Telstar Synchronization and Ranging Experiments. WM. MARKOWITZ AND C. A. LIDBACK, *U. S. Naval Observatory*.—Timing experiments via Telstar were carried out by the National Physical Laboratory, Teddington, at Goonhilly Downs, and by the U. S. Naval Observatory, at Andover, Maine, 25 and 27 August 1962. The purpose was to synchronize clocks at the Naval Observatory, Washington, and the Royal Greenwich Observatory, Herstmonceux.

Time pulses were transmitted and received at both Goonhilly and Andover. Experiments via Telstar included (a) simultaneous two-way transmissions, (b) retransmission, Goonhilly to Andover to Goonhilly, and (c) Andover to satellite to Andover.

A photographic technique used at Andover gave a p.e. of 0.36 μ sec for one photograph. A visual technique used at Goonhilly gave a p.e. of 3 μ sec for a single reading. Clocks were related as follows, in microseconds: Andover/Goonhilly, 1; Washington/Andover, using Loran-C, 1; Herstmonceux/Goonhilly, using 60 kc/sec time signals, 10.

Range data derived from time measurements provide an independent check on the scale of an orbit based solely on angle measurements. The agreement of such range data and an ephemeris furnished by the Goddard Space Flight Center of the National Aeronautics and Space Administration, based on Minitrack, is considered very good. Indicated errors in size of orbit are 0.2 km on 25 August and 1.8 km on 27 August.

Classification of Late-Type Stars in the Near Ultraviolet from Objective Prism Spectra. MARTIN F. MCCARTHY, S.J. AND VERA C. RUBIN, *Vatican Observatory and Georgetown College Observatory*.—Examination of the first plates obtained with the Vatican 25"/38.5" Schmidt and its 4° objective prism (O'Connell, *Mitt. Astron. Ges.* **100**, 1955) revealed a richness of ultraviolet features in G and K type stars and prompted a study of classification criteria in the region from 3400 to 3900 Å. The prism is made of flint and was not especially designed for ultraviolet transmission: its dispersion at $H\gamma$ is 250 Å/mm and at 3700 Å is 150 Å/mm.

Many blends used by previous investigators are resolved into separate lines at our dispersion. In the present study both eye estimates and microdensitometer tracings have been made. The spectra of stars classified in the LF 2 (McCuskey and Seyfert, *Astrophys. J.* **112**, 90, 1950) and LF 4 (McCuskey, *Astrophys. J. Suppl.* **2**, 75, 1955) regions have been chosen as secondary standards. Fourteen Vatican plates and four from the Case collection were examined. Thirty-nine stars of spectral types G2 and

G5 and luminosity classes III, IV, and V were studied.

Between the H and K lines and the CN blend at 3585 Å are 13 features, each of which has been investigated for use as a possible luminosity criterion. The excellence of Lindblad's criterion at 3883 Å for the separation of giants and dwarfs is indicated. Eight low E.P. lines of Fe show variations in strength and sharpness from star to star. A strong feature at 3660 Å is noted in certain giant stars. No new luminosity discriminants have been outstanding.

Further work will include multiple exposures on standard MK stars. Stars from the catalogues of Keenan and Keller and Nancy Roman will be observed and the research will be extended to later spectral types.

Steward Observatory Folded-Camera Grating Spectrograph. A. B. MEINEL, *Steward Observatory*.—A Cassegrain grating spectrograph has been developed for the Steward Observatory 36-inch telescope following a design by the author for McCuskey. This design, now in use by McCuskey, appears to meet the requirements of high optical performance and research versatility at low cost. The spectrograph uses a folded 126-mm focal length $f/2$ flat-field camera of the general Schmidt type, permitting the use of large photographic plates and the placement of multiple spectra on the same plate since the focal plane is completely accessible. It is possible to use field-curves to march this type of camera to image tube devices.

The spectrograph mounts interchangeable gratings, each grating being protected by a cell and cover slide. Since gratings are available in the 65×76 mm size from 2160 to 75 lines/mm, it is possible to obtain dispersions from 22 to 800 Å/mm (second order) at will. The spectrograph also adapts readily to different telescopes by replacement of the secondary of the Cassegrain collimator. The spectrograph is usually employed with a 600 lines/mm grating yielding 160 Å/mm which gives sufficient resolution for classification of stars on the MK system.

A Limitation on the Photometry of Faint Objects. R. H. MILLER, *University of Chicago*.—Very faint stars, appearing in different numbers as a diaphragm is moved to different neighboring locations on the sky, are expected to give rise to a fluctuation in the sky readings obtained through the diaphragm due to a "geometric fine structure" of the night sky. The relation of the expected brightness distribution seen through the diaphragm to that of