

# The Triplet Adaptor Soon Ready for 3.6 m Prime Focus Observations

M. Ziebell

*The primary mirror of the 3.6 m telescope has a complicated figure, and a "corrector" must be inserted, just below the prime-focus cage, in order to obtain sharp images in this focus. Until now, a one-element (Gascoigne) corrector has provided a usable field of about 16 arcmin or 6 cm. However, the full advantage of the excellent optical quality of the primary mirror can only be realized with more complicated optical means. After a long period of testing, a three-element (triplet) corrector that is optimized for the blue spectral region and a similar one for the red region will now be installed. They are supported by the "triplet adaptor", an advanced optical-electronical-mechanical system that will be remotely controlled from the main observing console in the telescope control room. ESO engineer Manfred Ziebell is now trimming the rather complicated instrument to perfection and we may expect soon to see the first wide-field (1:2) photographs from the 3.6 m prime focus.*

Since the winter time in Chile is the worst season for astronomical observations, it is a good time to install new instruments. It is therefore foreseen to install the *triplet adaptor* on the 3.6 m telescope in June 1979.

Presently, the simplified adaptor equipped with a Gascoigne corrector can be used for observations in prime focus on the 3.6 m telescope. This adaptor was developed for local control, and only the shutter and the High-Voltage of the TV camera are remote controlled.

The triplet adaptor, which is at the moment being assembled and tested in Geneva (see fig. 1), will be completely remote controlled and the number of facilities considerably increased.

## The Triplet Adaptor

The main parts included in the triplet adaptor project are:

1. The triplet corrector.
2. The triplet adaptor (the mechanical support for instruments).
3. The handling structure.
4. The filter changer.
5. The plate changer.

The *triplet corrector* produces a corrected field in prime focus of 240 mm diameter, corresponding to a field of 1:2 in the sky. It is possible to change between a red and blue coated triplet. The exchange from one to the other must be done when the adaptor with its handling structure is on the prime unit carriage.

The *triplet adaptor* is supported by the prime focus pedestal and is fixed to it by a circular flange. At the top side, there is a square flange for the fixation of instruments. The back focal distance measured from this flange is 75 mm. The adaptor is connected to the support structure by two astatic levers, which diminish the forces on the focusing mechanism of the prime-focus pedestal. Due to this mechanism the adaptor can support instruments with a weight of up to 100 kg. The housing of the adaptor is a welded mild steel construction, stabilized after welding. It is reinforced by several ribs to get a light-weight, but rigid structure.

The adaptor offers several facilities for the observations. They are:

- (a) offset guiding via a low-light level TV camera,
- (b) an acquisition field of 46 x 38 arcmin with centerfield viewing,
- (c) focusing with a knife edge, and
- (d) the adaptor is prepared for automatic guiding and some kind of automatic focusing, but the installation has been postponed until the availability of an advanced autoguider.

To perform these functions several electro-mechanical devices are installed. Inside the adaptor housing are mounted:

1. The guide probe, which is mounted on the XY-table, including a focus mechanism to focus the star image on the crosshair, and a crosshair-knife edge support.
2. The x-y table, which moves the guide probe over a field of 150 x 125 mm (corresponding to 46' x 38') with a precision of 5  $\mu$ m.

Outside are mounted:

1. The low light level TV camera.
2. The focus mechanism for the TV camera.
3. The filter turret for the TV camera.
4. The field lens support, which projects the image of the main mirror on the TV camera for focusing.

The guide probe is mounted on an x-y table and picks up the light either from a guide star or from the centerfield (see fig. 2). The light is then transmitted via a focus mechanism onto the crosshair or the knife edge (1). Through a collimation lens (2) the light is reflected in a parallel beam down from the x-y table on a fixed mirror which reflects the light out of the adaptor housing. The star and the crosshair are then focused on the photocathode of the TV tube (7). In addition, a filter turret with 6 filters (4) and a movable field lens (5) are mounted in the beam.

The TV camera is a small Quantex camera type qx26 with an ISIT tube. The entrance window has a diameter of 16 mm. Due to the usable target dimensions the field of the Quantex camera is 9x12 mm, i.e. 53" x 70" on the sky, which corresponds to a rather high resolution (12 lines per arcsec). The limiting sensitivity of the camera will be in the order of  $m = 18$  under good seeing conditions ( $\leq 2''$ ).

