circumstellar star shell or the gas disk, but confines himself to explaining the results which can be directly derived from the behavior in the course of time.

1. A linear regression over the represented total period of more than twenty years allows the estimate of a yearly increase of the emissive power. To what extent the total increase of approximately 19 Å (August 1971) to approximately 37 Å (October 1998) is related to the X-ray activities referred to cannot be assessed here.

2. At JD 2449750 an eruption which lasted about four months could be observed which at its maximum of approximately 60 Å, was nearly twice as powerful as the base equivalent width of approximately 30 Å. To the knowledge of the writer, this eruption has not be confirmed by comparative measurements carried out by other observers.

3. The writer will continue to monitor γ Cas and in due course it will be possible to again report here on the further behavior.

References

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3.6. Long-term Monitoring of the Hα Emission Line Strength of the LBV P Cygni

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The application of CCD technology gives an exciting opportunity for the amateur spectroscopist to provide a modest contribution to the professional study of Be-star phenomena and the variability of emission-line stars in general. Especially the long-term monitoring of the time evolution of the Hα emission is one of the possibilities which has already lead to interesting results with a relatively modest instrumental expenditure. Stars including γ Cas, P Cyg, and VV Cep, just to name a few, are on the top of my priority list to obtain long-term observations over a period of several years. As an example of such monitoring, the behavior of the Hα emission of P Cygni is presented here. Although this star is not a classical Be star, but an LBV prototype, these observations demonstrate the potential of amateur spectroscopy.

The equipment used to obtain the results presented here is a configuration of a Maksutov-type reflector (f = 1000 mm, aperture = 100 mm) and an objective prism made of F_2 flint glass of the same aperture with a refracting angle of 30°. This instrument's linear dispersion is about 6 Å pixel^{-1} at Hα. The spectrum is recorded on a CCD camera. The chip is an FT800P manufactured by Philips Co. with 386×290 pixels. The camera has a 6.4×4.8 mm field size and offers a resolution of $\lambda/\Delta\lambda \sim 2000$ at Hα. The equivalent width W_λ was calculated using the standard formula but with the sign convention changed to use positive numbers for emission lines. The integration interval over the emission maximum is 55 Å. Since the blue-shifted absorption component is not resolved, it is included in the measured W_λ. The exposure times of the spectra are 128 seconds, which leads to a S/N on the order of 200.

The observation period covered so far extends from September 1994 until January 1999 (see Figure 1), during which the equivalent width varied from 60 to 110 Å. The data over nearly 5 years document the slow passage through a minimum in the equivalent width, i.e., in the emission line strength. Superimposed, a quasi-periodic microvariation is seen on time scales from weeks to months. A period analysis by means of Lomb-Scargle periodograms, however, detects no statistically significant ($3\ \sigma$) periodic variations in the data record (Kaufer, private communication).

This result obviously encourages continuation of the monitoring of P Cygni in the same patient way for some further years in order to search for Hα variability in a much larger and continuous data record.

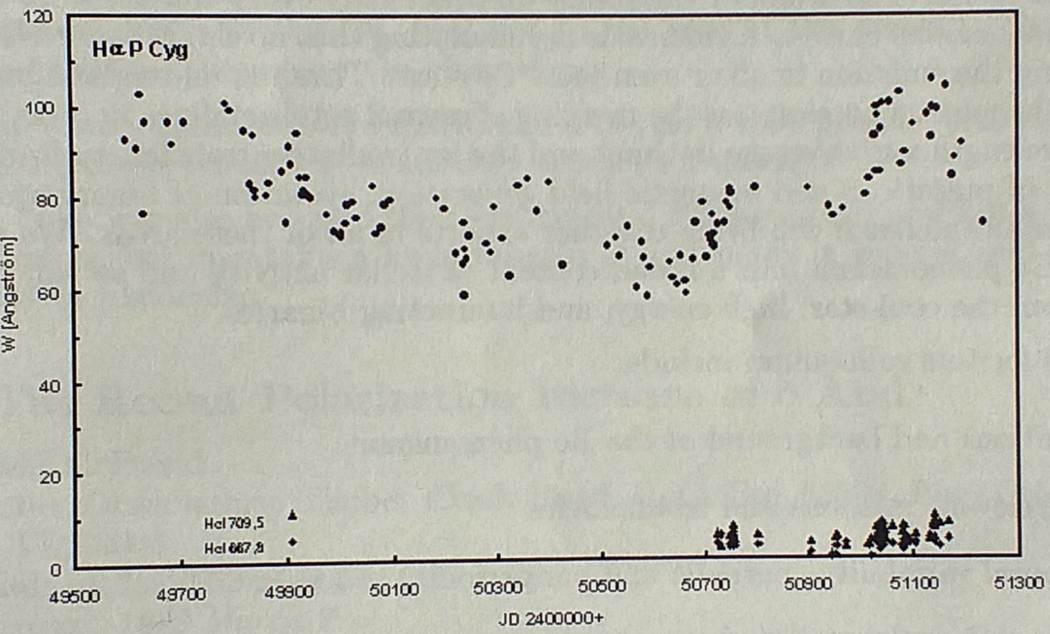

Figure 1. Equivalent width of the Hα emission line vs. time for P Cyg.