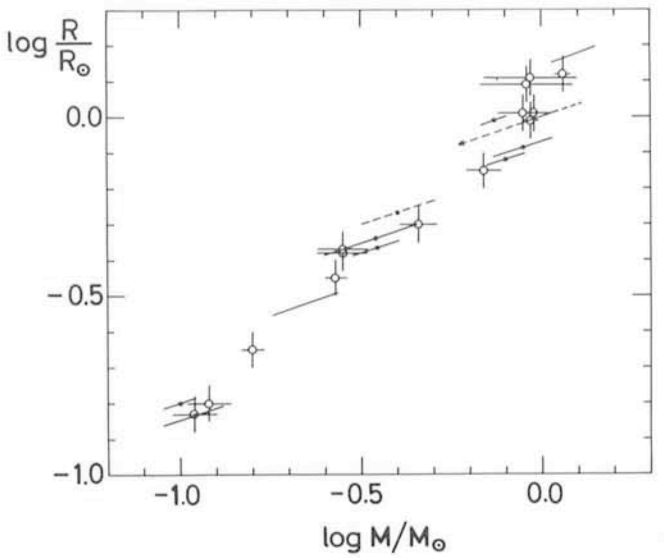


Fig. 4: *Comparison of the mass-radius diagram of the observed low-mass main sequence (open circles, data of visual binaries taken from Lacy, C. H.: 1977, Astrophys. J. Suppl.*, **34**, 479) with the mass-radius diagram of the secondary stars of cataclysmic binaries shown in Fig. 3.

all, or at least a substantial fraction, of the secondary's hydrogen envelope will result in a remnant which is considerably more evolved than a normally evolved star of the same mass and the same age. Depending on the exact chemical structure of such a remnant, the stripped star can stay either well above, or even below the main sequence. Since progenitors having secondaries of initially very low mass are less frequent than systems in which both stars are of comparable mass, the above suggested ablation of the secondary is likely to occur, at least in some cases. Thus a theoretician would not be much surprised if some of the secondaries of CB's were evolved.

(b) From the observer's point of view: In contrast to a theoretician, an observer would not compare the secondaries of CB's with theoretical computations but rather with other observations of stars which are known to be unevolved, e. g. with observations of visual binaries of low mass. The result of such a comparison is shown in Fig. 4. Obviously the secondaries of CB's and the observed low-mass main sequence, as defined by the visual binaries, match within the uncertainties. Thus the conclusion to be drawn from Fig. 4 is that the theoretical low-mass ZAMS is probably wrong rather than that the secondaries of CB's are evolved.

Consequences

As already mentioned above, the secondaries' masses can be determined from the orbital period by using a theoretical main sequence M-R relation. If, as has often been done, a M-R relation which is systematically incorrect is used, the resulting masses are also incorrect. The same holds for the masses of the white dwarfs, if they are derived from the secondaries' masses using an independently determined mass ratio. In fact, taking the observed rather than the theoretical M-R relation yields an interesting result in the case of the USPCB's. In contrast to previous results, it turns out that the corresponding white dwarfs are probably all of low mass, i. e. $M_1 \lesssim 0.5\ M_\odot$. This is interesting with regard to the physical significance of the observed period gap (Fig. 1).

The Period Gap

As just mentioned, the white dwarfs of USPCB's are probably all of low mass. On the other hand no low-mass white dwarfs have been found so far in any of the LPCB's. This gives rise to the speculation that the two subgroups of CB's may be distinguished in such a way that the USPCB's contain only (low-mass) helium white dwarfs ($M \lesssim 0.45\ M_\odot$) while the LPCB's contain only (massive) carbon-oxygen white dwarfs ($M \gtrsim 0.5...0.6\ M_\odot$). Thus the two groups would reflect two different modes of white dwarf formation. The USPCB's would accordingly have been formed in an evolution where the mass exchange started before the onset of the primary's central helium burning. On the other hand LPCB's would be the result of an evolution where mass exchange set in only after the central helium burning but still before the onset of central carbon burning (Ritter, H.: 1976, *Monthly Notices Roy. Astron. Soc.*, **175**, 279). The observed period gap would thus simply reflect the discontinuity in core masses connected with these two possibilities of mass exchange. However, the available observational data do not yet allow a reliable conclusion to be drawn.