For automatic guiding and focusing it was originally foreseen to use a quadrant photosil detector. Due to fabrication problems with the tube this feature has been dropped until another autoguider becomes available. However, an elec-

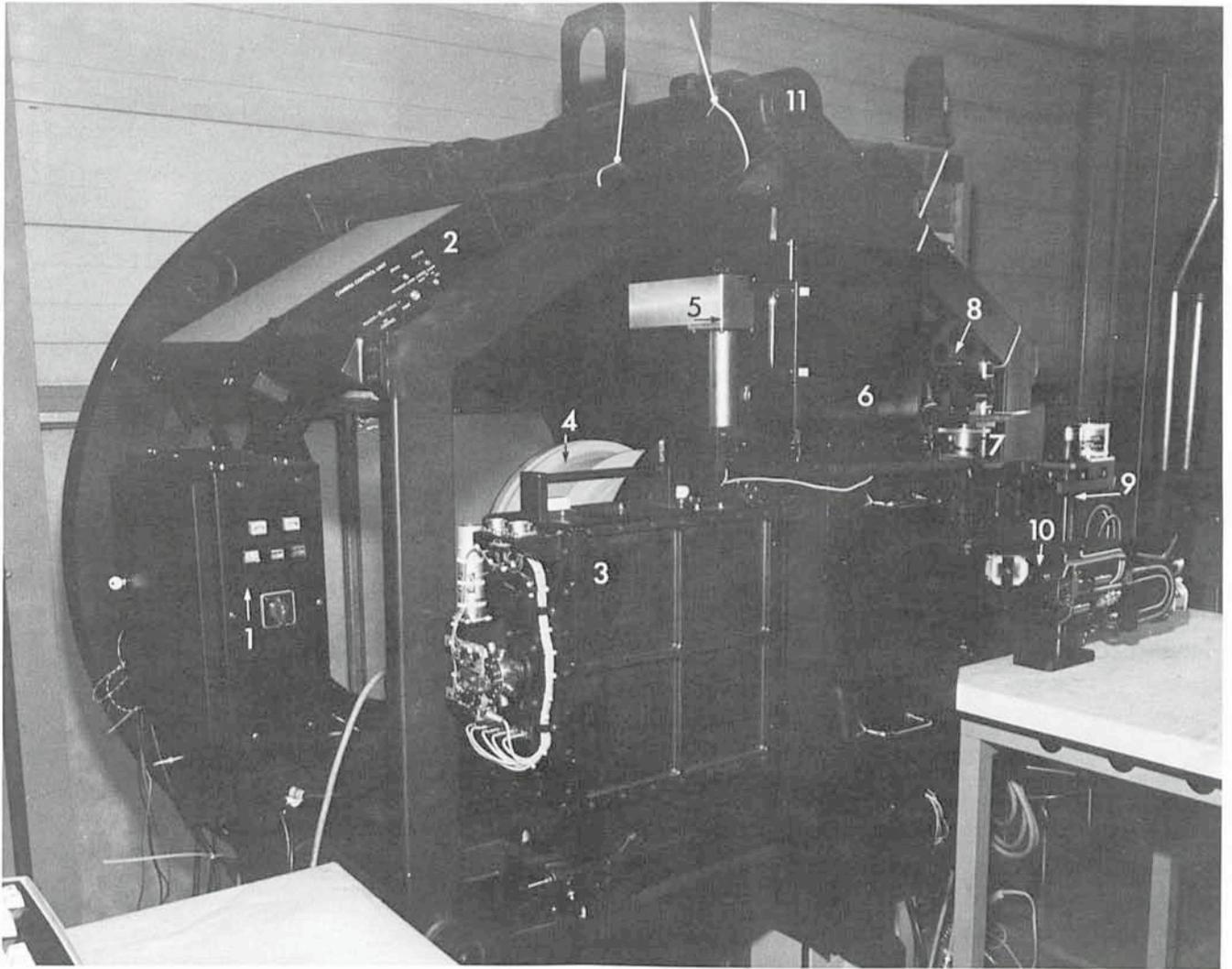


Fig. 1: The triplet adaptor during the tests in Geneva, before being shipped to La Silla. The various parts are indicated: (1) pedestal focus drive box, (2) camera control unit, (3) filter changer, (4) triplet corrector, (5) sensitometer, (6) plate changer, (7) TV focus drive, (8) TV filter turret, (9) X-Y carriage, (10) guide probe, and (11) handling structure.

