June:	Andersen/Nordström/Olsen, Lindgren, Ardeberg.
July:	Ardeberg, Ardeberg/Lindgren, Mayor/Burki, Mayor/Mermilliod, Ilovaisky/Chevalier/Motch/Hurley, Ilovaisky/Chevalier/Motch/Bezanger.
August:	Prévot/Imbert/Maurice/Andersen/Nordström/Benz/Mayor/Ardeberg, Maurice, Pedersen.
Sept.:	Pedersen, Fusi Pecci/Battistini/Bonoli/Buonanno/Corsi, Pedersen/Pizzichini, Cetty-Véron/Véron/Tarenghi/Petersen, Testor/Lortet/Heydari-Malayeri.

50 cm Danish Telescope

May:	Grenon/Hög.
June:	Grenon/Hög, Vander Linden.
July:	Vander Linden.

90 cm Dutch Telescope

April:	de Zeeuw/Lub/de Geus/Blaauw.
May:	de Zeeuw/Lub/de Geus/Blaauw, Brand/Wouterloot.
June:	Tanzi/Pakull/Tarenghi.
July:	Tanzi/Pakull/Tarenghi, Barwig/Ritter, Bruch.
August:	Diethelm.
Sept.:	Diethelm, v. Paradijs/v. Amerongen.

61 cm Bochum Telescope

April:	Sterken-group.
May:	Sterken-group, Terzan, Vogt.
June:	Vogt, Wendker/Heske, Metz/Häfner.
July:	Metz/Häfner.

Mechanics and the Stars

S. Balon, ESO

The ESO engineering workshop has recently acquired a universal "Tool Room Milling and Boring Machine" with computer control or, in more technical terms, "Continuous Path Control" (Fig. 1).

The production of parts with complicated contours is now possible with programmes which can be entered directly by the operator from a terminal in the lab (Fig. 2). In this way the technician has on the display screen a continuous check of the programme throughout its execution: He can see at any given time the next instruction to be carried out and he can also check the characteristics of the tool in use, e.g. length, radius and spindle speed, direction for the tool radius compensation.

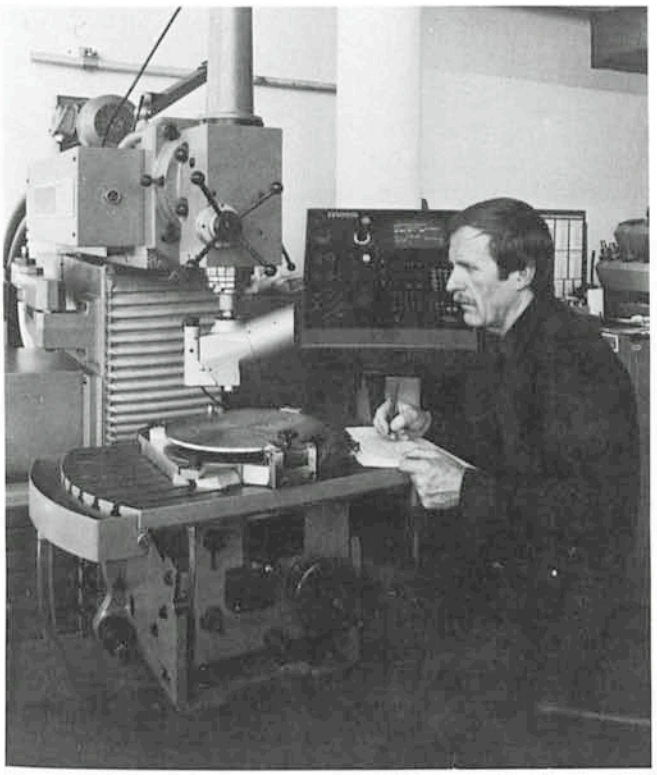

Fig. 1: *S. Balon working with the new "Milling Machine" in the ESO workshop.*

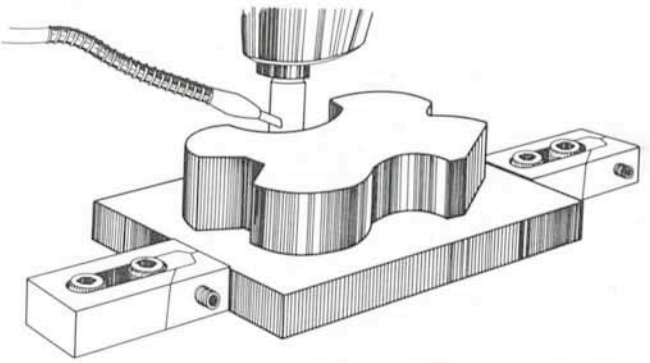

Fig. 2: *This is a schematic illustration of a complicated piece being milled on the machine table.*

The concept of the machine with recirculating ball screws in three axes completely eliminates backlash, thus permitting to achieve linear interpolation, inclined straight lines, circular interpolation, rounding of corners from straight lines to arcs, tangential approach of a contour at a defined point on a circle, absolute and incremental position set values, and entry of position – metric or imperial as selected. It is now possible to achieve radii up to 20 metres with an accuracy of five microns, which previously was very difficult to do with conventional machines.

The entries can be made in rectangular coordinates or in polar coordinates.

There are also some fixed programme cycles such as peck drilling, thread tapping, groove, pocket (rectangular and circular) milling, 3D straight lines, displacement of the zero point (useful for repetition with the help of sub-programmes of different contours at desired intervals), mirror images (x, y and z axis).

It is of course possible to use this machine in manual control mode via the electronic handwheel.

This handwheel with ten ranges of sensibility is switchable to each of the three axes, given for one revolution a displacement of the tables ranging from 10 mm to 0.02 mm according to the choice of the sub-division factor.

We can also appreciate the hydraulic quick action system for tool retention on horizontal and vertical spindle.

It would take too much time to describe all of this powerful new machine. But we can already appreciate the accuracy for example in the realization of the holes for the support of the fiber optics in the masks for this promising highly advanced instrument, already tested by Daniel Enard and Massimo Tarenghi at the 3.6 m telescope in November 1982. I am referring to the "Multiple Object Spectrograph".