which means that the velocity of small eddies² is larger in the upper layers, we find good agreement between the calculated curves and the observed points for all the stars that Wright investigated. Our conclusion as given by equation (4) depends, of course, very much upon the accuracy of the observational methods.³

Calculations have also been made for the center-limb variation of turbulent velocities in the sun. The result agrees with C. W. Allen's observations.⁴

1. K. O. Wright, *J. R. A. S. Canada* **40**, 183, 1946; **41**, 49, 1947; *Pub. Dom. Astroph. Obs. Victoria* **8**, No. 1, 1948; No. 9, 1950; R. B. King and K. O. Wright, *Ap. J.* **106**, 224, 1947; K. O. Wright and E. Van Dien, *J. R. A. S. Canada* **43**, 15, 1949.
2. S. S. Huang, *Ap. J.* **112**, 418, 1950.
3. Office of Naval Research Project M 720-5, Ann Arbor, Oct. 1947 and June, 1948.
4. *M. N.* **109**, 343, 1949.

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Huffer, C. M., and Burt Nelson. Two-color light curves of the eclipsing binaries TW Cassiopeiae and U Cephei.

Two-color photoelectric observations of TW Cassiopeiae confirm the period 1.428326 days announced by Dr. Otto Struve at the Bloomington meeting. These observations show a well-defined secondary minimum 0.07 mag. at approximately half period. The primary minimum is deeper in blue light and the secondary minimum is deeper in yellow light. The eclipse at primary is annular or nearly annular and the depth of minimum is as expected if the larger star is cooler than the smaller.

Two-color observations of the much-discussed total-annular eclipsing star U Cephei are in accordance with the well-known fact that the light curve is lower just before the beginning of primary minimum than it is just after. It also appears from the light curve that the duration of totality is different on different nights, the variation being apparent near the beginning of totality and not near the end. These effects are interpreted as due to a stream of gas between the two stars which absorbs the light of the bright star when it is on one side of the faint star and not on the other. The stream of gas appears to be variable in size and density. Our light curve is still incomplete and indicates that the secondary eclipse is detectable but very shallow.

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Hynek, J. A. β Lyrae in the photographic infra-red.

The infra-red spectrum of β Lyrae, at numerous phases of its cycle, was examined at the Perkins Observatory, using dispersions of 50 and 300 Å/mm, respectively, for the purpose of ascertaining to what extent the Struve-Kuiper picture of the β Lyrae system, based on observations in the blue portion of the spectrum, is confirmed.

Although the main features of the Struve-Kuiper hypothesis are substantiated, it is clear that the simple theory is not sufficient to explain several phenomena found in the photographic infra-red. Principal among these is the behavior of the Paschen series, which appears to be much stronger before eclipse than after. This is opposite to the well-established behavior of the Balmer lines at these phases. The phenomenon may be related to the behavior of the singlet helium lines in the blue, which vary differently from the triplets.

The Paschen decrement varies throughout the cycle and appears most disturbed at phases 0.07–0.30. It may be significant that it is at this time that the B5 gases are in the line of sight to the companion star.

Further, the *O*I lines at $\lambda 7774$ vary in a pronounced manner. These lines, which in normal B9 supergiants have a total absorption of about 2.0 Å, are exceedingly weak during most of the cycle and are as strong or stronger than they are in a normal B9 supergiant, immediately before, during, and after primary eclipse.

The *O*I line at $\lambda 8446$ is never positively present either in absorption or emission, although in a normal B9 supergiant it has a total absorption of 1 Å or more. It is not certain whether the difference in the behavior of these two *O*I lines can be ascribed to the Bowen "Lyman β " mechanism or to the metastability of *O*I $\lambda 7774$.

Considering the system as a whole, it appears that the physical parameters of the gases projected against the B9 component before and after eclipse are more varied than has heretofore been supposed. The Paschen and the neutral oxygen lines seem particularly promising for a further study of the β Lyrae system.

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Keller, G., and R. E. Meyerott. Potential fields around ions in high temperature gas mixtures.

Preliminary to the calculation of the radiative opacity of gas mixtures of astrophysical interest,