tronic crosshair has been developed for the ESO Schmidt telescope, and it seems possible to use the video signal of the TV camera for automatic guiding after a rather small amount of additional development work. The advantages of such an autoguider would be:

- (a) The image of the video monitor is still visible in the automatic guiding mode,
- (b) the ISIT tube is one of the most sensitive detectors when no integration on the target and no cooling is used,
- (c) the electronics can be installed close to the monitor and the control computer (i.e. not at the telescope).

To be able to calibrate the nonlinearities of the photographic plates, a *sensitometer* is being installed on the adaptor. It is a slightly modified version of the Kitt Peak sensitometer. The image of a uniformly illuminated step wedge is projected onto the photographic plate, in a corner of the plate outside the sky field.

The control electronics for the triplet adaptor are installed in four steel boxes which are fixed to the support structure. To reduce power dissipation, low power logic components are used for the control electronics and dc motors for the drive systems. Where possible, electro-mechanical devices

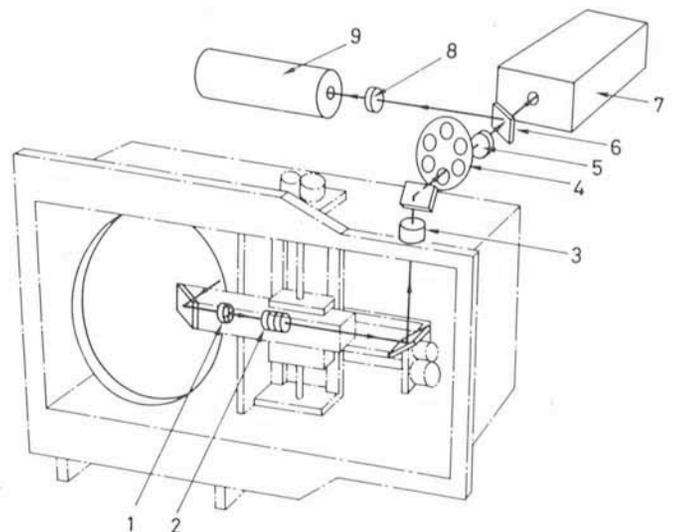


Fig. 2: Schematic diagram of the triplet adaptor: (1) crosshair and knife-edge support, (2) collimation lens, (3) focus lens for the TV, (4) filter turret, (5) pupil imaging lens for focusing, (6) beam splitter, (7) TV camera, (8) objective for automatic focus, and (9) autoguider (to be installed later).

are eliminated to increase the reliability. Inductive sensors are used as code and limit switches and relays are replaced by transistor switches.

The *handling structure* has several functions. It supports the triplet adaptor together with the instrument and the triplet corrector during the handling procedure. It diminishes the forces of the focusing mechanism of the prime focus pedestal by a pair of astatic levers. Furthermore it is provided with attachment facilities for a hook-on-chair. As it is foreseen to use this chair only for adjustment work, it will not be very comfortable and few functions of the adaptor have local control (this is another way of saying that we do not like to have the astronomer in the prime focus cage during the observations!).

One of the first instruments which will be fixed to the triplet adaptor are the filter and the plate changers. The first will be mounted onto the rectangular flange of the triplet adaptor and will carry the plate changer.

The *filter changer* (see also *Messenger* No. 10, p. 19) permits to change between 4 different colour filters of a size of 240 x 240 mm in front of the plate or film changer. The image of the sensitometer step wedge is also transmitted through these filters. The filter changer is equipped with a remotely-controlled shutter.

