of a shadow in these observations (to an accuracy of about one per cent) requires that the spatial density of material must increase outside the Earth's orbit. Model calculations suggest that the brightness distribution of the Gegenschein can be explained by dust produced by collisions between known asteroids. A cometary origin of the material is unlikely. One observation in February 1969 indicated that the Earth's shadow was visible in the center of the Gegenschein, and the result is attributed tentatively to increased dust near the Earth associated with the passage of the Earth through the orbital plane of P/Encke (see, also, IAU Circ. 2266).

8. N. Tanabe and K. Mori: A New Star Counting Device in Tokyo Observatory (read by M. Huruhata).

A new photoelectric, star-counting instrument has been developed to measure the diameters of star images on the *Palomar Sky Survey Atlas* to its limiting magnitude in blue and red. Operation of the instrument is described as are results of measurements in regions near the north celestial and ecliptic poles.

9. K. Mattila: Surface Brightness of Dark Nebulae and the Scattering Properties of Interstellar Grains (Diffuse Galactic Light).

UBV Observations of dark nebulae were made with a 50-cm Cassegrain at Boyden Station. Significant amounts of diffuse galactic light (25 to 80 S_{10} (vis) units) were found, and the results were used to infer the albedo of the interstellar grains.

10. N. K. Reay: Hβ Emission in the Night-Sky.

Observations of Hβ emission were made in northern Italy with a Fabry-Pérot interferometer. Three sources of Hβ emission were detected: galactic (to 25° latitude), night-sky, and nebulosity associated with the diffuse Cetus Arc radio region.

11. R. D. Wolstencroft: Annual Variation of the Zodiacal Light.

Variations in nightglow polarization toward the north ecliptic pole (between December 1968 and October 1969) are attributed to an annual variation in the polarized component of zodiacal light. The maximum brightness in polarized light is 32 S_{10} (vis) units (June 15 $\pm$ 30 days) and the minimum is 7.5 S_{10} (vis) units (December 15 $\pm$ 30 days).

https://doi.org/10.1017/S0251107X00020101 Published online by Cambridge University Press