Mayall show that the south-preceding end of NGC 5005 and the preceding end of NGC 5055 are approaching. There are now a total of eighteen spirals for which all the necessary data are known; these include the first eleven of the sixteen nebulae listed above plus NGC 224, 2613, 2841, 3031, 4088, 5055 and 6503. Using four interlocking criteria of tilt the spiral arms trail in all eighteen cases.

It is possible to calculate, under customary probability assumptions, what the *maximum* probability would be that one "reversed" spiral—a spiral with the arms leading—is among these eighteen spirals. This maximum probability is one forty-seventh; for two such spirals it is one over five hundred and thirty-three, and so on.

These observations and their analysis confirm and strengthen Hubble's conclusion that "the observational data lead to the working hypothesis that the arms are trailing in all spirals."

1. *Ap. J.*, 97, 112, 1943.

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Joy, Alfred H. Recent radial velocity measures of Mira.

Measures of faint metallic absorption lines of 92 high-dispersion spectrograms taken by Joy, Merrill, and Bowen in the last 16 years with the coudé spectrographs at the 100-inch and Hale telescopes indicate that marked variations in the velocity curves occur at different cycles of the light variation. While the maximum velocity of recession in a cycle is usually reached at or near maximum light this maximum velocity differs nearly as much at different cycles as the total observed range of velocity in any one cycle.

These irregularities are frequent and sufficiently large to make a constant mean curve, such as was previously deduced from low-dispersion plates,¹ invalid.

If a regular pulsation is present in the layers from which these lines originate it is frequently obscured by rapid disturbances from an unknown source.

The motions represented by the emission lines of neutral iron, silicon, and magnesium are always negative (outward) with reference to the absorption layers. The emission velocities seem less subject to disturbance than those of absorption and the velocity differences become less with increasing phases after maximum, as was previously found.

In general, the measures of Mira are in line with those of P. W. Merrill for other Me and Se variables.

1. A. H. Joy, *Mt. W. Contr.* No. 311; *Ap. J.* 63, 298, 1926.

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Levee, Richard D. Variations in the spectrum of σ Scorpii.

During 1950–1951, 225 3-prism spectrograms of σ Scorpii were obtained with the Mills spectrograph of the Lick Observatory. The radial velocities determined from the plates are connected by the period 0.246835 day. There is also a variation in the line width, which has a period identical to that of the radial velocity. On some nights double lines appear at maximum or minimum velocity; when they are not double, they are asymmetric, and there is little doubt that they are composed of the blended double lines. As in 12 Lacertae, it is the alternation of these lines which results in the measurement of a variable radial velocity.

There is a variation in the mean velocity with a period of approximately 33 days. The amplitude of the radial velocity curve also varies, but it is uncertain whether this variation is periodic. This latter variation is strongly correlated with a variation in the amplitude of the line width curves.

Struve's recent hypothesis for the β Cephei stars is considered in the light of the present investigation. The presence of a turbulent spot is fundamental to the hypothesis. The effect of such a spot on the line profile is examined. From the theory of the curve of growth the equivalent width of the turbulent spot may be taken to be three times that of the quiescent area, both per unit area, and it is found that for a symmetrical spot of radius one-half the radius of the star, the effect will be clearly marked.

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Liller, William and E. M. Lewis. The depression of the continuum in a Ko dwarf.

In the spectra of late-type stars where many lines are close together the wings of these lines overlap, thereby impairing measurements of the height of the continuum or the equivalent widths of the lines. The purpose of this study is to estimate the position of the true continuum of the Ko dwarf, ϵ Eridani, by comparing the computed