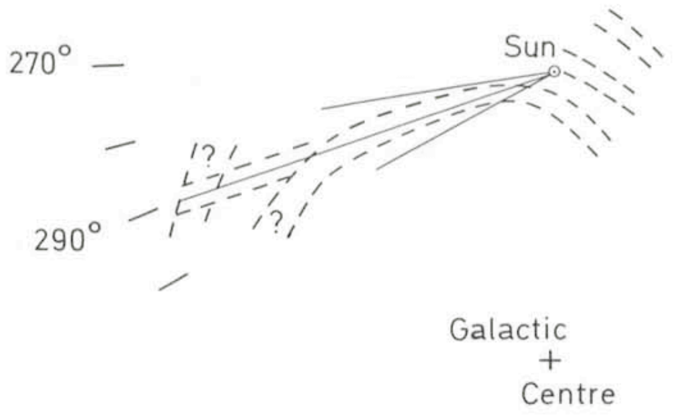

Geometry of the Carina spiral feature. The three directions in which observations were obtained are indicated on the figure.

1 and 8 kpc from the Sun. He also found that we are looking along the Carina arm at galactic longitude l ≈ 290°.

During three observing runs at La Silla (1974, 1976 and 1977) I studied some fields in the Carina direction. One area at l = 280° is situated just outside the Carina arm, another (l = 290°) contains objects belonging to the arm, and a third area (l = 298°) cuts through the arm.

Only OB stars were studied, since they are by far the most numerous ones and consequently the best for statistical treatment. Furthermore, their luminosities and intrinsic colours are fairly well known. The OB stars were measured in UBVβ. To discover fainter stars than those investigated by Graham, three-colour photographic survey plates were used for detection (U, B and V exposures were made on the same plate with slight displacements between the exposures).

Two fields along the arm, one in the plane and the other one degree below it, were examined. The results (*Astron. and Astrophys. Suppl.* **23,** 231) show that there are OB stars in both areas with distances from 1.5 to 15 kpc. About 40 of them are situated between 10 and 15 kpc. One may ask if these stars are members of the Carina arm, or if the arm bends inwards at a distance of about 6–9 kpc, as suggested by some investigators. Another possibility is that these stars are members of an outer arm as found from 21-cm radio data. This arm could be an extension of the Local arm or of the Perseus arm. It seems clear that the interstellar extinction does not increase very much from 2 to 6 kpc. Thus, in spite of the large number of young stars, practically no absorbing matter is found. An increase of the matter density occurs suddenly at 6 kpc. The increase is more pronounced in the plane than below it. This could partly explain why several investigators suggest a bending down of the Carina arm at larger distances.

A maximum of OB stars between 2 and 4 kpc displays the position of the Carina arm in the direction l = 298°. Very few stars have distances less than 1.5 kpc, which means that no connection is found between the Local arm and the Carina arm in this direction.

At l = 280°, on the other hand, a large number of OB stars were found within 1 kpc from the Sun, and the density of absorbing matter is comparatively high. This region is probably a part of the Local arm.

To get more information about the positions of spiral arms in our galaxy, the measurements of OB stars should continue. Furthermore, the spectra of some stars should be examined. In each of the studied areas there are stars with extremely high colour excesses. There may be a reason that cannot be explained from UBVβ photometry. There is another group of stars warranting a more careful examination. These come out with distances larger than 10 kpc, and since their galactic latitudes are higher than 2°, I derive distances from the galactic plane larger than 350 pc. Implicit in the reasoning is the assumption that the stars have luminosities of normal OB stars. That assumption cannot be refuted from UBVβ studies alone.

Three New Comets

The ESO 1 m Schmidt telescope has been involved in the discovery of three new comets since the last issue of the *Messenger*. One, P/Comet Schuster (1977o) is a "real" ESO comet; the two others, P/Comet Chernykh (1977l) and P/Comet Sanguin (1977p) were confirmed with this telescope, after they first had been sighted in USSR and Argentina, respectively.

Periodic comet Chernykh was found by soviet astronomer Dr. N. S. Chernykh at the Crimean Astrophysical Observatory on August 19, 1977. It was some time before the news reached La Silla, via the Bureau of the International Astronomical Union in Cambridge, Mass., USA. At that time the Moon had moved very close to the comet's expected position, but Dr. H.-E. Schuster still managed to get a 7-minute exposure on August 31, 1977, when the Moon was only 15° away. This was done on red-sensitive emulsion (098-04) behind a red filter (RG630) to reduce the influence of the moonlight. The plate confirmed the existence of the comet and helped Dr. Brian Marsden to compute the orbit, an ellipse with an orbital period of 16 years.

The discovery of periodic comet Schuster on October 9, 1977 brought the total of comet discoveries at ESO to four over a period of less than three years. Dr. Schuster noted the fuzzy trail on a plate, obtained under bad seeing condi-

Figure 1. — *Comet Chernykh (1977l) photographed with the ESO Schmidt telescope on August 31, 1977. Red-sensitive 098-04 emulsion behind RG630 filter. Exposure time 7 minutes.*

