Cetus Loops and the Gum Nebula (Sivan, J. P., 1974), and with the giant Hα shells observed in the Large Magellanic Cloud (Davies, R., Elliot, K., Meaburn, J.: 1976, *Memoirs of the Royal Astronomical Society,* **81,** 89).

Further investigations (in particular spectroscopic observations) are required to understand the origin of the isolated ring-like structures shown in Fig. 2 as well as that of those observed in the spiral arms (Fig. 1). The energy released in the interstellar medium by supernova explosions and stellar winds may play an important role.

Cyclic Variations of T Tauri Stars

N. Kappelmann and H. Mauder, Astronomisches Institut der Universität Tübingen

During a photographic survey of the Chamaeleon T association in 1971/72, evidence was found by Mauder and Sosna (*Information Bulletin on Variable Stars,* 1049, 1975) for quasi-cyclic light and colour variations of three variable stars, members of this nearby group of young stars. They were classified by Hoffmeister (*Veröff. Sonneberg* **6,** 1, 1963) as T Tauri stars because of their light variations, and this type was confirmed with objective prism spectra by Henize and Mendoza (*Astrophysical Journal,* **180,** 115, 1973).

These three stars, SY Cha, TW Cha and VZ Cha, were observed in the UBV system in the year 1974 by Mauder and twice in the year 1979 by Kappelmann and Mauder, using the ESO standard photometer. Although it could be seen even in 1974 that these three stars show the assumed quasi-cyclic periods, the data of the year 1979 allowed us to confirm these periodic variations and to derive the periods with suitable analysis methods. We derived a period of 7.6 days for SY Cha, 8.6 days for TW Cha and 7.2 days for VZ Cha, and the figures 1, 2 and 3 show the corresponding lightcurves in V.

The colour variations are nearly in phase with the changes in V, and a large ultraviolet excess is found, as expected in T Tauri variables. Thus the photometric measurements not only show variations of the continuum level and the UV excess on time scales of hours or days, a characteristic of the T Tauris, but indicate variations with periods reproducible on time scales of years.

The next step was to confirm these periods with spectroscopic data, but because of the rather faintness of these three systems, with m_V between 12th and 14th magnitude, detailed spectroscopic investigations are difficult. Spectroscopic observations in the blue region were carried out in July 1979 by Mauder, using the Boller and Chivens Cassegrain spectrograph of the ESO 1.5 m telescope. The usable spectral range was about 3600–5100 Å and the spectra were recorded with a dispersion of 58 Å/mm. The observations were carried out on 3 and on 4 consecutive nights, separated by a gap of 12 nights. The spectra are dominated by bright emission lines, among which the strongest lines are H_γ, H_δ, H_8, Ca II K and the Ca II H + Hε blend. The spectra show the typical veiling, a continuous emission in the blue spectral range and exhibit little evidence for an underlying late-type spectrum. As reported by Appenzeller (*Astronomy and Astrophysics,* **71,** 1979), these three stars are members of the YY Orionis type, a subclass defined, among other things, by inverse P Cygni profiles. But we found no evidence for these typical profiles, neither in the Balmer lines, which can be

