including many observers. The highly accurate radial velocities have been observed with the CORAVEL.

With the photometric as well as spectroscopic observations of all the selected southern systems hopefully completed in the first half of 1984, the data base for accurate absolute dimensions will be significantly increased – although still quite incomplete in some mass regions – and we look forward to carrying through a comprehensive and detailed discussion based on all results obtained from this long-term observing programme at La Silla.

Some News About the Coudé Spectrograph of the ESO 1.52 m Telescope

P. Giordano and E. Maurice, ESO

The coudé spectrograph was installed at La Silla early in 1969; the first reference spectra were obtained in May 1969. Since the beginning of the routine observations, several thousands of spectra have been taken, 8,127 with camera 1 at 20.1 or 31.3 Å/mm^{-1}, 12,913 with camera 2 at 12.3 or 19.4 Å/mm^{-1} and 2,058 with camera 3 at 2.6, 3.3 or 5.1 Å/mm^{-1}. After 14 years of often heavy duty, it appeared necessary to do a careful overhaul of the spectrograph. Some significant improvements were done during this 14-year period, but some important components had not been touched during a very long time, for instance the two closed cameras 1 and 2. The overhaul was done between August 1982 and February 1983 under the supervision of P. Giordano and with the help of B. Buzzoni. A. Torrejón, E. Araya and J. Pérez actively participated in the focussing phase and P. Alvarez and J. Torres, from the workshop, in the mechanical phase.

Most of the work done will only be noticed by the observer from the improved quality of his spectra (mainly with camera 1). Other changes have been made in order to simplify the normal observation procedure and to allow some special operations such as, for instance, exposing several spectra on a single plate.

Among the more important optical adjustments done on the spectrograph we mention the following: the coudé has been re-aligned with the telescope polar axis. The spectrograph itself has undergone a thorough optical alignment with particular attention paid to cameras 1 and 2. The mirrors of these cameras have been realuminized. The slit assembly has been repolished and thereafter protected by a special coating.

Some mechanical improvements have also been done. The movable plate-holder supports have been renewed to insure a more exact positioning in the focal plane. A revision of the plate-holders themselves is also foreseen in order to improve the fit of the plates to the curved focal surface. Presently 3 plate-holders may be used for both cameras 1 and 3 (in both cases plate-holders Nos. 1, 2 and 3). In the case of camera 2 (Fig. 1) only plate-holder No. 3 is presently usable but other plate-holders are currently beeing modified.

Finally a complete electric re-cabling of the spectrograph was done.

A number of modifications and improvements which affect the use of the spectrograph have also been made. Following the light path, first, the comparison lamps device has been changed: instead of using only an integrating sphere as effective light-source, a plane diffuser and a flat mirror have been added. Changing from one of these systems to the other is instantaneous. This permits the use of the new iron hollow-cathode source with reasonable exposure times. Remember that the flat-mirror system is 3.3 times faster than the plane-diffuser which in turn is 3.3 times faster than the integrating sphere. Exact exposure times will be available at the spectrograph.

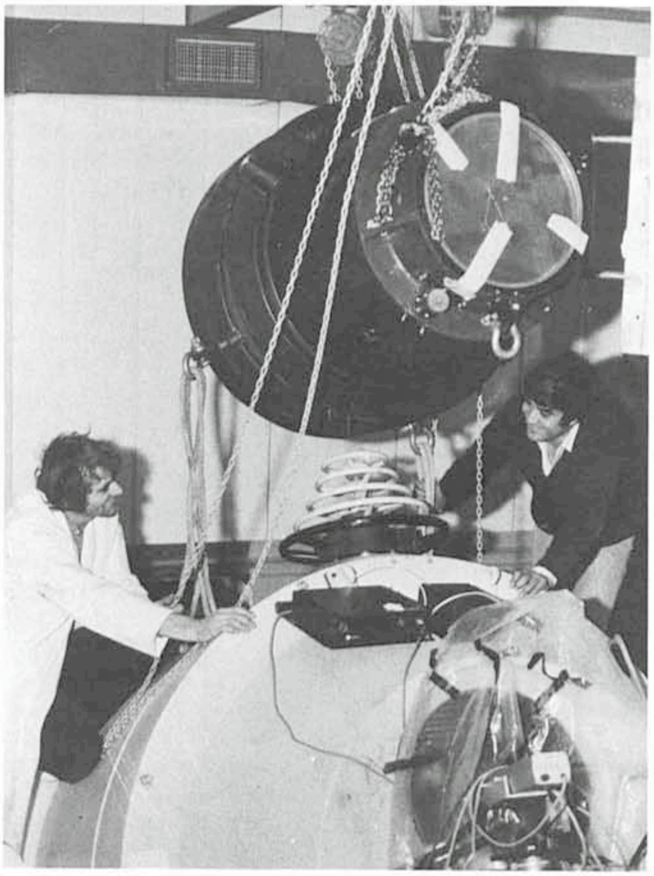

Fig. 1: *B. Buzzoni and P. Alvarez disassembling camera 2.*

Together with the new iron hollow-cathode lamp, the comparison lamps now in use are the following: the iron-arc, a mercury lamp, a neon lamp and a tungstene lamp for photometric calibration of plates in the coudé spectrograph itself. A colour filter to isolate the currently used grating order is now installed in the diaphragm of the source. Thus, it is no longer necessary to change these diaphragms if the comparison lamp is changed.

