So the question is open! Are these observations reflecting real events? (IAU Circ. No. 3503 and No. 3515.) Maybe the answer lies in the results of future observations. Meanwhile, let us consider Figure 6 which gives an idea of the problem.

With the same stellar flux level, I, II and III in this figure show the profile obtained with an intentional decentering (followed by immediate recentering, what we never did during the observations), the one of a possible newly discovered event, and the one of a known ring, respectively.

In the same figure, A, B and C correspond to the profile of a known ring, a seeing fluctuation and a possible event. Which is which?

Finally, let us recall the events reported by Churms (1977) and Millis and Wasserman (1978) during the March and December 1977 occultations and which have never been confirmed. On the other hand, one should bear in mind the fact that Nicholson *et al.* (1978) claimed that rings 5 and 6 are not two complete rings, but rather a collection of incomplete arcs. Again, only future occultations, preferably observed with telescopes less than 1 km apart, will throw more light upon the question of whether these random phenomena are caused, as suggested by J. Lecacheux (1980) by a profusion of large boulders not organized to form a ring.

Conclusion

The result of this observation will be published in the next months. Here, we can only give an abstract of the main results:

– The already observed structure of the rings has been confirmed and additional features have been discovered such as broad structures near the narrow rings. Rings have a very complex internal structure and the existence of incomplete arcs or additional satellites around Uranus has to be investigated.

– The observations from La Silla, Las Campanas and Cerro Tololo are used to compare the structure of the atmosphere of Uranus at points separated by about 100 km, along the planetary limb. There are striking, but not perfect, correlations of the lightcurves. This rules out the isotropic turbulence as the cause of lightcurve spikes. The atmosphere is strongly layered and its mean temperature is 150 ± 15°K.

In order to have a better understanding of the dynamics and the structure of the rings and the atmosphere of Uranus, it is necessary to observe additional occultations, each one being a high-precision scan of the planet and its rings, in order to reconstitute point by point the ring system.

References

Bouchet, P., Perrier, Ch., Sicardy, B. IAU Circulars, No. 3503 and No. 3515.

Brahic, A. (1977) *Astron. Astrophys.*, **54**, 895.

Brahic, A. (1981) in Uranus and the outer planets (IAU/RAS Colloquium No. 60, G. Hunt ed)., Cambridge University Press.

Churms, J. (1977) IAU Circular No. 3051.

Elliot, J. L., Dunham, E., and Mink, D. (1977a) *Nature*, **267**, 328.

Elliot, J. L., Dunham, E. and Mink, D. (1977b) *Bull. Am. Astron. Soc.*, **9**, 498.

Elliot, J. L., Dunham, E., Wasserman, L. H., Millis, R. L. and Churms, J. (1978) *Astron. J.*, **83**(8), 980.

Elliot, J. L., French, R. G., Frogel, J. A., Elias, J. H., Mink, D. and Liller, W: (1980), Center for Astrophysics, Preprint series No. 1407.

Elliot, J. L. (1981) in Uranus and the outer planets (IAU/RAS Colloquium No. 60 (G. Hunt, ed.), Cambridge University Press.

Goldreich, P. and Tremaine, S. (1978), *Icarus*, **34**, 227.

Goldreich, P. and Tremaine, S. (1980), *Astrophys. J.*, **241**, 425.

Hénon, M. (1981), *Nature*, to be published.

Klemola, A. R. and Marsden, B. G. (1977), *Astron. J.*, **82**, 849.

Lecacheux, J. (1980) (Journées Scientifiques de la S.F.S.A.), *le Journal des Astronomes Français*, November 1980.

Millis, R. L., Wasserman, L. H. and Birch, S. (1977), *Nature*, **267**, 330.

Millis, R. L. and Wasserman, L. H. (1978), *Astron. J.*, **83**, 993.

Nicholson, P. D., Persson, S. F., Matthews, K., Goldreich, P. and Vengebaner, G. (1978), *Astron. J.*, **83**(10), 1240.

RCW 58: A Remarkable HII Region Around a WN 8 Star

M. C. Lortet and G. Testor, Observatoire de Meudon, and L. Deharveng, Observatoire de Marseille

In the course of a programme of detailed study of galactic ring nebulae around Wolf-Rayet stars, we obtained an Hα photograph, Hα interferograms and Boller and Chivens spectrograms of the H II region RCW 58 (Rodgers *et al.* 1960).

