maxima and minima in the bands during light minima. This is assigned to variable penetration of excitation into the ejected shell, revealing the true distribution of matter best during light minima.¹

In Nova Aquilae the bands showed strong central maxima during light maxima, and prominent "horns" at the band edges in the light minima.² From the later pattern of the nebula, it is clear that the minima represent more nearly the true distribution of matter.

Baade's proposed system of rings and polar caps as a model of the Nova Aquilae nebula gives an excellent account of the Doppler patterns observed with the slit in different position angles.³ The central maxima can be assigned to an "equatorial ring," closer to the star than most of the gas; the "horns" are assigned to "polar caps" ejected towards and from the earth at an angle of 16° to the line of sight. The ring was a small fraction of the total ejection, while the polar caps were a large fraction.

It is suggested that, during light minima, the star's radiation was able to excite all the ejected gas, even the dense polar knots, which were then brought out in their correct proportions. At the light maxima, the star's cooler radiation could excite the entire equatorial ring and the inner sides of the polar knots, but could not penetrate far into the latter; hence the central maxima were accentuated and the horns suppressed. The forbidden emissions, especially [NII], had the central maxima stronger relative to the horns than did hydrogen and other permitted lines. This is consistent with higher density and resulting greater strength of permitted lines in the polar knots.

1. McLaughlin, *Pub. A. S. P.* **60**, 54, 1948.
2. Payne and Menzel, *Pub. A. A. S.* **8**, 18, 1934; Sayer, *Circ. Harv. Coll. Obs.* No. 406, 1935.
3. Unpublished, but see van de Hulst, *Problems of Cosmical Aerodynamics*, p. 116, Central Air Documents Office, 1951.

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Miller, Freeman D. Rank correlation in astronomical statistics.

Conventional correlation methods are not applicable to statistical problems in which a physical or geometrical variable is represented by a ranking in order of its intensity of development, rather than by a series of measurements. Such characteristics are not uncommon in astronomy: the spiral classification Sa, Sb, Sc; the classifica-

tion of solar flares into "importance" groups; and the spectral classifications of the Henry Draper Catalog are familiar examples of ranked data.

It is frequently necessary to correlate such variables with one another, or with measured data. Conventional correlation is sometimes (incorrectly) employed, or, more often, resort is had to simple inspection of graphs. Astronomically, no use appears to have been made of the method of rank correlation, a theory developed precisely for the purpose of statistical discussion of ranked data.^{1,2,3} In this theory, the correlation coefficient, its mean error, and the estimate of significance, which are familiar features of the conventional theory, have their analogs for ranked data.

Details of applications to several sets of astronomical data will appear elsewhere.

1. M. G. Kendall, *Rank Correlation Methods*, 1948.
2. H. Jeffreys, *Theory of Probability*, 1939.
3. Symposium on Ranking Methods; *J. R. Statist. Soc., Series B*, **12**, 153, 1950.

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Nail, Virginia McKibben. Eclipsing variable stars in the Magellanic Clouds.

In the Small and Large Magellanic Clouds we have found and studied twenty-four and twenty-one high luminosity eclipsing stars, respectively. Through analyses of eclipsing star population in fourteen neighboring comparison variable star fields, all but two or three of these stars are shown to be actual members of the Clouds. The periods range from 66.9 to 1.02 days, with the majority of periods coming in the interval between two and four days. The mean absolute magnitude is around -2 , and the β Lyrae type predominates. Secondary minima are recorded for three-fourths of the variables. There is no clear indication of a concentration of eclipsing stars to the densest parts of the Clouds. Details are to be published from the Harvard Observatory in the near future.

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Odgers, G. J. and R. Stewart. Dynamics of turbulent flow and the evolution of stellar systems.

On examination most of the theories of binary star origin show various unsatisfactory features. It is unlikely for instance that fission can give rise to a star at all, and the accretion hypothesis runs into the difficulty that there is no correlation between the mass and period of a binary system.