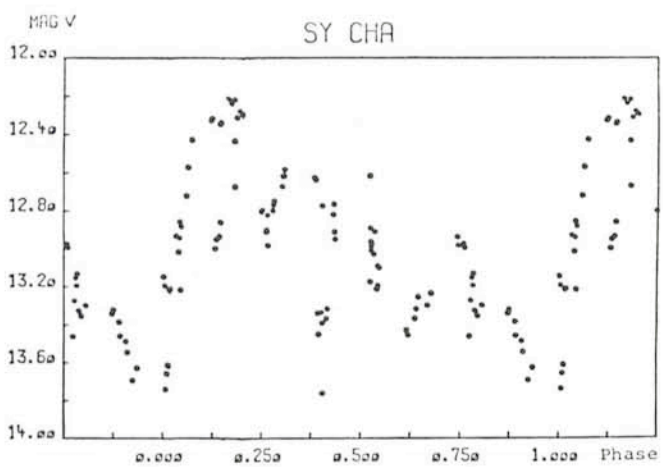

Fig. 1: *Lightcurve of SY Cha, plotted with a period of 7^d.6.*

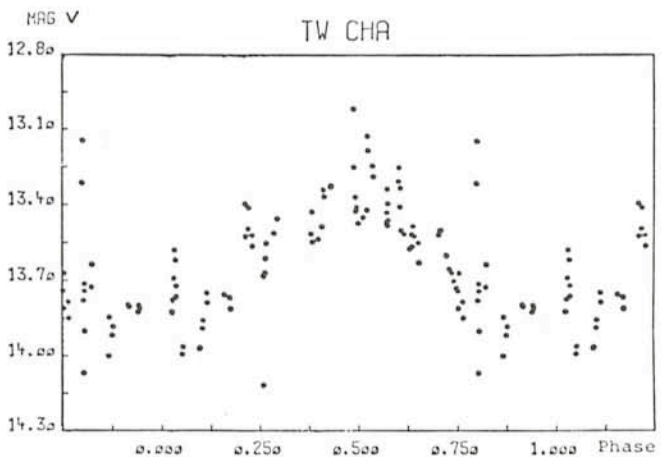

Fig. 2: *Lightcurve of TW Cha, plotted with a period of 8^d.6.*

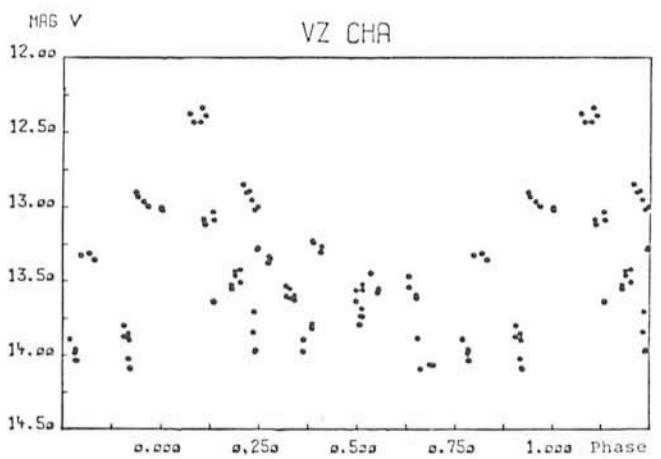

Fig. 3: *Lightcurve of VZ Cha, plotted with a period of 7^d.2.*

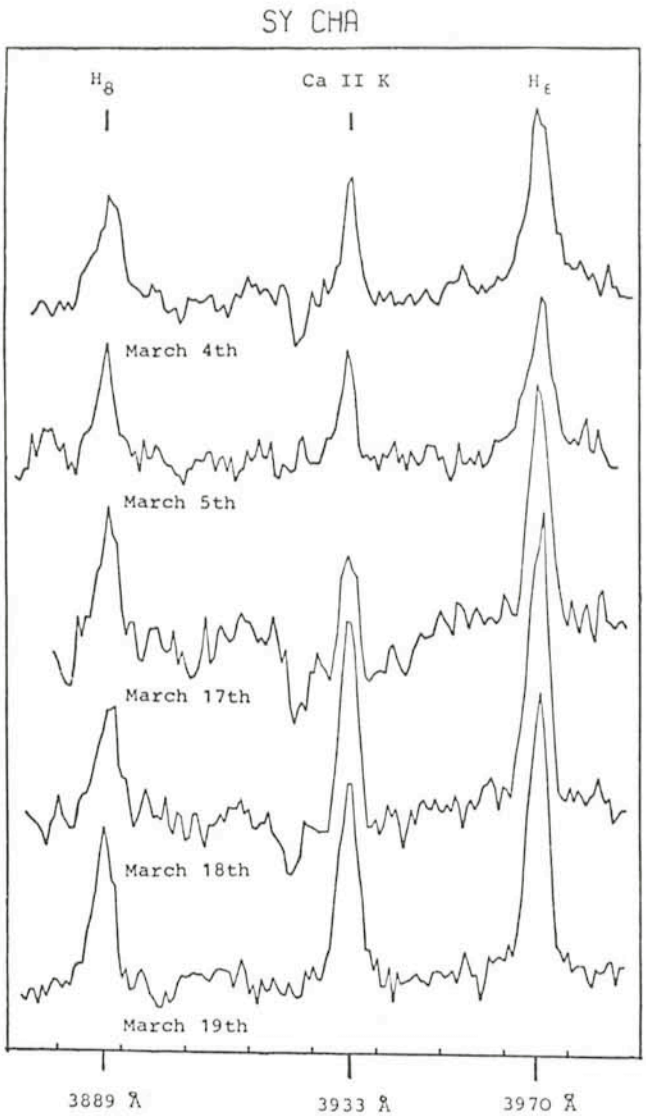

Fig. 4: *Density tracings of the spectrum of SY Cha between the Balmer H_ε and H_8 lines.*