The *automatic plate changer* contains up to 8 photographic plates or film sheets of the dimensions 240 x 240 mm. The time to change a plate is 35 seconds. The complete unit is fixed to the filter changer by a four-point spring-loaded latch and can be disconnected quickly. It consists mainly of a plate displacement mechanism, a vacuum back-up plate, a housing with reference frame, a cas-

sette with 8 plates and a suction pump. A digital display is used to mark the plate number directly onto the plate. The hypersensitized plates in the cassette will be stored in a Nitrogen atmosphere, to reduce loss of sensitivity.

The complete operation sequence for the filter changer and the plate changer will be controlled by a Motorola microprocessor board. The hardware will be incorporated inside the instruments themselves to reduce the number of cable connections. To each instrument one cable connection to the RIOS (Remote Input-Output Station) is needed to enable remote control from the telescope control consol.

The triplet adaptor with its handling structure, the filter changer, the plate changer, the red and blue triplet correctors, the Gascoigne adaptor, the McMullan camera and further instruments must be stored on the platform extension (see fig. 3). For the exchange procedure, the platform movement and the canti-lever crane are used. Therefore the rotation movement of the canti-lever crane will be motorized and a manual control for the dome rotation will be installed on the platform.

The exchange between different top units for prime focus observations (e.g. from Gascoigne to triplet adaptor) will take 40 minutes. With an additional change from blue to red triplet corrector it takes 10 minutes more.

To change from one instrument to another, the triplet adaptor with its handling structure can stay on the telescope.

To exchange the red and blue triplets, the whole adaptor with its handling structure must be removed from the telescope, and the exchange must be done on the prime focus carriage. About 30 minutes will be needed for this proce-

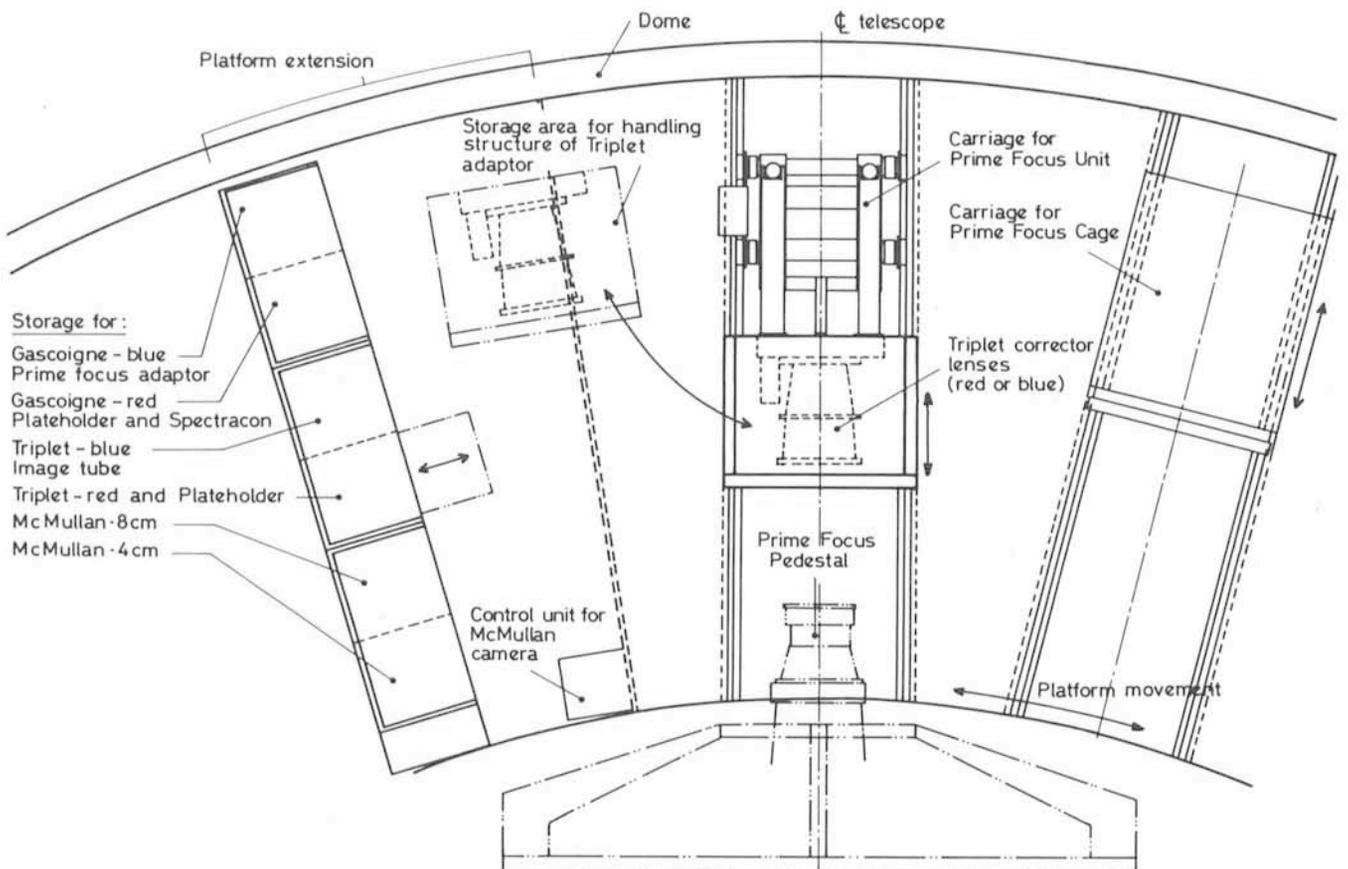
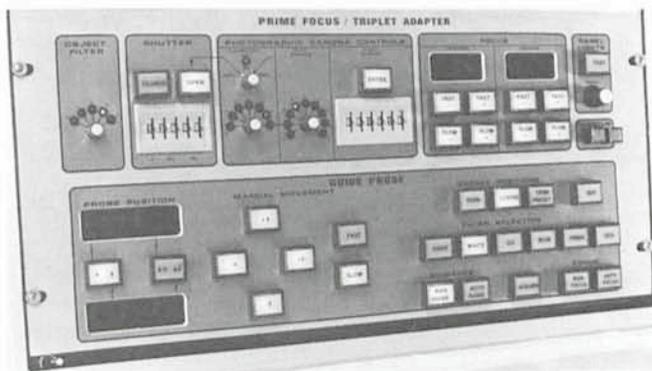