The Hα photograph is reproduced in Figure 1. The overall shape, as was known previously (Smith, 1968), is a ring centered on the WN 8 star HD 96548[1]. However, the nebula is remarkable for its clumpiness, the presence of large scale curls to the south, and above all the existence of radial features never observed for any other H II region.

The spectrograms indicate a relatively low degree of ionization, electron densities in the range 200 to 500 cm^{-3}, and large variations of the line intensity ratio of [S II]λλ6717–6731/[N II]λ6584 over the nebula.

The radial velocity field, obtained from Hα interferograms, is complex; different clumps display different velocities, from about −60 km s^{-1} to +60 km s^{-1}. On the spectrograms, the [N II]λ6584 and Hα lines are tilted, and even split; the velocity difference between the two components reaches 100 km s^{-1} in the direction of a low brightness central region. This behaviour is reminiscent of those observed for NGC 6164–5 and M1–67[2], two nebulae formed of condensations ejected respectively by an O6f and a WN 8 star.

The complexity of the radial velocity field does not allow any estimate of a kinematical distance for RCW 58. If its central star is a typical massive WN 8 star ($M_v \simeq -7.0$, Van der Hucht *et al.*, 1981), its spectroscopic distance is about 4 kpc.

Moffat and Isserstedt (1980) showed recently that the central star displays small periodic radial velocity variations; this may indicate the existence of a compact companion, so that the star would be a second-generation Wolf-Rayet star during the evolution of a binary system. This assumption is consistent with the large distance of the star from the galactic plane (z = 333 pc for D = 4 kpc) which could result from the ejection of the system when the primary star exploded as a supernova. Under this assumption, the spatial motion of the

[1] HD 96548 = number 40 in the Catalogue of Wolf-Rayet stars by Van der Hucht et al. (1981) = MR 34 in Roberts (1962).

[2] M1–67 in the catalogue of Minkowski (1946) = Sh2–80 in the catalogue of Sharpless (1959); the Hα radial velocity fields of NGC 6164–5 and M1–67 were obtained respectively by Pismis (1974) and Pismis and Recillas-Cruz (1979).

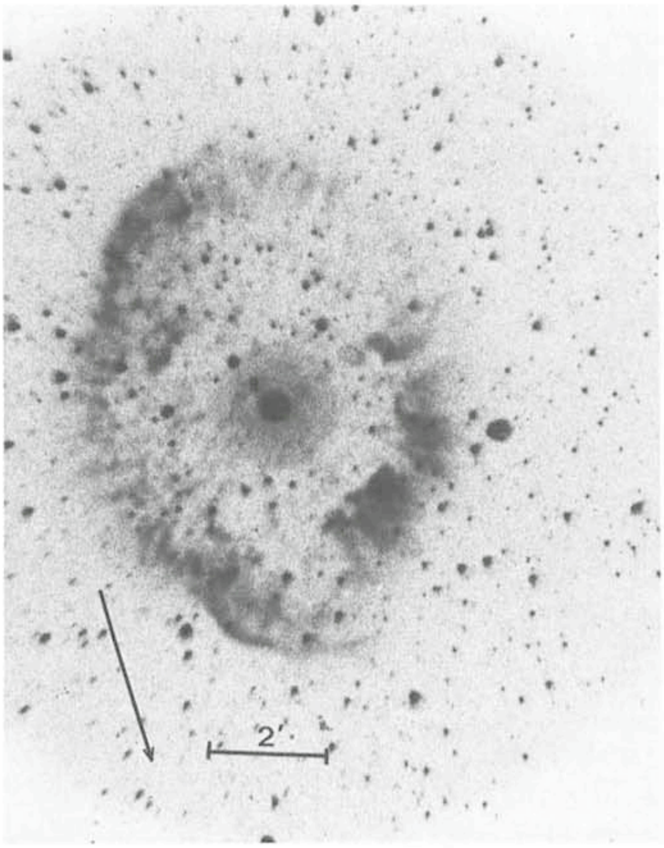

Fig. 1: *Hα monochromatic photograph of RCW 58 (plate taken by G. Tenorio-Tagle and L. Deharveng). The device used is the "focal reducer" attached at the Cassegrain focus of the 152-cm telescope at La Silla (aperture ratio F/1, exposure time 30 min, baked Kodak IIIa-F emulsion). The arrow indicates the direction of decreasing galactic latitude.*

