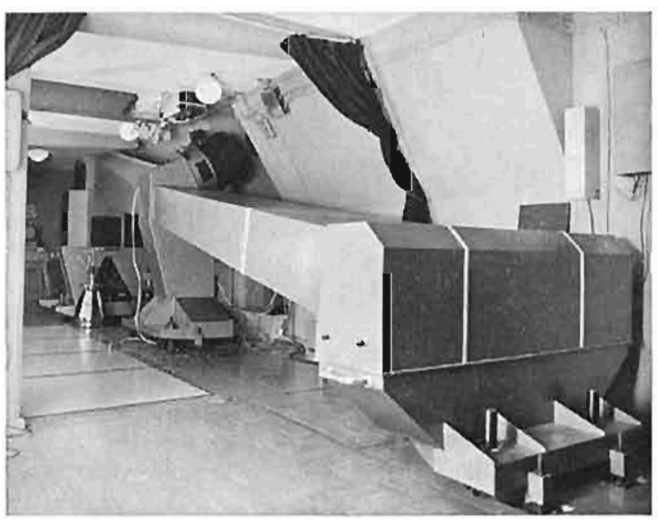
The "Echelec" — A New Spectrograph for ESO

ESO staff astronomer Dr. J. Breysacher reports from La Silla:

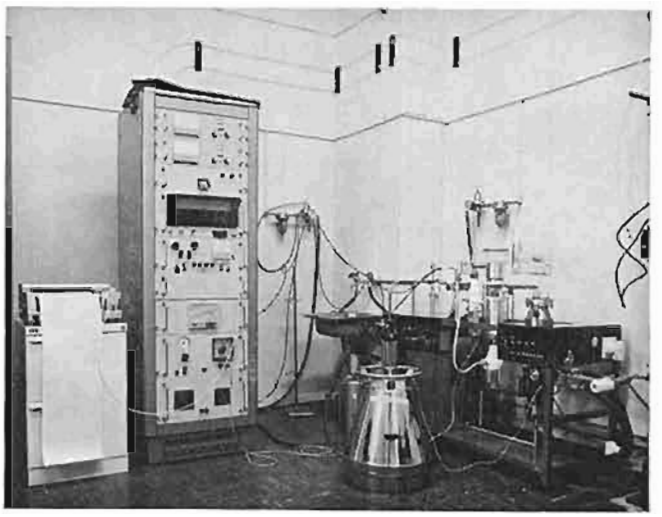
Two similar models of the Echelec spectrograph, designed by A. Baranne for the coudé focus of the 1.52 m telescope, exist at present. One, the prototype, is working at the Observatoire de Haute-Provence and the second was recently installed on La Silla. The instrument is composed of three independent units connected by two light-proof tunnels, the distance between the extreme units being about seven metres. It is positioned in the east-west direction, on the concrete of the telescope pillar in the coudé room. The central unit can be removed very easily, thus permitting a rapid exchange with the other big coudé spectrograph.

The detector normally used with the Echelec is the Lallemand-Duchesne "caméra électronique", but the spectrograph can also be operated with an image-tube and direct photography. The electronographic camera is electrostatically focused, the accelerating potential is 25 kilovolts and S-11-type photocathodes of 30 mm diameter are used with it. The magazine holds twenty plates. The camera gives a magnification of about 0.6. A special laboratory was constructed on the second floor of the 1.5 m telescope building for the preparation of the equipment which takes about twenty hours and demands great care.

In the "echelle mode", i.e. with two crossed gratings, the dispersion in the blue is 4.5 Å/mm. The mean exposure time for a star of magnitude B = 10 is about 2^h30 for a spectrum widened to 0.20 mm. The spectrograph may also be used in a conventional mode by suppressing the transmission grating and exchanging the echelle grating with a first-order grating. The presently available first-order grating gives a dispersion of 74 Å/mm in the blue at a cathode of the camera. The mean exposure time for a star of magnitude B = 14 is one hour.



The ESO Echelec spectrograph.



