Walker, Merle F. Empirical tests of pulsation in HD 199140 and 16 Lacertae.

Empirical tests of pulsation in HD 199140 and 16 Lacertae have been carried out using photoelectric observations of the light variation in the ultra-violet, visual, and infra-red, together with radial velocities obtained simultaneously by other observers. The stars were tested both by Wesselink's method of points of equal colors,¹ and by assuming black body conditions in the stars. Neither test leads to results consistent with the pulsation hypothesis. The failure of the former test may result from the fact that in these stars the variations in brightness arising from changes in temperature and from changes in surface area are 180° out of phase, and from the symmetry of the light curves about maximum light. The second method avoids this difficulty but may fail owing to departures from black body conditions in the stars.

These results will be discussed in greater detail in forthcoming papers.

1. *B. A. N.* 10, 256, 1947.

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Wellmann, P. A spectrophotometric study of recent eclipses of 32 Cygni.

A spectrophotometric study of the 1949 and 1952 eclipses of 32 Cygni has been made from plates taken at the David Dunlap Observatory, the University of Michigan Observatory and the Hamburg-Bergedorf Observatory. Lines of the following spectra have been investigated: *CaII*, *SrII*, *TiII*, *CaI*, *FeI*, and *CrI*. The study of other lines is in progress.

The manner in which the intensity of the K line changes during ingress and egress has been used to establish the time of third contact 1949 (Nov. 9.8 UT), second contact 1952 (Dec. 20.8) and mid-eclipse 1952 (Dec. 27.3). These data point to a period of 11148^d which is sensibly longer than the period of 1140^d.8 hitherto accepted.

The intensity ratio of the continua for the two components has been derived by comparing the depth of corresponding lines in the composite spectrum and in the K spectrum during totality. The result is that the two stars are nearly equal in brightness at $\lambda 3900$, whereas near *H γ* the B star contributes only 10 per cent to the brightness of the whole system. If K5 Ib is assumed as the spectral type of the primary, B2 is derived for the secondary from these data, and

the difference of visual absolute magnitude between the two stars is found to be about 4 magnitudes.

The increase of chromospheric line intensities with time at the ingress of 1952 begins farther from totality for the lines of ionized metals than for the lines of neutral atoms which show a steep rise of intensity only during a short interval before totality. Resonance lines and lines of low excitation develop stronger chromospheric components than do high excitation lines.

The increase of the chromospheric absorption in *H δ* and *H ζ* is faster than in the neighboring lines before 1952 Dec. 17.0 and slower after that time. This indicates the disappearance of the Balmer lines of the B spectrum, that is, the beginning of the partial phase.

The hydrogen line intensities in the K spectrum point to a high luminosity for the primary. They have been used to derive the Balmer line intensities in the B-type spectrum. The results again indicate a B2 V spectrum for the secondary.

The intensity ratio between the *CaII* and *CaI* lines, and the comparison of the chromospheric line intensities expressed as equivalent width in the continuum of the B star give evidence of a low temperature about 3300–4400°K, and of a low electron density at the base of the chromosphere of 32 Cygni.

These results allow a preliminary calculation of elements for this system. From the intensity ratio i_B/i_K and the temperatures of 20,000° and 3200°, derived from the spectral types, the ratio of the radii is found to be 1:90. From the duration of totality, 13^d.0, and the most probable value of the partial phase, 4^d.0, the following are deduced:

radius of the K star	353 $\odot$,
radius of the B star	3.9 $\odot$,
inclination of the system	72°5 $\odot$.

The eclipse is therefore nearly grazing.

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Weston, Edwin B. The spectrum and characteristics of the long-period eclipsing binary 32 Cygni.

The spectrum of 32 Cygni at recent eclipses has been studied on plates taken at the David Dunlap and the University of Michigan Observatories. Reference has also been made to Wright's published description of the Dominion Astrophysical Observatory (Victoria) spectra,¹ to