The observed minima occurred about 15 minutes earlier than the times predicted from Shapley's light elements. New light elements have been determined as Pr. Min. = JD 243 2380.7145 + 1^d7785720 E. There is no definite evidence of any change of period. Secondary minimum is displaced forward on the curve by 0^d0020. Although this displacement amounts to only three minutes, the shape and depth of the minima and the precision of the observations make it easy to detect. The secondary minimum is also slightly wider than the primary.

The initial plot of the observations showed two well-separated minima and an asymmetric light-curve between them. The asymmetry amounted to several hundredths of a magnitude; the observations near first quarter were actually lower than those just outside of primary, while those at third quarter were distinctly higher. A study of the magnitude differences between the comparison star and the check star on different nights suggested a variation in one of these. When the measures of the variable were reduced to the check star, the asymmetry of the light-curve disappeared almost entirely. There is thus evidence to indicate that the star used as comparison, BD +12°3546, varies over a range of at least 0.04 mag. Fortunately, the nightly use of a check star made it possible to remove from the curve the effects caused by the variation of the comparison star. When these corrections are made, the probable error of an individual observation from the theoretical curve is ± 0.007 mag.

The displacement and the broadening of secondary indicate that the orbit is eccentric. Because of the difficulty of separating the spectra of two similar stars of comparable brightness, this eccentricity has not been detected spectrographically. It is thus necessary to determine it photometrically without help from the spectrographic orbit. Fortunately, this can be done in the present case. The component, $e \cos \omega$, is of course determined from the secondary displacement. Further, the secondary is sufficiently deep and well observed to permit an independent determination of the elements from it. Comparison of these with the elements determined by the solution of primary gives the component $e \sin \omega$ and the true elliptic elements. The eccentricity is found to be small, < 0.02 . It is of interest to note that this is one of the few cases where the eccentricity can be determined photometrically and not spectrographically.

The principal elements of the system are:

α_0^{tr}	0.916	r_b	0.232, 2.26 $\odot$
α_0^{oc}	0.939	r_f	0.188, 1.83 $\odot$
k	0.810	m_b	2.1 $\odot$
i	85°6	m_f	1.9 $\odot$
L_1	0.636	ρ_b	0.18 $\odot$
e	0.018	ρ_f	0.31 $\odot$
ω	95°5		
J_1/J_2	1.1		

The absolute dimensions were computed with the aid of Sanford's¹ spectrographic elements.

In conclusion, an indication of the determinancy of the results is in order. While the above elements give the best fit to the observations, other solutions were tried in order to see how much the elements might be varied and still give an acceptable fit. The permissible variations were found to be slight. For example, the greatest permissible changes in depths and shapes of minima yield a change of only 5 per cent in the computed radii; the greatest value of the inclination thus found, combined with the spectrographic elements still yields a mass of 2.1 $\odot$ for the larger component. Another solution assuming 0.4 for the degree of darkening makes even a slighter change in the final elements.

1. *Ap. J.* 68, 51, 1928.

Steward Observatory,
Tucson, Ariz.

Yu, Ch'ing-Sung. Notes on a possible photometric effect from Struve's theory of whirlpools around binary systems.

Struve's recent theory of revolving streams around binary stars, which has been amply supported by spectroscopic evidences, appears to receive an additional proof from a photometric effect observed in the light curve of an eclipsing binary. In his photometric study of CG Cygni, the writer noted in 1922 that the total light of the binary at phase 0^p.25 is greater than that at phase 0^p.75 by 0.045 mag. This was at first puzzling, since at these two positions, the components are symmetrically identical and therefore the brightness of the system should remain the same. However, it seems an explanation can be obtained now if we assume, following Struve, that the system is surrounded by a whirlpool ring of gas. The portion facing the observer at 0^p.25 is hotter, according to the theory, than that at 0^p.75, giving rise to the slight difference in magnitude. It is pointed out that for CG Cygni a difference of 100°K is sufficient to account for the discrepancy. Reasons are given to explain the lack of similar observations so far, but sugges-

tions are made to look for this effect in the future with highly sensitive photoelectric equipment.

*High Altitude Observatory,
Climax, Colo.*

TITLES OF ADDITIONAL PAPERS PRESENTED AT THE MEETING IN NEW HAVEN, CONN.

Aller, Lawrence H. The profile of the CaII K-line in the solar spectrum.

