ing to about 400 km/sec, sharply bounded and strong.

3. The violet component of a doubled hydrogen line is usually two to three times as strong as the red one. For $H\gamma$ the tendency is less conspicuous, and for $Ca II$ it may be reversed.

4. During both minima $H\beta$ shows emission on the red side.

5. The spectrum undergoes drastic changes from cycle to cycle.

6. The difference in absolute magnitudes, deduced from the radii and temperatures, is in sharp contradiction to that derived from the well determined light-curve.

Further spectroscopic and photometric studies are needed. The system may be tentatively considered as consisting of two components of about the same mass, but very different sizes. The bluer component has apparently a rotation (see No. 2) about 15 times as fast as would be required if it rotated with the revolution period. At the same time, the blue component seems to eject a continuous stream of material from its far side, which spirals around the whole system, forming a tenuous envelope.

*Harvard College Observatory,
Cambridge, Mass.*

Gaposchkin, Sergei. Computing elements in an eclipsing system.

A modification of the method of Sharbe¹ is developed in detail. It seems to be fast and accurate, and to involve a minimum of auxiliary tables for computing the elements for eclipsing variables.

1. *Bull. Obs. Central Poulkovo* **10**, Part I, 31, 1923.

*Harvard College Observatory,
Cambridge, Mass.*

Gaposchkin, Sergei. The variable star HD 26750, BD —10°863, HV 11087.

A star in the field of the variable star YY Eridani was found to show a drop in brightness during the year 1944. The Harvard patrol plates, extending from March 7, 1888, to December 23, 1945, show only one minimum, lasting at most 321 days, with constant brightness at the bottom. If we ascribe the variable to the eclipsing class, the period must be over 53, perhaps over 57, years; the range is 0.8 magnitudes, 8.5 to 9.3 photographic. The spectrum is that of an M6 giant; no secondary spectrum was visible in December, 1944.

*Harvard College Observatory,
Cambridge, Mass.*

Henroteau, F. A rapid calculator.

This is a device to attach to what is now called a fully automatic mechanical calculator such as the Monroe calculator or the Friden Calculator.

The device takes the numbers from the machine without having to read them and writes them on the paper. It also takes the numbers from the paper and places them on the keyboard of the machine without having to read them.

Each figure 1, 2, 3, 4, 5, 6, 7, 8, 9 and 0 is written on the machine or on the paper by means of different colors. A rotating drum formed of ten successive sectors, each of which is displaced by one unit rank with respect to the other, and each of which contains ten color filters, revolves in front of the numbers to be picked up.

When the proper filter passes in front of the proper number it activates the single photo-cell of the system for a very short time and trips the thyatron which during this short time is just connected to the cell by means of a rotating commutator. As the thyatron remains energized it pushes down its corresponding key of the machine's keyboard by means of an electromagnet, if the number has to be placed on the machine, or pushes down its corresponding colored pencil, if the number has to be written on the paper.

*Farnsworth Television and Radio Corporation,
Fort Wayne, Ind.*

Henroteau, F. A wide-field reflecting telescope.

This telescope which would replace the Schmidt telescope with advantage is composed of two concentric spherical mirrors which neutralize each other's aberrations. The first mirror which first receives the light of the stars is convex while the second which has a greater radius than the first and which also has a central aperture to allow the light of the stars to reach the first mirror, is concave.

According to computations it should give images as good as those of the Schmidt telescope. It is, however, much simpler to build.

*Farnsworth Television and Radio Corporation,
Fort Wayne, Ind.*

Hertz, Hans G. A theory of the Trojan group, with application to (659) Nestor.

A general theory for the asteroids of the Trojan group has been outlined by Brown and Shook in their *Planetary Theory*. The details have been carried out and have led to a development of an approximate numerical theory that may be con-

structed for each member of the group individually. The theory is based on a development of the disturbing function to the second order of the eccentricities and inclinations. Canonical variables are employed which makes possible a separate treatment of the long and short period terms.