system may be as large as 100 to 200 km s^{-1}. As no high radial systemic velocity is observed (the N IV line λ 4058, with V_R = −16 km s^{-1}, may have a velocity close to the systemic velocity, Moffat and Seggewiss, 1979), the motion may be nearly perpendicular to the line of sight. Its expected magnitude, about 5 to 10 10^{-3} arcsec per year, makes it detectable by the Hipparcos experiment to be launched in 1986 by ESA. The direction of the motion is expected to be nearly perpendicular to the galactic plane towards negative latitudes, as indicated on Figure 1.

Current work is going on in order to check the suggestion made by Chu (1980, 1981) that RCW 58 is primarily made of discontinuous ejecta from the central star, and to elucidate the process of formation of the southern curl and the radial filaments.

References

Chu, Y. H.: 1980, *Bull. Amer. Astron. Soc.* **12**, 842, and preprint.
Chu, Y. H.: 1981, Submitted to *Ap. J.*
Minkowski, R.: 1946 *Publ. Astron. Soc. Pac.* **58**, 305, table I.
Moffat, A. F. J., Isserstedt, J.: 1980, *Astron. Astrophys.* **91**, 147.
Moffat, A. F. J. Seggewiss, W.: 1979, *Astron. Astrophys.* **77**, 128.
Pismis, P.: 1974, *Rev. Mexicana de Astron. Astrof.* **1**, 45.
Pismis, P., Recillas-Cruz, E.: 1979 *Rev. Mexicana de Astron. Astrof.* **4**, 271.
Roberts, M. S.: *Astron. J.* **67**, 79.
Rodgers, A. W., Campbell, C. T., Whiteoak, J. B.: 1960, *M.N.R.A.S.* **121**, 103.
Sharpless, S. L.: 1959, *Ap. J. Suppl.* **4**, 257.
Smith, L. F.: 1968, in *Wolf-Rayet Stars,* p. 41, Proceedings of a Symposium held at the joint Institute for Laboratory Astrophysics, National Bureau of Standards, Boulder, Colorado (eds. K. B. Gebbie et R. N. Thomas).
Van der Hucht, K. A., Conti, P. S., Lundström, I., Stenholm, B.: 1981, Space Sci. Rev., **28**, 227.

Installation and First Results of the Coudé Echelle Spectrometer

Daniel Enard, ESO

Introduction

The Coudé Echelle Spectrometer was installed in the 3.6-m telescope building in November and December 1980.

Despite several unexpected difficulties—like the necessity of the replacement of the granite table supporting the monochromator, which arrived broken into three pieces, and the astonishing discovery that the wall paint of the coudé room was slightly fluorescent—the instrument was assembled and pretested. Unfortunately, and because of lack of time, the final adjustment and first improvement of the software in the light of the first practical observations could not be done during this period. It is only in May 1981 that the first test observations were done with the active collaboration of E. Maurice and P. E. Nissen.

The Instrument

The main characteristics are summarized in Table 1. The CES has already been described (D. Enard, *The Messenger* No. 11, Dec. 1977) and at the 1978 Trieste conference (D. Enard and J. Andersen, 4th Colloquium on Astrophysics,

Table 1. – CES CHARACTERISTICS

- *Resolving power: optimal 100,000 (FWHM of instrumental profile)*
- *Spectral range: 3600–11000 Å*
- *2 separate optical paths optimized for:*
  - Blue 3600 < λ < 5500
  - Red 5000 < λ < 11000
- Modes:
  - Scanner single/double pass: – Max scanning frequency 5 Hz
    – Detector PMT QUANTACON
  - Multichannel: – Camera F/5, dispersion about 1.2 Å/mm
    – Detector – Reticon RL 1872 F
    – CCD or photon counting device (not yet determined)
- Dispersive element: – 200 × 400 mm echelle grating; 79 grooves/mm, blazed at 63°26′
- Order separation achieved with a prism monochromator