

response of both stars and gas to forcing by a growing bar in which she demonstrated that the stellar component substantially affects the shape of the spiral arms formed in the gas. Kalnajs presented, amongst other things, a report of his students' (Schwarz) study of the role of dissipation in spiral formation in barred galaxies.

We also found time for a few other topics: Martinet was anxious to grapple with the complications of genuinely triaxial stellar systems. Wielen drew attention to the evidence for slow diffusion of stellar orbits which seems to be implied by the velocity dispersion of old stars in the solar neighbourhood.

The meeting was a great success. With fewer than ten participants, each contribution could be discussed quite informally, allowing everyone to gain much deeper understanding than is possible in larger gatherings, and several new ideas emerged for future study.

J. Sellwood

## New Technology Telescope

As an intermediate step towards a very large telescope (VLT), ESO intends to design and to build a New Technology Telescope (NTT) with a mirror of 3.5 m diameter. This telescope will help on the one hand to reduce the demand of the 3.6 m telescope on La Silla and will allow on the other hand to test some of the new ideas for telescope design in practice.

Until fairly recently, a telescope in the 3 to 4 m class was considered as the largest telescope for a big observatory. These telescopes were therefore built as very universal instruments with an important capital investment. It is only within the last few years that the first two telescopes which deviated remarkably from this trend came into operation. These were the Multi-mirror telescope (MMT) on Mount Hopkins and the British 3.8 m Infra-red-telescope (UKIRT) in Hawaii. The new approach aims at achieving a large telescope at low cost. The NTT will follow the same approach.

The main guide-lines for large low-cost telescope are:

- minimum weight of primary mirror,
- minimum size of telescope-building,
- minimum number of focal positions.

Working on these guide-lines and from the information gathered at the Conference in Tucson [1] ESO astronomers and engineers defined in clear terms the requirements and the basic concept of the NTT.

From these discussions emerged the three main requirements for a modern telescope:

- high pointing accuracy of 1 arc sec,
- good dome seeing,
- large space inside the control room.

The combination of these requirements including low-cost guide-lines led to the following statements:

1. *Alt-azimuth mounting* occupies the smallest volume in the building and has the smallest deflections (best pointing accuracy) when compared to an equatorial or alt-alt mounting.

2. *Cassegrain focus* requires the smallest dome diameter and building volume when compared to a prime, Nasmyth and coude focus.

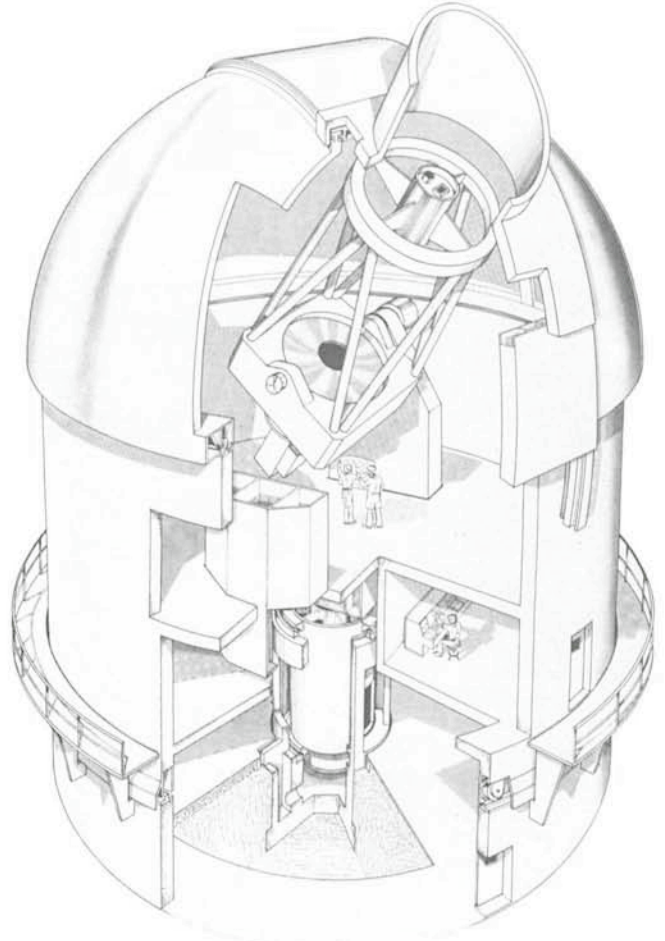
3. *Main mirror with f/2.2 focal ratio* is fast enough to obtain a small dome diameter and not too fast with respect to the increasing difficulties for the figuring of the mirror.

4. *Rotating building* increases the useful space inside the building and avoids difficult cable twists.

5. *Control room beneath observing floor* removes heat production from dome (which gives better seeing) and provides more space for the control room. This location of the control room without a direct view to the telescope is also a first step towards remote operation of the telescope.

Experience of telescope operation on La Silla revealed three facts which have been neglected in the design so far:

- space inside a telescope building is used efficiently only insofar as the work cannot be done elsewhere. It is therefore a bad capital investment to provide more than the barest minimum of space inside the building.
- a high building with a large dome and good climatization has a "dome seeing" which is worse than that of a very small building without heating and climatization.
- instrument changes on a telescope disturb the optical quality of the telescope and produce a considerable loss of observing time due to readjustments which are not properly carried out.



The outcome of the studies so far can be seen in the artist's view. The building has an outside diameter of 14 m and a total height of 20 m. There is no crane inside the building.

Assembly and major maintenance such as mirror aluminizing will be performed with an outside portal crane. No more than two instruments – one for optical observation during the new moon period and one for infrared observation during the full moon period – will be used with the telescope at any one time. It is envisaged however, that these instruments be changed after a year of service. The control room just underneath the observing floor has a surface of 100 m<sup>2</sup>.

This description represents a very early stage in the project, and an invitation is extended to all future users of this telescope, and not only those astronomers from member states, to offer comments which will help to obtain the best final design.

W. Richter

[1] A. Hewitt: Optical and Infrared Telescopes for the 1990s. Proceedings KPNO-Conference, 7-12 Jan. 1980, Tucson, Arizona.