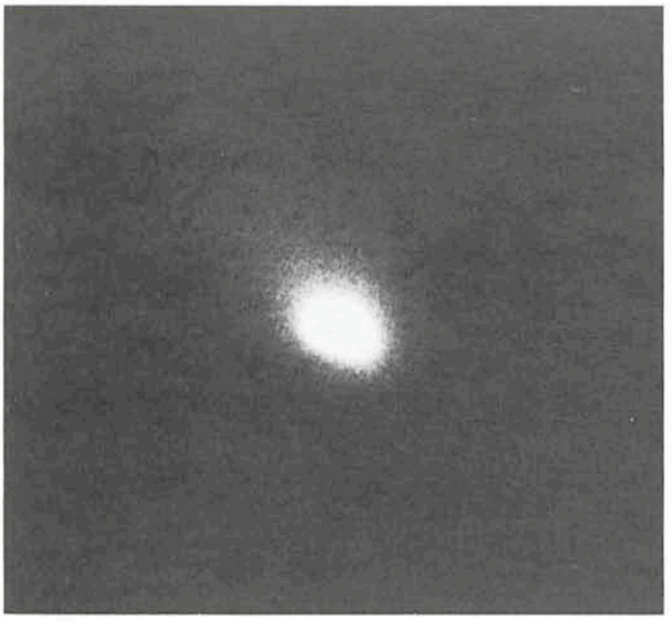

Figure 2. — *Comet Schuster (1977o) on a one-hour exposure with the 3.6 m telescope. October 15, 1977. IIIa-J + GG385. Observers: Drs. S. van Agt and P. O. Lindblad. (With their permission we reveal that the telescope was set to follow automatically the expected motion of the comet and that they spent most of the 60 minutes in the 3.6 m kitchen for a midnight snack! O tempora, o mores . . .)*

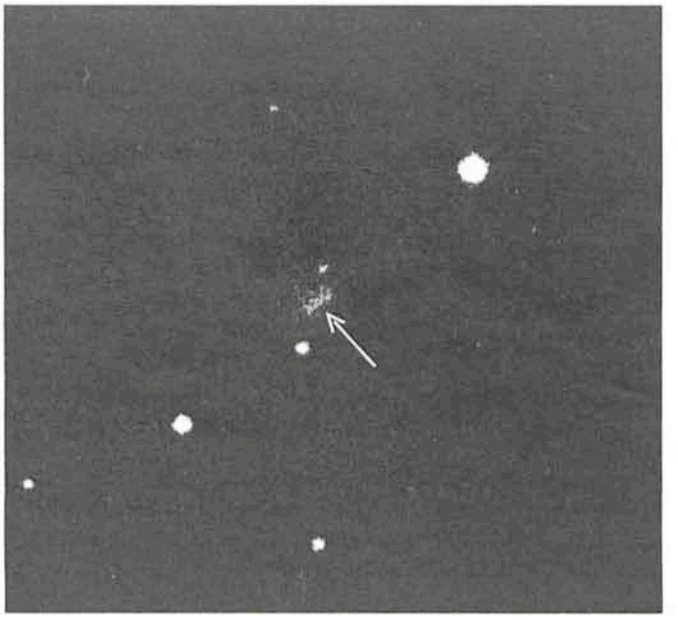

Figure 3. — *Comet Sanguin was confirmed on this 15-min Schmidt plate on October 20, 1977. 098-04 + RG630.*

tions for Drs. L. Schmadel and J. Schubart in Heidelberg, FRG. At first there was some doubt about the nature of the object (due to the bad seeing most of the trails—i.e. the minor planets—were equally fuzzy) but more plates on the following nights soon removed the doubts. It also turned out that the comet had been photographed on six plates in the beginning of September 1977, but at that date it was indistinguishable from a minor planet. Dr. Marsden finds an elliptical orbit from the observations September 3–October 17, 1977 with a period of only 7.48 years. The comet is intrinsically comparatively faint and will not become brighter than 16 mag this time. A deep 3.6 m plate was obtained on October 15 and is reproduced here.

Comet Sanguin was discovered at El Leoncito (Argentina) on October 15, 1977 by J. G. Sanguin. It was confirmed with the ESO Schmidt on October 20 (IAU Circular 3124) at magnitude 15–16, although the Moon again was troublesome. The preliminary orbit was computed by Dr. Marsden, who favours an elliptical solution; period about 13 years.

These are just three examples of the many contributions to solar-system astronomy that have come from the ESO Schmidt telescope during the past few years.

Those Troublesome Wolf-Rayet Stars

The Wolf-Rayet stars are among the more spectacular in our Galaxy. Not only are they some of the hottest and most massive stars known, but they also stand out as strong emission-line objects. With the aim of improving their usefulness for the study of the structure of the Galaxy, two Swedish astronomers, Drs. Ingemar Lundström and Björn Stenholm from the Lund Observatory, have initiated a study of the absolute magnitudes of Wolf-Rayet stars. Dr. Stenholm writes about the observations at ESO and how it now appears that most (if not all) Wolf-Rayet stars are in fact double stars:

During two observing runs at the 1 m reflector on La Silla, Ingemar Lundström and Björn Stenholm from Lund Observatory have obtained photoelectric observations of galactic Wolf-Rayet (WR) stars. Our fundamental idea is that WR stars, although evolved from the main sequence, are young stars, due to their high masses. They should then be useful as tracers of the spiral arms of the Galaxy (see also the article by S. Wramdemark, p. 10). If so, they might be the most powerful ones among optical spiral tracers, as a consequence of their high luminosity and easy detectability (emission lines!) on objective-prism plates. However, earlier investigations of the relation between WR stars and spiral structure have not been fully convincing. There are two reasons: the number of galactic WR stars is small, just about 150 are known today, and precise knowledge of their absolute magnitudes is lacking, although several attempts to determine them have been made. The most reliable calibration of the absolute magnitudes was made by L. F. Smith in 1973 and implies a variation in luminosity with spectral subtype. In order to use the newly discovered and faint WR stars for studies of galactic structure, it is thus necessary to make at least an approximate spectral classification.

When the observational programme at ESO was started, photometric and spectroscopic data were missing for about one-third of the WR star population.

The aim of our programme was thus twofold:

(1) Increase the number of WR stars with reliable magnitudes and colours suitable for distance determinations.