Following the light path, we now arrive at the decker immediately in front of the slit: the old prism-system is unchanged but new deckers (Fig. 2) will soon be installed. These will permit a better definition of the edges of the spectrogram and an easier guiding; some special deckers will also permit several (two at present) exposures on the same plate. Each of these deckers will also make it possible to insert a step-wedge, containing 8 neutral density levels, in front of the slit, for photometric calibration purposes. This will enable calibration plates to be taken in exactly the same way as the stellar plates. Of course, the ETA spectrograph will remain in use if one prefers to expose calibration plates during observations. The movements of these new deckers will be controlled by accurate encoders.

We then arrive at the spectrograph shutter. The old mechanical shutter has been replaced by a motorized one which permits it to be linked to the exposure meter; if the shutter is closed, the exposure meter will be turned off. This avoids the accumulation of dark counts on top of the measured stellar signal. On cloudy nights (very rare) this is very useful if one is forced to make interruptions in the stellar exposure. The old exposure meter is still in use but will soon be replaced by a new one, identical to the one at the CES spectrograph which permits dark current subtraction. The photomultiplier tube will remain the same.

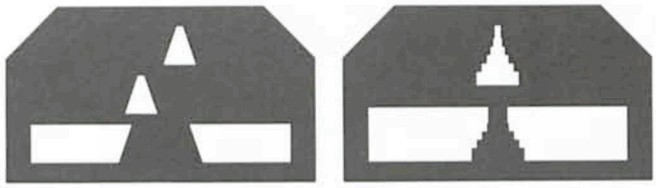

Fig. 2: *The two new deckers of the coudé spectrograph.*

The last modification planned for the spectrograph will be the motorization of the movements of cameras 1 and 2. This will be of help to night assistants when short exposures are done. Since the motors will in general move the cameras more gently than human hands, the danger of misalignments of the cameras' optics (mainly the mirror) will be reduced.

Fine Structure Lightcurve of (51) Nemausa

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From the beginning of the discoveries of minor planets in the last century their brightness has been a subject for study. For astronomers mainly interested in variable stars and stellar magnitudes, the minor planets could be a useful tool for transferring the magnitude scale uniformly over the sky. From the observational point of view, minor planets were like variable stars with light variations which could be computed from the distances to the Sun and the Earth. However, at that time the stellar magnitude scale was arbitrary and based only on subjective estimates. It was therefore necessary to determine the ratio of light corresponding to a difference of one unit of stellar magnitude. We owe the magnitude scale of our time to N. Pogson, who in his ephemerides of the brightness of 36 minor planets for the year 1857 (1) adopted a light ratio of 2.512 for the difference of one magnitude.

When F. Argelander in 1854 discussed the brightness of minor planets (2) he recommended minor planet magnitudes to be thoroughly investigated. He gave a list of diameters which are surprisingly accurate for the 18 S-type objects it contains. One of the reasons given by Argelander for studying the brightness of minor planets was that *all* information about the circumstances of an observation may possibly be used for increasing the accuracy of the position! It is exactly an improvement of the positions we have in mind by the lightcurve observations of (51) Nemausa.

(51) Nemausa was selected by B. Strömgren at the Copenhagen observatory in 1939 for the purpose of improving the fundamental star catalogues. Resulting from the requests for observations many series of precise photographic observations are now available and their residuals seem to indicate a systematic displacement of the observed photocentre towards the illuminated side of the body. This means that precision has reached a level where the diameter, of order $0''.15$, and the flattening of the body can no longer be ignored.

At present we do not even know which side of the body is facing the observer at a given moment, so a first step must be to determine the sidereal period of rotation and the axis of rotation with an accuracy which allows us to compute ephemerides for physical observations.

It is planned to secure very precise positions in the future by having (51) Nemausa observed by the astrometric satellite "Hipparcos", and by observations of occultations of stars which will have their positions observed by the satellite. The mission length of the satellite is expected to be less than the orbital period of minor planets but by the use of occultations this interval will effectively be extended. If size and shape of the planet are known, the occultation observations can be reduced to the centre of mass of the body and an occultation will provide a more accurate position than a direct observation. For this purpose all occultations of catalogued stars by (51) Nemausa until the year 2017 have been found by Gordon E. Taylor, Herstmonceux.

Although occultations are rare events, an occultation of SAO 144417 has already been successfully observed in the U.S.S.R. on August 17, 1979. Due to the accuracy of the orbit and of the star, which happened to be a Southern Reference Star, the error of the prediction was only 90 km and the ground track was predicted long in advance of the event. The derived diameter was $D = 153 \pm 7$ km (3). The determination of size and shape of the body by the powerful tool of occultations is greatly facilitated by a good orbit and vice versa, – if size and shape are known, an occultation gives a position with an accuracy equal to that of the star, so the orbit can be much improved if the position of the star has the high accuracy of "Hipparcos".

One of the occultations found by G. E. Taylor is especially favourable and will occur on 1983 September 11. It is the occultation of the bright star 14 Psc of visual magnitude $5^{m}.9$ which will be visible in the densely populated eastern part of the United States. Hopefully, many observations at this rare occasion will be secured, so that a detailed profile can be determined, it may even happen that the silhouette could explain why the lightcurve has *three* maxima.

A campaign of photometric observations of (51) Nemausa has been initiated in 1980/81 and coordinated by H. J. Schober, Graz, with the ultimate aim to determine the pole, flattening and sidereal period (4). The observations now to be described continue this programme.

The observations were made with the ESO 1 m telescope and single-channel photometer during the two periods March 19–25 and April 2–5, 1982. The time was chosen well in advance of the date of opposition, May 3, 1982, in order to