Barney, Ida. Investigation of the magnitude error in the declinations of the *General Catalogue* from a comparison with the Yale photographic positions.

Binnendijk, A. The light variation of Pleione.

Brouwer, Dirk. The solar parallax determined from lunar occultations 1932-1942.

de Jonge, J. Kiewiet. Luminosity function of A stars—preliminary results.

Goldberg, L., O. C. Mohler, and R. R. McMath. Isotopes of carbon and oxygen in the earth's atmosphere.

Grosch, H. R. J. Construction and use of optimum interval mathematical tables.

Heard, J. F. Velocity study of eight stars formerly assigned to the β Cephei group.

Hogg, Helen Sawyer. Two RV Tauri variables in globular clusters.

McCuskey, S. W. Variations of the luminosity function in Auriga and Orion.

Northcott, Ruth J., and Ralph E. Williamson. The pole of the galaxy as determined by radiofrequency radiation.

Phillips, John G. The spectrum of the C_2 molecule between 2370Å and 2855Å.

Savedoff, Malcolm P. Anharmonic pulsations of the standard model.

Schatzman, Evry. Heating of the solar corona and chromosphere by turbulence.

Schwarzschild, Martin. Magnetic oscillations of a star.

Seeger, Charles R., Charles R. Burrows, and W. E. Gordon. The galactic pole at 200 megacycles.

Shapley, A. H. Coordination of solar activity observations.

Sitterly, Charlotte Moore. Recent analyses of atomic spectra.

Spitzer, Lyman, Jr. Interstellar lithium and beryllium.

Whipple, Fred L. The Harvard photographic meteor program.

Yowell, Everett C. Period changes in RW Draconis stars.

REPORTS OF OBSERVATORIES

Allegheny Observatory. University of Pittsburgh, Pittsburgh, Pa.

Thaw refractor. In its thirty-fourth year this telescope was used almost exclusively for astrometric work. Observing conditions were below average. The total number of plates secured was 1422 which is 275 less than the average of the last ten years and the smallest yearly total since 1938-39. Observations were made on 111 evenings and 81 mornings. On only 57 nights were both evening and morning observations obtained. Observers were Burns, Daniel and Wagman. Two amateur astronomers were in training to take part in the observing.

Stellar parallax, double star and proper motion programs were continued. Observations of asteroids for the Yale program, begun in 1935, were concluded with the taking of 131 plates of 15 asteroids during the past year. Fifty-four plates of major planets and satellites were secured.

Stellar parallax. Parallaxes for 33 stars were determined during the year bringing to 83 the parallaxes completed but unpublished. Merrill's Wolf-Rayet star (1900: $19^{\text{h}}07^{\text{m}}00^{\text{s}}$, $+16^{\circ}40'$), suspected of being the most likely such star to have a measurable parallax, yielded a parallax of $-.005 \pm .005$. In van Maanen's last list the parallax was $-.029 \pm .008$. Altair was measured on 42 plates with 124 exposures. The neutral filter reducing seven magnitudes was used

in the observations. The right ascension measures yielded a parallax of $+'.189 \pm '.004$ and the declination measures $+.075 \pm '.016$. The discordant result in declination suggests a possible orbital shift in that direction.

Mass ratios. The stars ζ Her and β CrB have now been observed throughout their entire orbital cycles. The period of β CrB was found here astrometrically in 1929. The stars γ Gem and 70 Oph will be observed completely throughout their orbits in two and three years respectively.

New variable star. The discovery of a new variable star near τ Cyg was reported by Burns (*A. J.* 53, 234).

Laboratory wave lengths. Burns reported the wave lengths of 118 lines, mostly infra-red, of the iron arc in air and Burns and K. B. Adams, Westinghouse Research Laboratories, 34 infra-red neon lines to the president of Commission 14 of the I.A.U. Work on the infra-red neon spectrum will be continued.

Burns and Fr. Francis Sullivan, O.F.M., St. Bonaventure College, published "The Spectrum of Nickel in the Vacuum Arc" in *Science Studies* for June 1947 (2991A-8968A) and June 1948 (1981A-2991A). The interferometer wave lengths of 1415 lines were included. Wave lengths of certain other spectra were also given for 252 lines.

Teaching and public visitors. A course in the history of astronomy, taught by Wagman, was