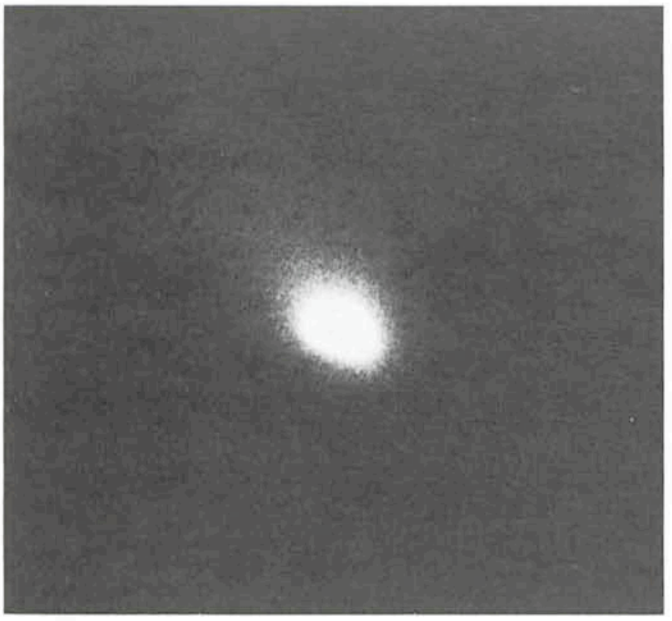


Figure 2. — *Comet Schuster (1977o) on a one-hour exposure with the 3.6 m telescope. October 15, 1977. IIIa-J + GG385. Observers: Drs. S. van Agt and P. O. Lindblad. (With their permission we reveal that the telescope was set to follow automatically the expected motion of the comet and that they spent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

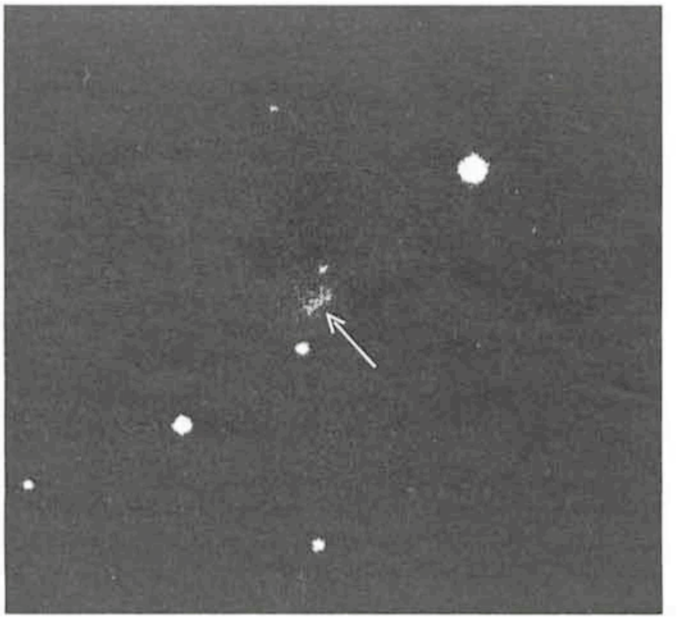


Figure 3. — *Comet Sanguin was confirmed on this 15-min Schmidt plate on October 20, 1977. 098-04 + RG630.*

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.

(2) Improve our knowledge of the absolute magnitudes of WR stars.

Due to the broad emission bands in WR spectra, ordinary UBV photometry is impossible for these stars. A narrow-band, five-colour system, originally invented by L. F. Smith and in which the majority of the WR stars were observed by her, was also used by us. This photometric system makes it possible, besides magnitude and colour measurements, to determine approximate spectral classes for faint stars, which are too faint for regular spectroscopy. We measured 32 stars not previously observed in this system and for most of them we have now obtained spectral classes. Four stars among them appear to be Of stars, a class of stars resembling the WR stars, and a few may be ordinary absorption-line stars.