An application was made to (659) Nestor. A preliminary comparison of the theory for Nestor with a numerical integration of the orbit was made and corrections to the assumed values of the arbitrary constants were determined. A correction of $+1.1$ to the coefficient of the libration led to the new value of 10.2 . The assumed coefficient of the free oscillation of period approximately 3600 years in $p = \xi_2 \cos(60^\circ + \pi_0') - \eta_2 \sin(60^\circ + \pi_0')$ and $q = \xi_2 \sin(60^\circ + \pi_0') + \eta_2 \cos(60^\circ + \pi_0') - e_0'$ is 0.131 and the correction $+0.002$. In these expressions ξ_2 and η_2 are the Poincaré variables. The expressions are valid for those Trojan asteroids which follow Jupiter in longitude.

This work was begun at Yale Observatory under the direction of Dr. Dirk Brouwer and continued at the U. S. Naval Observatory. Acknowledgment is also made to the Watson Fund of the National Academy of Sciences for assistance. A detailed discussion will be published in the *Astronomical Papers of the American Ephemeris*.

U. S. Naval Observatory,
Washington, D. C.

Heyden, Francis J., S. J. Colors of seven Cepheid variable stars in Cygnus.

Light curves of seven Cepheid variables in Cygnus, namely, V 386, MW, VY, BZ, TX, SZ and CD Cygni, have been determined in blue-photographic, photovisual and photored light from photometric plates taken at the Harvard Oak Ridge Station. The mean light-curves were derived from observations taken during the summers of 1944 and 1945. Two telescopes were used so that each yellow or red plate was taken simultaneously with a blue one.

Color curves showing the variation of the blue-yellow and the blue-red color indices have been derived from the mean light-curves for each of the seven stars. These color curves show a definite correlation with the spectral curves which have been provided for this program by Dr. Struve of Yerkes Observatory.

Color excesses from the blue-yellow color indices are based on the difference between the observed color index at minimum light and pro-

visional normal color indices for stars of luminosity class Ib in the Morgan, Keenan and Kellman system. These normal colors were prepared by Miss Hagopian at Harvard Observatory. The color index at minimum light was selected because Struve has found¹ the spectra nearest to normal at that part of the light curve. Total photographic absorptions have been computed by multiplying the color excesses by the factor 5. This factor is perhaps too large.

The distance of the stars have been computed from the median absolute magnitude taken from Dr. Shapley's photographic period-luminosity curve, from the median apparent magnitude of the blue light-curves and from the total photographic absorption. The formula used was:

$$5 \log r = m - M - A + 5.$$

The following table contains a summary of the results.

Variable (Cygni)	m (pg)	Sp. (MKK)	M (pg)	C.E. (mag)	A (pg)	Distance (parsecs)
V386	11.00	G1	-1.53	0.91	4.55	395
MW	10.60	G1	-1.64	0.61	3.05	689
VY	10.60	G1	-1.85	0.71	3.55	603
BZ	11.75	G5	-2.02	0.80	4.00	900
TX	11.25	G6	-2.32	0.93	4.65	608
SZ	10.75	K0	-2.33	0.50	2.50	1308
CD	10.00	K0	-2.42	0.10	0.50	2421

The total absorptions found for these seven stars agree very well with those estimated by F. Miller² from star counts in the obscured regions near the North American nebula, and by Oort and Oosterhoff³ from the colors of four Cepheids in the Cygnus star cloud.

1. *Observatory*, 65, 257, 1944.

2. *Ann. Harv. Coll. Obs.* 105, 316, 1936.

3. *B. A. N.* 9, 325, 1942.

Georgetown College Observatory,
Washington, D. C.

Jehle, Herbert. Statistically independent elements of a stellar system; their significance for stellar dynamics.

Stellar dynamics has yielded many results by studying the motion of stars in a smoothed-out gravitation field. When we come to the problem of studying the interaction terms due to stellar passages, the force fluctuation method has so far been the most successful one. It has its serious limitation in the fact that in order to make calculations about the size, etc., of these force fluctuations, we have to make assumptions about stellar masses, and their distribution in position and velocity space. This difficulty is accentuated by the fact that we usually have a mixture of