Conclusions

The above discussion has shown the importance of reliable observational data of CB's for a better theoretical understanding of the history of these objects. New and better observations particularly aimed at determining the physical parameters of CB's, i. e. their masses and absolute dimensions, are urgently needed. It is with this end in view that the author, in cooperation with Dr. R. Schröder from the Hamburg Observatory, has started an observing programme on CB's. In a first step, two nights at the ESO 3.6 m telescope have been exclusively devoted to spectroscopy of the highly interesting CB Z Cha (see e. g. Ritter, H.: 1980, *Astron. Astrophys.*, **86**, 204). Thereby roughly 140 IDS-spectra have been obtained which are currently in the process of reduction. Results will be presented in a forthcoming communication.

NEWS AND NOTES

Micro-Workshop on Galactic Dynamics

Some members of the ESO Scientific Group and several distinguished guests participated in a "micro"-workshop on galactic dynamics at ESO Geneva, held on 5th and 6th May 1980.

The workshop concentrated on barred galaxies, and began with a lively discussion between Contopoulos and Lynden-Bell on the nature of stellar orbits in bars. They disagreed principally over the dynamical importance of highly elongated orbits in a weak bar. Sellwood presented results of several computer simulations in which bars formed due to instabilities in stellar disks, finding support in his models for some aspects of both theories. Lindblad had studied the response of stellar orbits to growing bars and found that spirals would result near the resonances of the pattern. Athanassoula reported an investigation of the global 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's (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 Infrared-telescope (UKIRT) in Hawaii. The new approach aims at achieving a large telescope at low cost. The NNT 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 coudé focus.

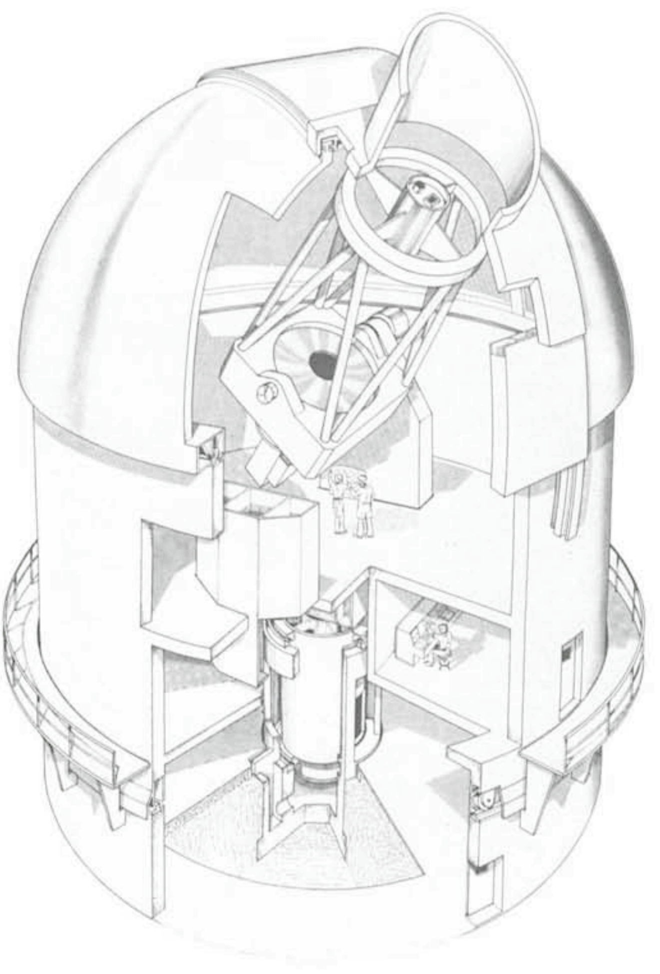
3. Main mirror with f/2.2 focal ratio is fast enough to obtain a small dome diameter and not too fast with respect to the increasing difficulties for the figuring of the mirror.

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^2.

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.