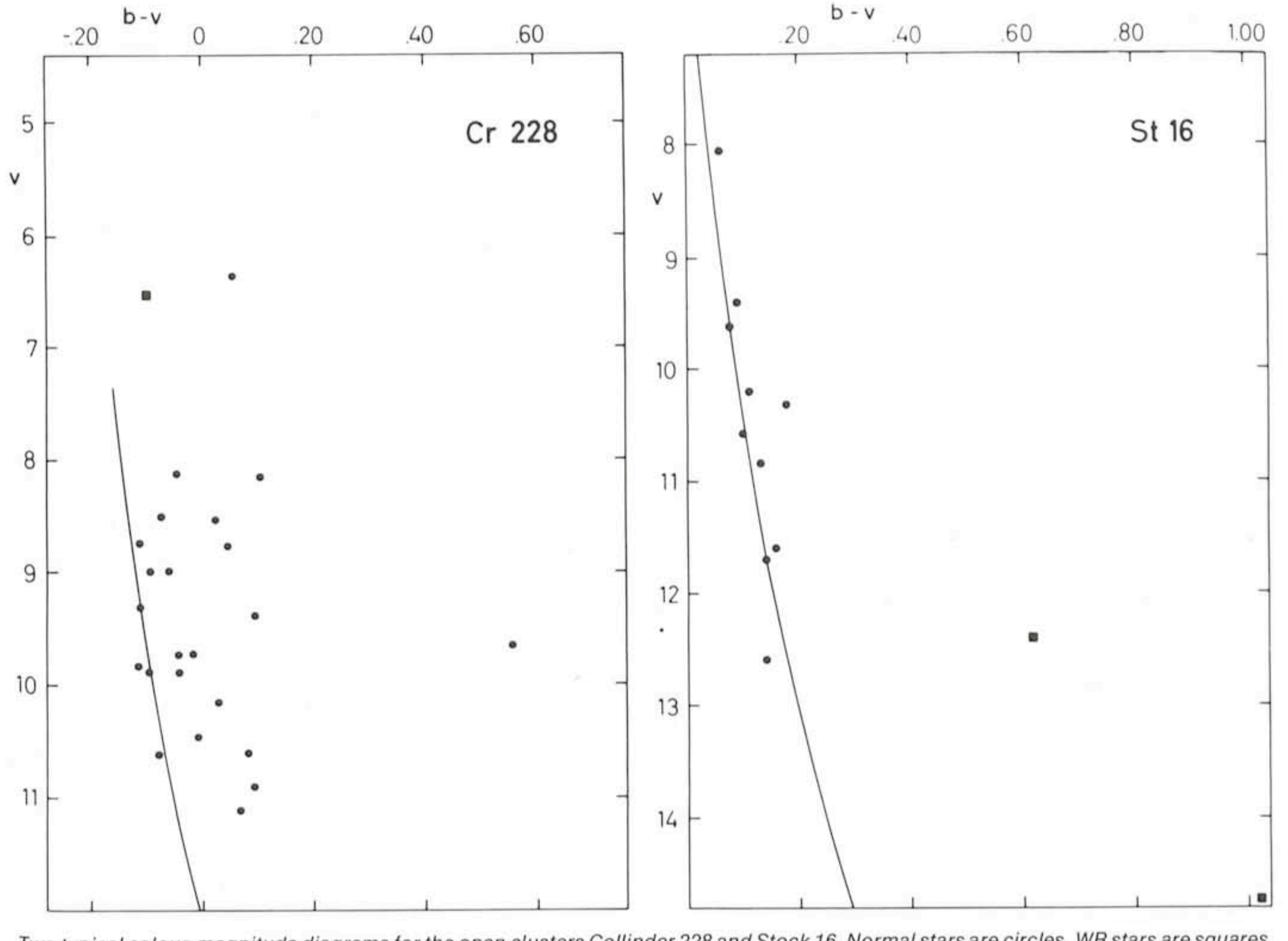
Absolute Magnitudes

Before we use these measurements to improve the map of WR stars in the Galaxy, we also want to investigate the existing absolute magnitude and intrinsic colour determinations. This question has always been somewhat controversial. The fundamental assumption in absolute magnitude investigations is that there exists a standard correlation between the spectral appearance and the luminosity, but this is not necessarily so. WR stars might be highly individual objects.

