

$H$  and  $He$ . Neither the effects of lines nor departures from LTE are accounted for.

For  $0.45 \leq \theta_e \leq 0.7$ , models were made with  $1 \leq \log g \leq 4.44$  while for  $0.1 \leq \theta_e \leq 0.4$  they were made with  $\log g = 3.5, 4.0$ , and  $4.5$ , all assuming  $N(He)/N(H) = 0.15$ . At the higher temperatures sequences were made with changes in the assumed helium abundance.  $H\beta$  and  $H\gamma$  profiles were computed using Griem's Stark broadening theory, and for the hotter models we computed the profiles of  $He\ I \lambda 5876, \lambda 4438, \lambda 4121$  and  $He\ II \lambda 5412, \lambda 4686, \lambda 4542$ , and  $\lambda 4200$ . The computed line strengths have been fitted to observations of six O-type stars, made with the photoelectric spectrum scanner at the coude of the 100-in. telescope, and estimates made of these stars' effective temperatures, gravities, and helium abundances.

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**$H\alpha$  Shock Wave and Winking Filaments with the Flare of 20 September 1963.** G. E. MORETON, *Lockheed Solar Observatory*.—Filtergrams of this event were obtained in sequence at  $H_\alpha$ ,  $H_\alpha + 0.5 \text{ \AA}$ , and  $H_\alpha - 0.5 \text{ \AA}$ , with 30 sec between filtergrams at one wavelength. The flare starts at 23<sup>h</sup>49<sup>m</sup>; a 1-min duration explosive phase commences at 23<sup>h</sup>58<sup>m</sup>, during which parts of the flare expand at  $\simeq 120 \text{ km/sec}$ . A shocklike disturbance propagates from near the explosive region across the sun to a distance of 420 000 km, maintaining a constant transverse velocity of 750 km/sec. Radio data from J. P. Wild and A. A. Weiss show an outstanding type III burst extending from 2000 Mc/sec coincident with the explosive phase, and a type II coincident with the visible shock front. Two dark filaments are encountered by the front near the end of its visible trajectory, and the filaments are caused to undergo a "winking" activation: at  $H_\alpha$  the filaments momentarily disappear; in the  $H_\alpha$  wings they momentarily darken.

The three-wavelength coverage confirms earlier observations of fast disturbances expelled from explosive type flares (Athay, R. G., and Moreton, G. E., *Astrophys. J.* **133**, 935, 1961), and provides new data: the activated filaments darken first in the red wing, then in the violet wing. This effect, observed first by Dodson-Prince (NASA-AAS Symposium on Flare Physics, October 1963) may be attributed to a Doppler shift, caused by the

filament moving first down, then up. Each filament executes three oscillations, with a period  $\simeq 7 \text{ min}$ .

These observations show the moving disturbance only in the wings of  $H_\alpha$ , as has been demonstrated previously. It is now found that the leading edge of the front is darker than the chromospheric background in the red wing, and brighter in the violet wing. This suggests that the disturbance is an *effect*, caused by an invisible agency that depresses the chromosphere and mottling as it passes tangentially through the solar atmosphere.

**Stellar Population of the Nuclear Region of the Andromeda Nebula.** W. W. MORGAN AND JOHN S. NEFF, *Yerkes Observatory*.—A photometric system having effective wavelengths at  $\lambda\lambda 5500, 4700, 3700, 3300$  has been developed at the Yerkes Observatory. This system permits a high degree of resolution between K giants and dwarfs, by use of the colors  $\lambda 3300-\lambda 3700$  vs  $\lambda 4700-\lambda 5500$ .

The nuclear region of the Andromeda Nebula has been observed on the new system with the 36-inch reflector of the McDonald Observatory. The results indicate that in the ultraviolet spectral region the principal contributors to the light of the central part of M31 are K giant stars. This is in agreement with earlier spectroscopic results in the blue region of the spectrum by Morgan and Mayall.

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**Depolarization of Radio Sources.** D. MORRIS, V. RADHAKRISHNAN, AND G. A. SEIELSTAD (presently at the Geophysical Institute, University of Alaska), *Owens Valley Radio Observatory, California Institute of Technology*.—Measurements of the wavelength dependence of the linear polarization of 29 radio sources have been compiled. It is confirmed that in the decimeter wavelength range the observed Faraday rotation of the plane of polarization arises in the Galaxy. Although the magnetic field in the local spiral arm must be highly ordered the data do not allow a definite field configuration to be deduced. The simple model due to Chandrasekhar and Fermi (Chandrasekhar, S., and Fermi, E., *Astrophys. J.* **118**, 113, 1953) is shown to be untenable, however.

The hypothesis that depolarization at decimeter wavelengths is caused by differential Faraday rotation in the Galaxy is rejected for lack of supporting evidence.

An inverse correlation between emissivity (or magnetic field strength) and fractional polarization at 10-cm wavelength is presented. This is interpreted as confirmation of the suggestion by Woltjer