Results

Usually B, V photometric results on star systems are displayed through a colour-magnitude diagram (V, B-V). In a similar diagram globular clusters are characterized by the presence of a red giant branch (GB), a horizontal branch (HB) and an almost vertically descending subgiant branch to the turnoff (TO) point and main sequence (Fig. 4).

The most characteristic part of the upper region of the diagram is the HB which crosses the RR Lyrae instability strip. Its structure may strongly differ from cluster to cluster.

A change of the metal abundance was found for the inner halo clusters, in the sense that more metal poor clusters have the blue side of the HB more populated, while metal rich globular clusters have more stars in the red part.

However, a number of significant exceptions seem to indicate that factors other than the metal abundance are playing an important role (the "second parameter effect").

Fig. 5 shows the colour-magnitude diagram of Pal 3. Well defined GB, SGB and a short, predominantly red HB are present with some RR Lyrae variables, indicated by "v" symbols. Similar results have been obtained for the other two clusters. The HB structure is anomalous for intermediate metal-poor clusters like these ones. This anomalous behaviour seems to be quite frequent among outer halo clusters (Pal 14, Da Costa, Ortolani and Mould, *Astrophysical Journal*, **257**, 633, 1982; NGC 7006, Sandage and Wildey, *Ap. J.* **150**, 469, 1967) giving evidence for the importance of this mysterious "second parameter effect".

Another important result is a good distance estimate for these systems which lie at about 100 kpc from the Sun, at the frontiers of the Galaxy.

The exceedingly good quality of the data and the unexpected character of the results indicate the importance of extending our survey to other unstudied clusters at the edge of the Galaxy.

Comet P/Crommelin 1983n

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Comet Crommelin has a period of approximately 27.4 years and consequently a well-studied orbit. It has an orbital excentricity $e \simeq 0.92$, taking Crommelin on its excursions through the solar system out to a distance of 9.09 AU and in to a perihelion distance of approximately 0.73 AU. The precise orbit details are given in IAU circular No. 3886. A comet's predicted brightness is unreliable, a function of distance from the sun, earth and albedo and naturally it is the albedo which is poorly known. But predictions for a comet with many previous passages are more reliable and the integrated visual brightness of Crommelin was predicted to be in the order of 7 to 11. It was recognized that Crommelin would serve nicely as a test object for the International Halley Watch network (IHW), i.e. its participating observers, equipment and data compatibility. Obviously the closer the comet to the sun the brighter it becomes but of course the more it moves into day. It is usual then when the comet is brightest to catch it either in the early morning as it rises before the sun, or just above the horizon in the early evening after the sun has set.

In April and March Crommelin was well placed for observations in the southern hemisphere, reasonably bright and above the horizon in the early evening for approximately 40 to 90