Fig. 3: Layout of the platform, seen from above. The front-end of the telescope is at the bottom.

ture. The same is valid when aperture plates for the McMullan cameras have to be installed.

A lot of discussion has taken place about the optimal use of the triplet adaptor and there will be more details to discuss in the future as it is difficult to find a solution that suits everybody. For the triplet adaptor it was decided to install a so-called "software switch panel" which will simplify the use and give a better overall view of the status of the triplet adaptor (see fig. 4). This panel still has to be interfaced to the 3.6 m control computer.

Fig. 4: "Software switch" panel for the 3.6 m triplet adaptor. ▶



## Fauna on La Silla

### I. Meinen

*During most of the time ESO has existed, rumours about the "dangerous" animals on La Silla have circulated among astronomers in the member countries. It appears for instance that the "vinchucas" are often described in very exaggerated terms. We have asked Dr. Inge Meinen, ESO Administrator in Chile, to tell the readers (and in particular prospective visiting astronomers) the truth about the fauna on La Silla.*

La Silla, the ESO Observatory site, is located at an altitude of 2,400 m in the "Norte Chico", the "little North" of Chile, in an almost—but not quite—desert country. In this dry and sunny climate, so well suited for astronomical observations, it enjoys but little vegetation and has a limited fauna as well.

Wild larger animals are non-existent, although the llama-like "guanaco" may sometimes come down from the high Cordillera (the Andean chain) in search of food. Occasionally some half-wild donkeys ("burros"), or mules, goats and dogs can be seen; they "belong" to seminomads who from time to time pass through ESO territory in search of pastures for their herds of goats, or are on their way to charcoal burning places, or trading goat cheese.

Recently more birds (sparrow-type species) settled on La Silla and some mountain foxes have almost become domesticated pets, as they find, or get food from La Silla dwellers (see *Messenger* No. 9, p. 20). The birds of prey of the region (vultures ("jotas") and condors) may sometimes be seen high in the air, but their aeries are far away from La Silla in the high Cordillera. There are numerous small, very timid, but extremely curious lizards taking the sun or in hiding behind the many stones on La Silla.