The "caméra électronique" during its preparation in the laboratory.

During the past six months, the Echelec has been used frequently. Various programmes were carried out by visiting and staff astronomers: identification of X-ray sources, a study of Wolf-Rayet stars in the Magellanic Clouds, high-dispersion observations of interstellar calcium lines, determination of stellar rotation in open clusters and high-time resolution spectroscopy of eruptive variables. The first results will soon appear in print.

ERRATUM

Due to an error discovered only in the printing-press, nearly the whole edition of the March 1976 issue of the "Messenger" has been printed as No. 1.

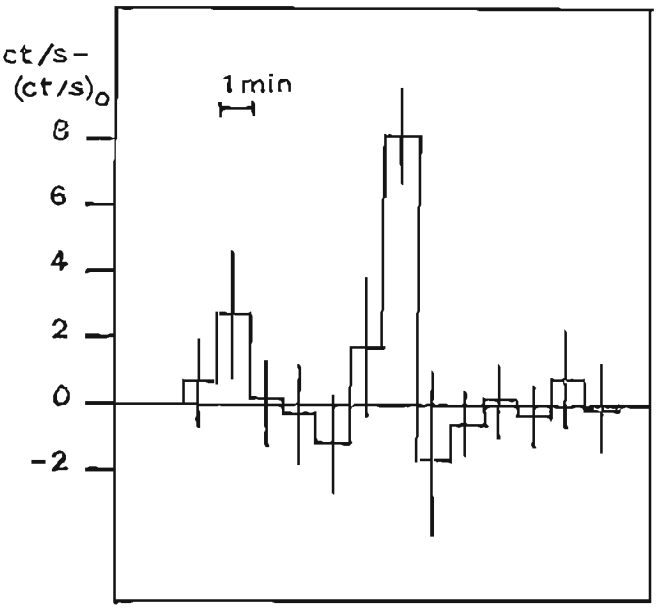
Three numbers of the "Messenger" were already published in 1974 and 1975, and the last issue, therefore, was **No. 4.** We apologize for this misfortune and inform the readers that Nos. 1, 2 and 3, which had a more limited distribution, are no longer available.

The editors

Optical Identification of a Galactic X-ray Source

Dr. H. Mauder from the University Observatory in Tübingen, Federal Republic of Germany, recently identified a southern X-ray source optically. This is the second X-ray source identified with an ESO telescope on La Silla. The first, Cen X-3, was found by Dr. W. Krzeminsky from the Warsaw University Observatory, using the ESO 1 m photometric telescope in May-August 1973. Dr. Mauder reports:

It is of great interest to identify galactic X-ray sources with optical stars, since it has turned out that the X-ray emission in these objects is due to accretion of matter onto compact, collapsed stars in binary systems. Studying the normal optical components in those systems gives much information on the nature of compact stars; in some cases it has been possible to show that the compact component must be a neutron star; one system may even contain a black hole. Until now, only eight binary X-ray sources have been definitely identified with optical stars, which can therefore be studied in



Mean light-curve from all the observations, folded with the period of 11.657 minutes. The bars are mean square errors.

much detail. A very famous example is Cen X-3, which was found by Krzeminsky at ESO. Now it has become possible to identify another source of similar type.