Our way to calculate absolute magnitudes for some stars was to investigate the eventual membership of WR stars in open clusters. It is well known that some open clusters have WR stars nearby, and in some cases investigations for membership have been made, but with UBV photometry, which is not reliable in this case. A proven membership, evaluated from colour-magnitude and evolutionary diagrams, gives a good absolute magnitude, and other, independent investigations of cluster distances can easily be taken into account. Our results for four stars are shown in this table:

Star	M_V	Spectral type
MR 28	—6.5	WN7
MR 29	—6.5	WN7+O7
MR 64	—6.4	WN7
MR 65	—5.9	WC7+O5

By chance we have got three stars out of four of spectral type WN7, and one of them is considered a binary, which is also the case for the fourth. Although the magnitudes of the three WN7 stars are very similar, we now have to ask whether these individually-determined absolute magnitudes for the spectral types in question can indeed also be used for other stars in the same spectral class? We hope so but we are not sure. And this leads us into the question about duplicity among WR stars.



Two typical colour-magnitude diagrams for the open clusters Collinder 228 and Stock 16. Normal stars are circles, WR stars are squares. In Cr 228 the WR star, MR 28, falls close to and at the top of the main sequence; it is considered a member. The width of the main sequence depends largely on variable extinction within the cluster, which is a part of the Carina Nebula complex. In Stock 16 the two WR stars fall far from the very well defined main sequence. These stars are obviously not members of the cluster, although they are situated only a few minutes of arc from the cluster centre.

Are All WR Stars Binaries?

From spectroscopic observations of bright WR stars it is obvious that the great majority are binaries; one of the components a WR star, the other a normal early-type star. Recently, there has appeared some theoretical work on close binaries which shows that such a pair can undergo a so-called WR stage once or twice during the evolution of the binary. It is seen that the non-WR component can have a wide range in luminosity, from a faint neutron star to a bright O star. This may imply that a binary system always is responsible for the WR phenomenon, and it is only when the secondary component is bright enough that we have been able to detect its binary nature. Thus, all WR stars might actually be binaries, and in each individual case we have to estimate the influence in luminosity from the companion. This is the main difficulty in the work with WR star absolute magnitudes, and to solve it requires a considerable amount of spectroscopy.