Few of the staff have ever seen a scorpion or a snake on La Silla. There is, however, the odd chance to encounter such animals, and walking barefoot is not recommended, not even indoors. In summer time (from December onwards) one should have a look into one's shoes before putting them on, and into one's bed after lifting the cover blanket. A scorpion bite, even though hurtful, is not life-endangering;

moreover, the risk to be bitten on La Silla is but a fraction of that encountered in a Hotel in provincial Italy or Spain.

Spiders are not uncommon on La Silla and some may look rather impressive (tarantulas), but they are not very poisonous.

Even in summer very few mosquitos appear, but sometimes an army of tiny inoffensive ants may invade a room (especially if there are leftovers of something sweet). They are easily destroyed with spray available in all the dormitories.

A few specimens of various types of beetles may be seen crawling on roads and pathways, and even indoors. Most of them are entirely harmless, and non of them will attack man in the open. Only one beetle type is a blood-sucker, like a mosquito, and its bite must be avoided: the *Triatoma Infestans*, popularly called "vinchuca". Vinchucas are rare in Chile nowadays and officially they count as extinct, but they do survive in remote rural areas. At some stage of its development this beetle can even fly. On La Silla, even though regularly sprayed and disinfected, some "invaders" have therefore been located every year.

The disinfection is made in all the dormitories and around them, in all the telescopes and around them, in the hotel, clubhouse, office and library building, other offices, technical installations, contractors' camps, Old Camp and Old



Fig. 1: A well-sized tarantula, photographed on La Silla in 1977 by ESO photographer B. Dumoulin.

Pelicano, including the houses of the Quebrada inhabitants (with their permission). During the summer time, the disinfections are repeated monthly and in the winter time, about every 2 to 3 months.

The vinchuca bite itself is not hurtful but there is a risk of later infection as the beetle may be host animal, carrier and transmitter of a parasite (*Tripanosoma cruci*) which also may affect man. The infection in man is called "Chagas disease" and is still widespread, for instance in certain tropical and underdeveloped parts of Brazil.

Only a small fraction of any vinchuca population is ever infected with *Tripanosoma cruci*. None of the vinchucas so far found on La Silla, and sent to the Institute for Tropical Diseases in Hamburg (FRG) for investigation, was infected. Such a check can also be made on a person who has been bitten, and anyone bitten by a vinchuca (or who suspects that he may have been), should undergo the necessary tests so that he may receive medication if necessary and thus avoid a severe infection.

The infection with Chagas disease typically presents itself with an initial feverish stage and may much later reappear as a heart condition or in the form of other internal troubles.

It may be of interest that the infection from vinchuca to man is not directly transferred by the bite of the beetle but by its droppings (a common reaction after the bite) which may get into the tiny wound inflicted by the bite.

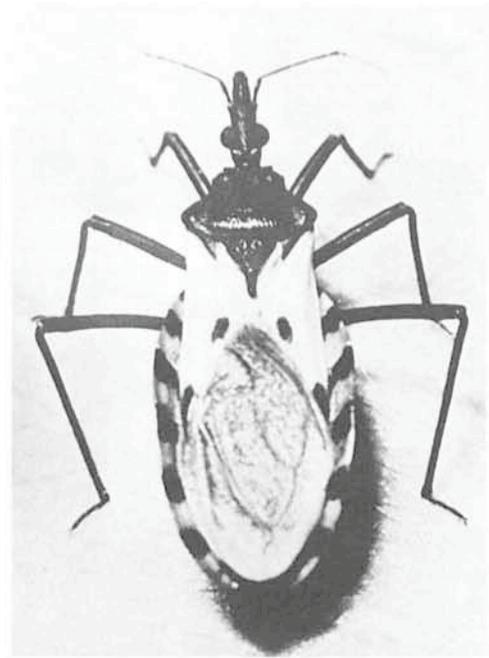


Fig. 2: One of the vinchucas that were sent to Europe for a test. Photographed by Dr. G. Schaub of the Zoological Institute of the Freiburg University (FRG).

