Gould, Nancy E. The spectra of γ Virginis.

The two components of gamma Virginis appear to be close together on the main sequence of the Hertzsprung-Russell diagram if judged by the usual criteria of magnitude and spectral class. However, an examination of their spectra shows differences which can be interpreted as a higher degree of ionization and a higher rotational, or turbulent, velocity in the southern component.

Measurements of the equivalent widths of eight lines of ionized atoms and eight lines of the corresponding neutral atoms give values between 1.06 and 1.37 for the ratio of $(W_{II}/W_I)_{\text{south}}$ to $(W_{II}/W_I)_{\text{north}}$. Assuming that the electron pressures are the same in both stars, the ionization equation gives a difference of about 300° . The observed difference in apparent magnitude, 0.03 mag., is more nearly consistent with a temperature difference of 30° .

Two possible explanations come to mind: (1) Both stars are on the main sequence and the excess of ionization is caused by some other effect such as turbulence or rotation; (2) one or both of the components are not on the main sequence. An accurate determination of the color index difference of the two stars should distinguish between these two explanations.

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Herget, Paul. The return of comet Pons-Brooks 1884 I.

The observations in 1883-84 have been used to determine all the elements of the orbit except the period. Accurate perturbations were computed back to 1812, and those observations were used to determine the period. The resulting residuals in 1883-84 have a distinctly systematic character. Perturbations to the present and a recovery ephemeris have been computed. Perihelion is 1954 May 27.

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Huang, Su-Shu and Otto Struve. The curve of line-width correlation and its applications.

A new method for studying Doppler velocities in stellar atmospheres is proposed. It depends upon a relation between the equivalent widths and the half widths of the absorption lines. We call this relation the curve of line-width correlation. Following the procedure involved in the curve-of-growth method we first compute the

theoretical curve of line-width correlation and then compare it with the observed one. In this way we determine turbulent velocities of both, large and small, eddies.¹ Because the number of effective absorbing atoms is eliminated we need no longer any f values (which is one of the uncertainties in the plotting of the usual curve of growth) in order to get an observed curve of line-width correlation.

Applying this method to δ Canis Majoris we find that the turbulent velocities of large eddies are practically constant with respect to the strengths of absorption lines, and that the turbulent velocity of small eddies increases rapidly with increase of line intensities. The latter phenomenon was first discovered by K. O. Wright using the curve-of-growth method.² The mean velocity of the large eddies is of the order of 6.5 km/sec; that of small eddies ranges between 4 and 15 km/sec. The former may include an unknown contribution from the star's rotation.

1. E.g., A. Unsöld and O. Struve, *Ap. J.* **110**, 455, 1949; S. S. Huang, *Ap. J.* **112**, 399 and 418, 1950.
2. *J. R. A. S. Canada* **41**, 49, 1947, et al.

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Huffer, C. M. and Zdeněk Kopal. Limb-darkening of VV Orionis in two colors.

New photoelectric observations in two colors have been made with the 13-inch Cassegrain telescope of the McDonald Observatory of the University of Texas, using photoelectric equipment belonging to the Washburn Observatory. These observations, combined with others made in Madison, are more accurate than any obtained formerly. A new and better solution for the elements of this star than that published in 1951 is therefore possible.

It is apparent from the light-curves that the minima in the two colors are shallower than before. The secondary eclipse, which is total, permits an accurate determination of the phases of second and third contacts and hence a new determination of the darkening coefficients.

Assuming one solution with $\mu = 0.2$, $K = 0.455 \pm 0.003$, the ratio of the radii of the two components, is smaller than before, with a probable error ± 0.003 compared to ± 0.008 . There are corresponding changes of the other elements, but these changes are small. The ratio of surface brightness of the two stars is 1.64 in yellow light and 1.74 in blue light. The difference in magni-