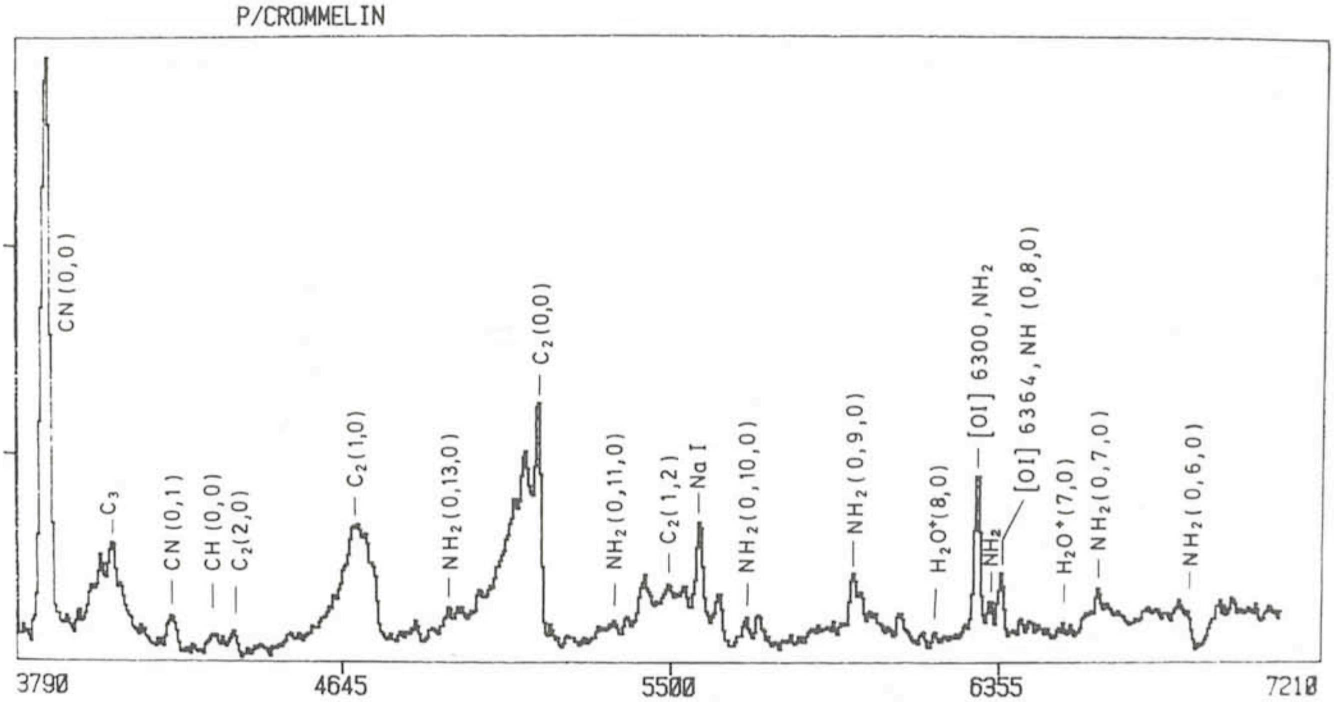

Fig. 1: *A 6 minute integration on Comet P/Crommelin taken at the 3.6 m telescope on March 9, 1984 (by J. Lub and R. Grijpe), using the Boller and Chivens spectrograph and IDS detector.*