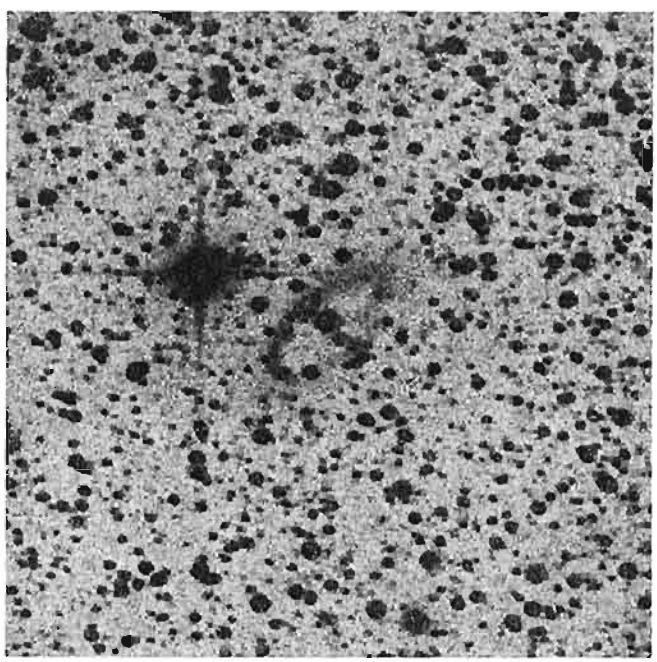
From observations by the Ariel 5 and the Copernicus satellites it was found, in 1975, that the UHURU source 3U1223-62 shows a periodic X-ray variation with a period of 11.64 ± 0.02 minutes. In 1973, Vidal suggested the 11^m emission-line B-type supergiant WRA 977 to be the optical counterpart of 3U1223-62. However, at that time, it was not possible to confirm this identification. I therefore decided to look for some indication of the X-ray period in the optical light of WRA 977.

During a stay on La Silla in March 1976, the ESO 50 cm photometric telescope was used in the pulse-counting mode for observations in the U band, with a time resolution of two seconds. On three different nights, a total of five runs was obtained, each lasting for about forty minutes. There seemed to be several small peaks of approximately one minute duration. The peaks were not always present, but whenever they were visible, their separation was 11.657 minutes or multiples of this interval over all nights, well consistent with the X-ray periodicity. Folding the data with this period in intervals of one minute yielded a significant pulse structure. Thus, WRA 977 and 3U1223-62 should indeed be counterparts.

In the meantime, additional UBV observations with the ESO 50 cm telescope and with the 50 cm Danish telescope have been obtained, as well as a set of 20 Å/mm coudé spectra with the ESO 1.52 m telescope. Due to the faintness of the object, exposure times up to eight hours were necessary! It will be interesting to see what can be learned about this system, when the optical observations are carefully analysed during the coming months.

The Riddle of the "Smoky Ring" Solved

Take a look at this diffuse ring, which was found last year on a very deep (21^{m}5-22^{m}0), red ESO Schmidt plate. What do you think it is? The position is close to the Milky Way equator: (l, b) = (311°, 2°5). It was reported in a recent note in Astronomy & Astrophysics (46, 139) by ESO astronomers H.-E. Schuster and R. M. West. They believed that it could be a planetary nebula, although of rather peculiar shape. However, an extra-galactic origin could not be entirely excluded.



This question has now been answered. A perfect 135 Å/mm spectrum, obtained on April 1, 1976 with the 1 m telescope at the Las Campanas Observatory (ESO's neighbour to the north) reveals the strong emission lines of a planetary nebula, very strongly reddened by interstellar absorption. Furthermore, Dr. N. Sanduleak of the Warner and Swasey Observatory, Ohio, USA, has found that the central star in the ring is of spectral type B9 V, by means of plates taken with the Curtis Schmidt telescope on Cerro Tololo (ESO's neighbour to the south). So, although the ring was "only" a planetary nebula, it gave rise to a nice collaboration between the three major observatories in the Atacama desert!

Relocation of the ESO Administration from Hamburg to Munich

Following the Council decision of December 1975, to establish the European Headquarters of ESO at Garching, near Munich (cf. "The Messenger", No. 4, March 1976), the Office of the Director-General is doing a first step towards that direction and moves, on Juli 1, 1976, from Hamburg-Bergedorf to Garching.

This move will simplify ESO's involvement in the construction activities for the Headquarters, improve the communications with the ESO departments in Geneva and facilitate the preparations for their removal to Garching, which will take place in about three years time.

Therefore, from Juli 1, 1976, the Office of the Director-General will be located at **Schleißheimer Straße 17, D-8049 Garching (Munich)**, not far from the site that will house the ESO Headquarters.