## Visiting Astronomers

### April 1—October 1, 1979

Observing time has now been allocated for period 23 (April 1 to October 1, 1979). As usual, the demand for telescope time was much greater than the time actually available.

The following list gives the names of the visiting astronomers, by telescope and in chronological order. The complete list, with dates, equipment and programme titles, is available from ESO/Munich.

#### 3.6 m Telescope

- April: Stenholm, Kohoutek, Schnur/Sherwood, Gillespie, Vogt, Pakull, Melnick/Quintana, Gammelgaard/Laustsen/Pedersen, Möllenhoff, Balkowski/Guérin, Chevalier/Ilovaisky/Motch.
- May: Chevalier/Ilovaisky/Motch, Epchtein/Turon/Puget/Wamsteker, de Loore, Audouze/Thuan/Dennefeld/Kunth, Kunth, Zuiderwijk, Bergeron/Boksenberg, Boksenberg/Caloi/Cannon/Castellani/Danziger, Boksenberg/Danziger/Fosbury/Goss, Boksenberg/Danziger/Fosbury/Goss/Bergeron.
- June: Boksenberg/Tarengi, Ulrich/Boksenberg, Terzan, van den Heuvel/van Paradijs, Wamsteker/Pedersen, Shaver/Danks/Pottasch, Alloin/Tenorio-Tagle.
- July: Alloin/Tenorio-Tagle, de Vries, Wamsteker/Pedersen, Lyngå, Vogt, Adam, Lub, Phillips, Rahe/Schnur/Bouchet.
- August: Rahe/Schnur/Bouchet, Bergvall/Ekman/Lauberts, Bergeron/Kunth, Hayli, Seggewiss, West/Kurtanidze, Alcaïno.
- Sept.: Sherwood/Kreysa, de Vegt, Wehinger, P. Véron, Norgaard-Nielsen/Kjaergaard Rasmussen, Goss/Shaver, Wamsteker/Danks.

#### 1.52 m Spectrographic Telescope

- April: Grosbøl, Lindblad/Lodén, Bouchet, Ahlin/Sundman, M. Spite, Ilovaisky/Chevalier/Motch, Houziaux, Möllenhoff.
- May: Möllenhoff, de Loore, Zuiderwijk, Henrichs/van den Heuvel/van Paradijs, van Dessel, Rahe, Ahlin/Sundman, Metz/Pöllitsch, Appenzeller/Krautter/Mundt.
- June: Appenzeller/Krautter/Mundt, Imbert, Sterken, Renson, Manfroid/Heck, Bouchet, Ahlin/Sundman, Querci/Bouchet.
- July: Querci/Bouchet, de Vries, Arpigny, Bastiaansen, Rosa, King.
- August: King, Bouchet, Ahlin/Sundman, Häfner, Bergvall/Ekman/Lauberts, Schnur/Sherwood, Loibl/Schulz.
- Sept.: Loibl/Schulz, Bouchet, Ahlin/Sundman, Macchetto, Büscher/Bruch, Crane/Materne/Tarengi/Chincarini.

#### 1 m Photometric Telescope

- April: Kohoutek, Hunger/Groote/Schultz, Schmidt/Engels/Schultz, Wamsteker, Wamsteker/Weiss, Bensammar, Lundin, Pakull, Pedersen, Vogt.
- May: Pedersen, Vogt, Shaver/Danks/Wamsteker, Moorwood/Salinari, Bouchet, Wielebinski/Schnur/Mattila, Metz/Pöllitsch, Neckel.
- June: Neckel, Tarengi/Tanzi, Vogt, Mattila/Schnur/Pedersen, Schnur/Mattila, Querci/Bouchet.
- July: Querci/Bouchet, Epchtein/Turon/Roucher/Guibert/Nguyen-Q-Rieu/Wamsteker/Bouchet, Guibert/Nguyen-Q-Rieu/Turon/Epchtein/Roucher/Wamsteker/Bouchet, Lub, Adam, Bernard, Tinbergen.
- August: Tinbergen, Wamsteker, Wamsteker/Weiss, Alcaïno, Bergvall/Ekman/Lauberts, Schober.
- Sept.: Schober, Reipurth/Wamsteker, Büscher/Bruch, van Woerden/Danks, M.-P. Véron.