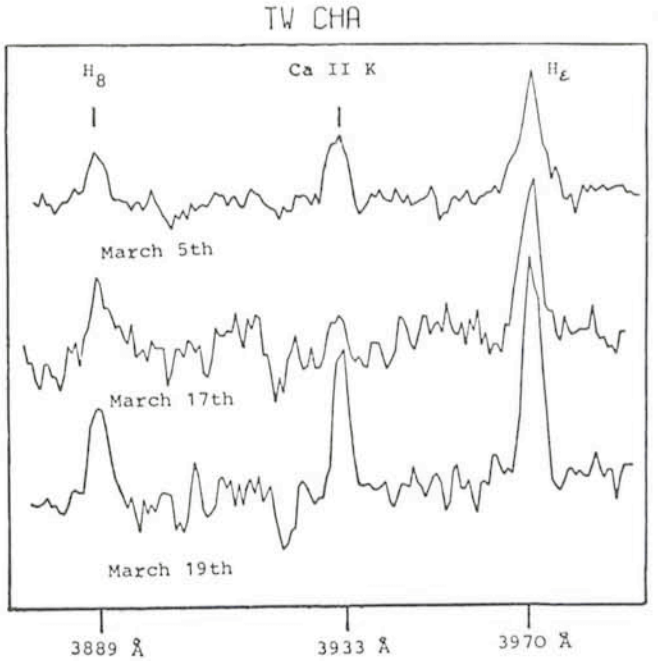

Fig. 5: *Density tracings of the spectrum of TW Cha between the Balmer H_ε and H_8 lines.*

resolved until H_{12} (but the lines with $n > 8$ are rather weak and therefore not very suitable to detect this type of profile, most conspicuous at these lines), nor in the metallic Ca II K line. However, besides a variation of the Balmer lines, there is a complex P Cygni profile of the calcium line, varying strongly within the observational run. In Fig. 4, where the density tracings of SY Cha are plotted, you can see the profile very well in the first spectrum, while vanishing in the second one. Nearly two "photometric" periods later there is again this complex but well seen P Cygni profile in the spectrum of March 17 and it is hardly detected in the last spectrum. A similar behaviour of the Ca II K line of TW Cha can be seen in three selected spectra in Fig. 5.

The lightcurve of TW Cha seems to be well defined, and these three types of spectral features can therefore be attached to the photometric phase of this star. The spectrum of March 5 is correlated to a phase (0.25) of medium luminosity, the spectrum of March 17 is correlated to a phase (0.5–0.6) of high luminosity and the last feature is correlated to a phase (0.9) of low luminosity. This correlation holds true for the other two stars in nearly the same way. Thus we make the conclusion that there is a strong evidence of correlation between the metallic emission line of calcium and its P Cygni profile and the luminosity of the star. But simultaneous photometric and spectroscopic observations based on a time scale of at least two periods are needed to verify this conclusion, to solve the problem of the appearance of different types of P Cygni profiles, and would help to understand the responsible physical processes.

MR 2251–178: A Nearby QSO in a Cluster of Galaxies and Embedded in a Giant H II Envelope

J. Bergeron, Institut d'Astrophysique, Paris

Very extended nebulosities of high excitation have been discovered around a few active galaxies. For the two radio galaxies 3C120 and PKS 2158–380 they extend over dimensions of at least one arcminute (or about 50 kpc) and can be studied in the optical with a reasonable spatial resolution. These observations give information on the interaction between the active nucleus and its surrounding and on the nature of the gaseous envelope.

In the case of 3C120, the luminosity approaches those of QSOs. In addition, a stellar component has been brought into evidence in the brighter parts of the nebulosity.

The strongest lines emitted by these nebulosities are