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The Frequency of Binaries among A-Type Stars. HELMUT ABT, *Kitt Peak National Observatory.*—Previously it was reported that an investigation of a random sample of 25 metallic-line (Am) stars showed that 88% gave evidence of binary motion. After a reasonable allowance for undetected binaries we concluded that all Am stars are members of spectroscopic binaries.

This is a preliminary report on the binary frequency among the normal field stars in the same region of the color-magnitude diagram as the Am stars. A sample of 57 such stars (A4-F2 V, IV) was observed repeatedly with the McDonald 82-inch coudé and Mount Wilson 60-inch Cassegrain spectrographs. Complete measurements on 24 stars yielded nine spectroscopic binaries, indicating a frequency of at least 35%. However, surprisingly all nine binaries have periods greater than 100 days; also none of the remaining 33 incompletely measured stars have large velocity variations. Therefore it appears that all stars in this region of the color-magnitude diagram that are members of binaries with periods less than 100 days have abnormal spectra while the single stars have normal spectra.

The way in which duplicity affects the spectral appearance is probably through its effect on the rotational velocity. There are no rapidly rotating Am stars or slowly rotating normal ones. Perhaps rapid rotation inhibits the magnetic fields which, in turn, may (according to Unsöld and Böhm-Vitense) account for their peculiar spectra.

High-Contrast Electronic Image-Orthicon Techniques Applied to the Lunar Surface. R. AIKENS, W. POWERS, and J. A. HYNEK, *Dearborn Observatory, Northwestern University.*—The current interest in the structure and mapping of the lunar surface has led to the increased use of various methods of investigating the lunar surface, e.g., photographic stereoscopy over the entire range of lunar libration and the sequential photometry of lunar shadows, as presently employed by the Army and Air Force, respectively.

The advent of high-contrast image-orthicon techniques appears to offer a valuable and versatile variation of the conventional point-by-point photometry of the lunar surface. By a combination of the subtraction of a constant background and the subsequent variable expansion of the residual range of brightness, it is possible to emphasize relatively minor differences in contrast, without the loss of gray-scaling, nearly simultaneously over the entire lunar surface. The effects of the inevitable increase in noise attendant in this technique can be effectively minimized by the use of long-persistence phosphors on the viewing screen and the use of relatively long exposures with the recording camera.

The application of these techniques is at present a part of the image conversion program at the Dearborn Observatory. They are particularly adaptable to the detection of minor differences in lunar albedo and are capable of delineating fine differences particularly in the lunar maria, especially at full lunar phase, when lack of shadows limits the effectiveness of conventional photography. The method, therefore, offers more promise in the detection of differences in texture, and by inference, composition, of the lunar surface rather than in contour determination.

Movies illustrating a run across the full moon at constant contrast, the effects of variation of contrast discrimination near the subsolar point, and preliminary studies of relative photometry of line elements using the video signal itself, have been made.

Dust Particles of Micron Size Associated with the Leonid Meteor Stream. W. M. ALEXANDER, C. W. MCCRACKEN, and H. E. LAGOW, *Astrophysics Branch, Goddard Space Flight Center, National*