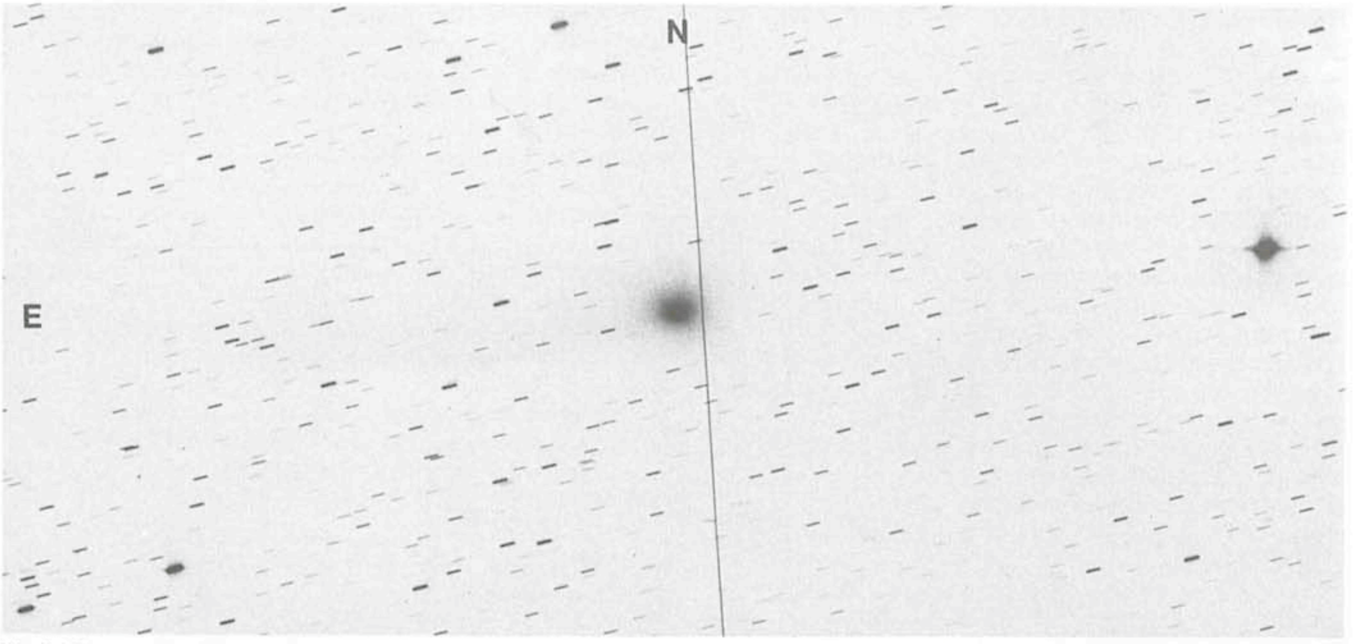

Fig. 2: *Photograph of the comet with satellite trail. A 10 minute exposure taken on March 19 by H.-E. Schuster using the Schmidt telescope, 098-04 emulsion and a GG 495 filter.*

minutes. Visiting astronomers at the 3.6 m, Dr. J. Lub and R. de Grijpe (Leiden) kindly agreed to include Crommelin in their observing list and made a trial integration using the IDS detector and Boller and Chivens spectrograph on March 8. The ephemeris provided by the IHW network (1984) proved very good and the comet was immediately visible in the field of the 3.6 m, moving quite quickly and with an estimated magnitude of $V \simeq 13$ mag. A second integration 2×3 minutes was made on March 9 and is shown in Fig. 1 with the principal spectral features identified. The instrument configuration was optimized for observing emission line galaxies but was quite suitable for initial exploratory spectra of Crommelin. The two entrance apertures of the IDS subtended 4×4 arcsec on the sky and were separated by 40 arcsec. The spectrum shows the strong CN (0,0) Violet band at 3880 Å, C_3 λ 4050 and well developed C_2, $\Delta v = 0, +1, -1$ sequences. The other prevalent common molecule seen is NH_2. The spectrum shown does not have the sky subtracted, however, as the second aperture was still in the comet coma but the reflected solar continuum is quite low in the blue and suggests Crommelin has a relatively low dust content. The grating used was 170 Å/mm and gave a spectral resolution of approximately 13 Å.

At the same time Dr. D. Cesarsky (Institut d'Astrophysique, Paris) was observing with the recently commissioned 2.2 m telescope at La Silla, also equipped with a Boller and Chivens spectrograph but with a CCD detector. A 15 minute integration clearly showed the continuum spectrum from the comet's nucleus and emission bands from the CN (2,0) Red system.

Later, on March 19, H. E. Schuster took a fine photograph shown in Fig. 2 with the ESO Schmidt telescope. A satellite trail is seen crossing the field of view during the exposure which was made on 098-04 emulsion with a GG495 filter. The tail can be seen stretching to the east.

These are just a few of the results obtained on Crommelin at La Silla. Many visiting astronomers took spectra and carried out photometry including a group coordinated by M. Festou specifically for the HWI team. However, what is clear is that with the kind cooperation of visiting astronomers interesting and useful coverage of comets can be achieved.

I would like to thank the visiting astronomers who participated in obtaining these observations.

Reference

International Halley Watch Spectroscopy and Spectrophotometry Bulletin No. 1 (1984).

The Pickering-Racine Wedge with the Triplet Corrector at the ESO 3.6 m Telescope

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Racine (1969, 1971) has revived the original idea of Pickering (1891) for extending photometric magnitude sequences on photographic plates, namely placing a slightly deviated glass wedge in the entrance beam of the telescope. This technique produces a faint secondary image next to the primary image of each bright star, and the apparent magnitude difference will be, in theory, constant over all the plate and in all colours. The secondary images may then be compared directly with the primary images of fainter stars, thereby allowing the extension of the magnitude sequence to the plate limit.

In principle the magnitude difference Δm between the two images should depend only on the ratio of the wedge area to the rest of the beam area. However, in practice, Δm should be determined for each photographic plate since it can depend