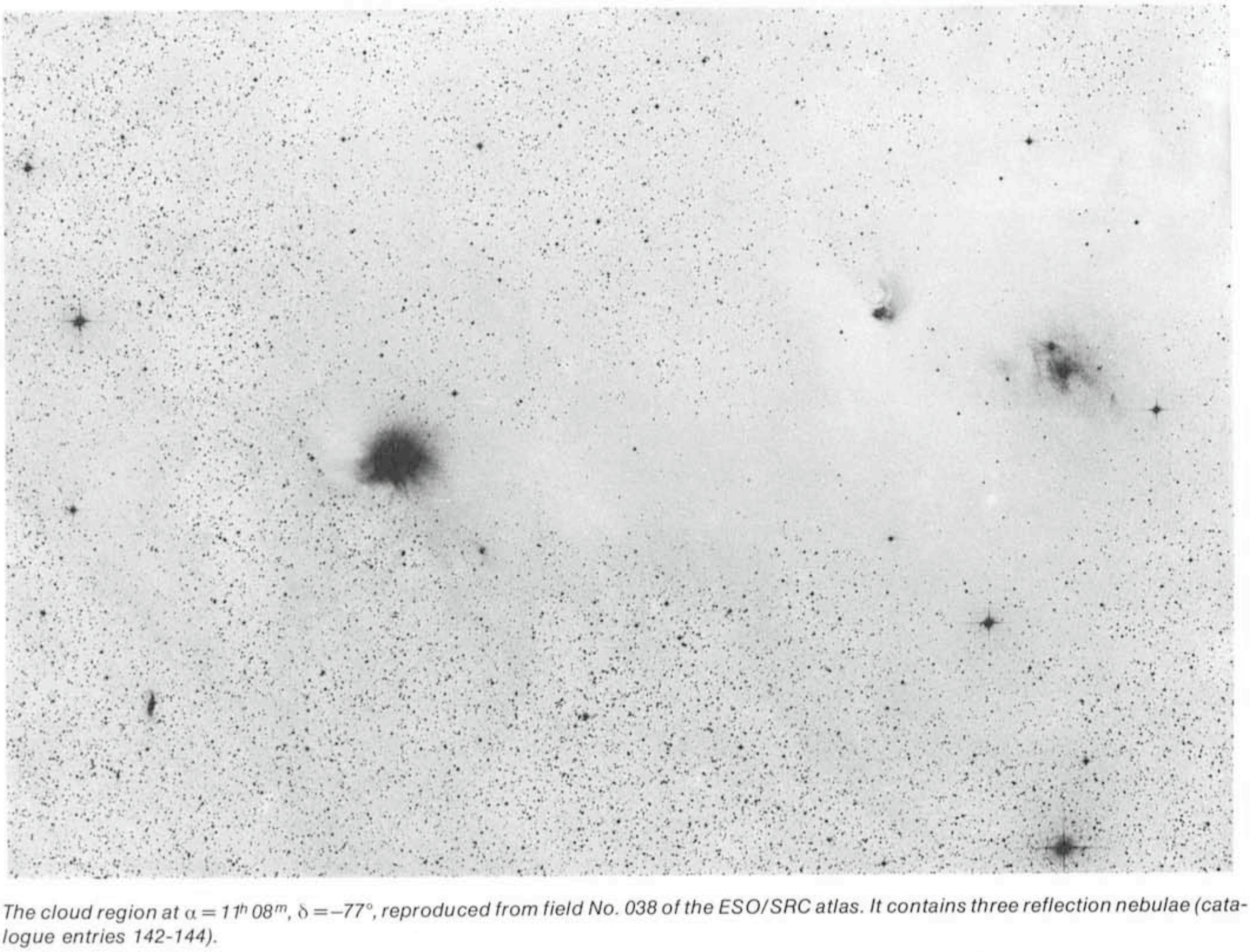
We expect to begin to publish the results of our observations at ESO early in 1978. They were carried out in February 1975 and August 1977.

Where Stars are Born

Dr. Claes Bernes of the Stockholm Observatory has compiled a new catalogue of bright nebulosities in dense dust clouds. He found 160 such objects when searching on the Palomar and ESO (B) atlases. Many of these objects are stellar birth-centres and they will soon be studied by radio and infrared observations. Dr. Bernes reports:

If you consult the Palomar Sky Survey or another sky atlas to check the optical appearance of some celestial region that infrared and radio observations have shown to contain newly-formed stars or even stars being formed now (like NGC 1333 or R CrA complex), you often find a nebulous patch situated in a dark cloud. Contrarily, the existence of a bright nebula in a dark cloud has in many cases attracted the attention of radio and infrared astronomers. It is also clear, after more systematic investigations, that regions with these optical characteristics form a quite well-defined class of objects. Evidently, they may serve as useful indicators of recent and/or still-active star formation.

With this in mind I decided to survey available photographic sky atlases and compile a catalogue of bright nebulo-



The cloud region at $\alpha = 11^h 08^m$, $\delta = -77°$, reproduced from field No. 038 of the ESO/SRC atlas. It contains three reflection nebulae (catalogue entries 142-144).