Preliminary analysis of the relative intensity curves for different wave lengths indicates the following phenomena pertinent to the Martian atmosphere:

1. The deviation from the Lambert cosine reflection law is strong, particularly on the limbs of the planetary disk, due to the greater scattering arising in the Martian atmosphere through the obliquity of view and longer atmospheric path lengths on the limbs. This limb-light deviation from cosine reflection is in the form of higher relative intensities for blue-violet light than the computed.

2. The red light from the limb suffers diminution, compared to the blue-violet light, due to the greater penetration of the atmosphere. The blue-violet light apparently is reflected from higher up in the atmosphere. This difference between red and blue-violet is most marked with strong phase, as would be expected with the obliquity of view and atmospheric path lengths encountered then. These comments refer to the relative intensities of limb light compared to the center of the disk in each color and not to the absolute intensities of red light compared to blue-violet light for any particular region on the disk.

3. The relative increase in brightness of the polar caps by shorter wave lengths, compared to the rest of the disk by each color, is confirmed and amounts to more than a 50 per cent increase of relative brightness of the cap by blue-violet light, compared to the center of the disk in blue-violet light, over the cap intensity by red light, compared to the center of the disk by red light. The presence of surface markings has been allowed for by choosing relatively featureless areas for the central comparison region.

Heterochromatic terrestrial photographs, made at the same effective wave lengths as the Mars photographs and sensitometrically standardized, indicate that the usual blue-violet obscuration in the Martian atmosphere is roughly equal to that encountered in a path 20 to 30 miles long horizontally in the earth's atmosphere, at an elevation of 2400 feet, in a dry desert climate. Because of the greater total horizontal terrestrial air mass, compared to that possible for Mars in vertical view, it is evident that the blue-violet scattering element in the atmosphere of Mars is considerably more optically active than is normal molecular scattering in the atmosphere of the earth under the dry desert conditions encountered. S. L. Hess has suggested that the blue-violet haze may be due to small, solid, frozen crystals of carbon

dioxide suspended in the Martian atmosphere.¹

1. *J. Met.* 7, 7, 1950.

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Miczaika, G. R. Evolutionary trends in the H-R diagram of galactic clusters.

Comparison of the color-luminosity diagrams of open galactic clusters that have been photo-electrically investigated, shows that ordinary giants appear when the upper end of the main sequence has dropped to about 0 or 0.5 visual absolute magnitude. For the masses, it may be stated that no giants occur in the open clusters when main sequence stars of more than $3\odot$ are present, or if there are main sequence stars having larger masses than usually assumed for ordinary giants. The occurrence of subdwarfs in galactic clusters seems to be linked to the occurrence of giants. No subdwarfs are found in clusters containing bright B-stars, such as the Pleiades and NGC 2362. But they are definitely present in those clusters containing giants, such as the Hyades, Praesepe or the Ursa Major stream. It is concluded that about 5×10^8 years elapse before ordinary giants and subdwarfs appear in an open cluster.

A shifting to the right of the steep bright end of the main sequence is related to the decrease of the luminosity of the brightest stars of the main sequence. The effect may be explained by a weak mixing mechanism in the stars' interiors. The Ursa Major stream seems to display a phase of evolution where stars moving away from the main sequence to the right populate possibly an evolutionary line, as has been pointed out by Schwarzschild and others.

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Miller, Freeman D. Objective prism spectroscopy in the one-micron region.

Spectra of bright stars between 9000 and 11,000 Å can be photographed in reasonable exposure times on I-Z(2) emulsion with the combined 4° and 6° prisms of the Curtis Schmidt. The dispersion at one micron is 1300 Å/mm. Stars of types B to G require about 1000 times the exposure needed to record a blue-violet spectrum of the same width and density on 103a-O plates. In late class M, this ratio decreases to less than unity.

A survey of typical spectra indicates that at this low dispersion stars of the hotter and cooler types are of the greatest interest. A discussion of the latter is in press.