Physical Characteristics of the System

	H.D. 37043-A	H.D. 37043-B
Sp	O8.5	O8.5
T_e	31,000° K	31,000° K
L	7,800 $\odot$	1,230 $\odot$
m_v	3.05	5.04
M_v	-5.0	-3.0
R	10.3 $\odot$	4.1 $\odot$
Mass	39.4 $\odot$	23.2 $\odot$
ρ	0.04 $\odot$	0.34 $\odot$

Separation of stars: at periastron = 26.6×10^6 km
 at apastron = 193.2×10^6 km

locity of escape. The parallax of the system is 0".0026, corresponding to a distance of 1250 light years.

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Petrie, Robert M. Recent spectroscopic results on HD 199140.

Radial velocities and spectral line intensities have been measured on single-prism spectra of this β Cephei star. The following results are established.

- 1) The period of the velocity variation is increasing linearly at the rate of 0".037 per year.
- 2) One period only is present and the spectral lines vary also in this period. The velocity curves exhibit irregular differences from cycle to cycle.
- 3) The total range of the velocity curve varies irregularly but increases on the average at a rate of 1.5 km/sec per year.
- 4) The spectral lines vary in shape being deepest and sharpest at "maximum" star and broad and shallow at "minimum" star. The total absorptions however remain sensibly constant over the cycle.

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Popper, Daniel M. Two eclipsing binaries with giant components.

TW Cancr. An earlier report¹ on this 70-day eclipsing binary indicated that the brighter and hotter component receded after primary minimum, which is a total eclipse. It is now clear that the lines measured are instead those of the cooler and photographically slightly fainter component. The only line of the hotter component which I have been able to measure is a broad strong K line, which yields rather uncertain velocities. On the basis of the velocity curves and of unpublished fragmentary light curves by Huffer and by Whitney, the following provisional properties of

the system are obtained:

Spectrum	G9 III+	F5::
Mass	1.3	1.3
Radius	8	1.5
M_{bol}	+1.2	
M_{pv}	+1.5	

The classification of the cooler star is from spectrograms at total eclipse. The computed value of M for this star from its radius and surface temperature is in good agreement with that expected from the spectral type, whereas M_{bol} is over two magnitudes above that predicted from the mass-luminosity relation for main sequence stars; i.e., it is over-luminous for its mass.

This system is comparable to Capella in respect to types of stars and period, and may perhaps be of equal or greater importance for the determination of the mass of a typical giant star. An advantage of TW Cnc lies in the fact that the spectral type and color of the giant can be determined unambiguously from observations at primary minimum.

The highly provisional nature of the data given above should be emphasized. The principal purpose of this note is to point out the importance of the system, and the need for improved data.

V356 Sagittarii. Since the previous report on this system,² light curves in yellow and blue light have been obtained at Mount Hamilton. Primary eclipse is total, and both eclipses are of considerable depth. The photometric ellipticity, Nz in Russell's notation, has the high value 0.34, which is due entirely to the cooler star. Because of the great difference in shapes of the stars, obtained from dynamical considerations, rectification of the light curve by ordinary procedures is invalid. On the hypothesis that the orbital inclination, i , is 90°, the following properties of the stars are obtained from the spectrographic and photometric data:

Spectrum	A2 II	B3: V
Mass	4.7	12.1
Radius	12.7	4.7
M_{bol}	-3.2	-4.1
M_{pv}	-2.7	-2.0

The values given here supercede those listed earlier.² The spectral class of the larger star was provided by W. W. Morgan from spectrograms at primary minimum.

For the hotter star the derived mass fits the mass-luminosity relation and the computed M is normal for the spectral class. For the cooler star, M_{pv} is in agreement with the estimate for this type of star,³ but M_{bol} is about 1.5 magnitudes

above the value predicted from the mass-luminosity relation for main sequence stars.

The question of the distribution of light over the surface of the large, greatly distorted A star is of particular interest, but cannot be answered adequately with the present observations.

1. *Pub. A. S. P.* **60**, 248, 1948.
2. *A. J.* **55**, 78, 1950.
3. Cf. Keenan and Morgan in *Astrophysics*, edited by J. A. Hynek, 1951.

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Recht, Albert W. Comet d'Arrest, 1943-50.

Short-period Comet d'Arrest has now been observed at ten appearances since its discovery in 1851. It has become of interest because of its constantly delayed returns, and this paper is a report of progress in following its motion during the last two returns, along with a prediction of the circumstances of its next return in 1957.

By using the best fit to normal places of 1910 and 1923-4 the 1943 return of d'Arrest was predicted with an error in T of -1.2 days, after two unobserved returns in 1930 and 1937. There were 33 observations in 1943-4, 30 by Van Biesbroeck at McDonald and Yerkes Observatories, 2 by Giclas at the Lowell Observatory, and one by Herbig at the Lick Observatory. The same elements with a correction of -1.2 days in T were carried forward to predict the 1950 return with an error of 0.2 day in T . There were 35 observations in the 1950-1 return, 30 again by Van Biesbroeck at McDonald and Yerkes, 2 by Jeffers at Lick, and 3 by Johnson at the Union Observatory at Johannesburg.

The observations for both appearances have been reduced and show a good modern precision. They are being used to form four normal places in 1943-4 and ten normal places in 1950-1. The period of observation in 1950-1 was the longest yet; rediscovered in April by Van Biesbroeck the comet was followed for ten months with the help of the powerful 82-inch McDonald reflector. It would be a fine thing if more large reflectors could be used to obtain observations to help explain the peculiar motion of this faint comet and to check the agreement of its actions with the Whipple theory for delayed and accelerated returns of comets.

We extend our thanks to George Van Biesbroeck of the Yerkes Observatory for these new series of observations which make continued study of d'Arrest possible, and to Arthur W. Beck of Denver, formerly assistant at Steward

and Chamberlin Observatories, for his work in their reduction.

The reductions to normal places and the prediction for the 1957 return of Comet d'Arrest will be published later in the *Astronomical Journal*. Indications are that the return to perihelion in January, 1957, will not be favorable for observation. At similar returns to the sun in 1864, 1884, 1903, 1917, and 1937, Comet d'Arrest was not observed at all. Now, of course, there are larger telescopes which may make observations possible even though the comet will be close to the sun in the sky during the 1956-7 return.

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Rense, Wm. A. and Barbara Todd. Problems in solar ultraviolet spectroscopy.

The solar continuum down to about 1900Å and the Lyman- α line have been successfully studied with rocket spectrographs in connection with programs sponsored by the Naval Research Laboratory and by the Cambridge Research and Development Center. Both normal-incidence and grazing-incidence spectrographs have been used. Several methods have been employed for illuminating the slit with solar radiation during the flight.

The solar spectrum should be extended in the 1900Å-1300Å range in the near future. A few of the other members of the Lyman series and even some helium lines are also likely prospects for future programs. The detection of both soft and hard X-rays by photon-counters has widened the possibilities for the explanation of the formation of the E and D layers in the atmosphere. Optical explorations of these latter radiations is difficult but may be accomplished soon.

New evaluations of the solar constant will soon be made both by direct measurement from rockets and by appropriate correction of the older values with the aid of information about infrared and ultraviolet solar radiations obtained to date from rocket instruments.

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Roberts, W. O., R. Grenchik* and D. E. Billings. Origin of white-light coronal streamers.

Two hypotheses were advanced for the explanation of the shape of individual rays or streamers of the electron corona seen in white light during eclipse, and sometimes found extending to