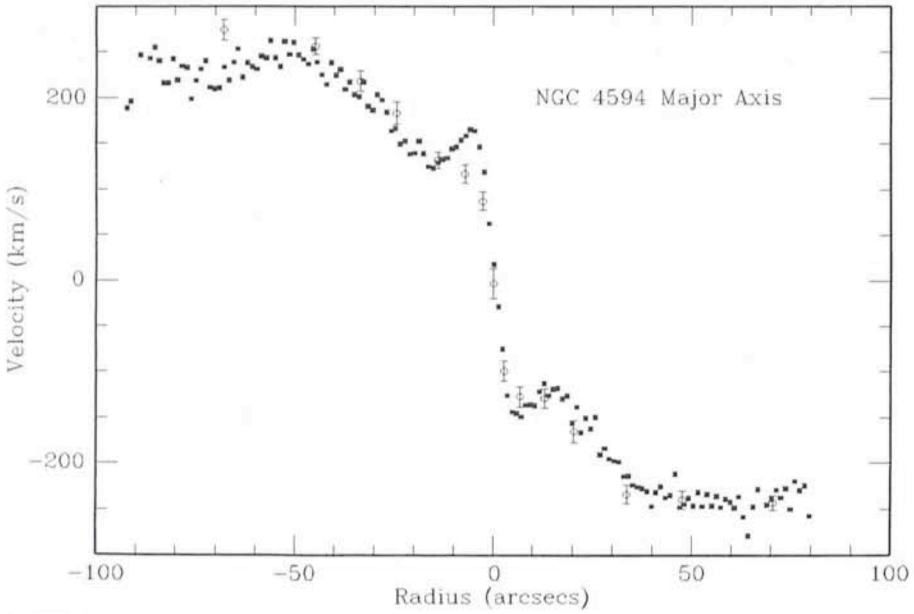

Figure 5.

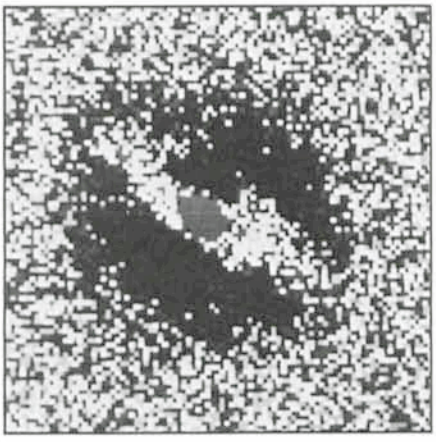

Figure 6.

dissipative history as is generally believed for the bright ellipticals? The small colour gradient in IC 3370 argues against a strongly dissipational collapse. This is also supported by the lack of a significant amount of highly dissipated material in the form of a disk. These and other more subtle points require us to look for a non-dissipative type model for IC 3370.

One alternative possibility may lie with mergers as these have been shown to be capable of producing the characteristic box and peanut shapes (Binney and Petrou, 1985). Their models showed that the slow accretion of a satellite galaxy by a more massive host can lead to the box or peanut shapes with the proviso that the mass of the bulge must not amount to more than a small fraction of the overall mass of the host system. However, for IC 3370, the ratio of the bulge mass to total mass is almost unity. Also, the satellite capture hypothesis cannot work well in the case of the host system being highly triaxial, a possibility in view of the large amount of isophotal twisting observed. Slightly triaxial or oblate elliptical galaxies with an approximately axisymmetric potential cannot be excluded however. Thus it seems that the most likely merger possibility for IC 3370 proposed by Binney and Petrou is the slow collision of two massive disk galaxies which have appropriately inclined total angular momentum vectors. The absence of a significant amount of dust in IC 3370 would tend to argue in favour that the merging progenitors were S0 galaxies unless the merger process triggered efficient star formation depleting nearly all of the gas. These proposals have no sound physical basis at present and can only be tested by adequate n-body experiments.

V. Conclusions

The main conclusions reached in this study of IC 3370 are as follows:

1. IC 3370 is an S0pec galaxy and not an elliptical as previously classified. The strongest supporting evidence for this is the discovery of a faint luminous stellar disk.
2. IC 3370 is highly cylindrically rotating to much greater z distances than have previously been observed in box- or peanut-shaped bulges.
3. The kinematic data show that IC 3370 has as much rotation as an oblate isotropic model flattened by rotation alone.
4. There is an unusually large amount of isophotal twisting in the bulge of IC 3370 amounting to a total shift of about 25°. Merger or tidal processes may offer the only satisfactory explanation for its occurrence.
5. The bulge of IC 3370 is very luminous with $M_B = -22.1$, making it one of the most luminous bulges known.

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Upgrading of the ESO 1.52-m Telescope

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A Few Words of History

At the time the ESO Convention was signed, two telescopes 1 metre in size were foreseen, one dedicated to photometric observations, the other to spectroscopic work. The latter however, was soon turned into a 1.52-metre telescope, a modified twin-brother of a telescope then under construction at the Haute-Provence Observatory. A rather large building was planned to house the coudé spectrograph and an aluminizing plant for up to 2 metre diameter mirrors, and was erected in 1968.

The 1.52-metre spectroscopic telescope was first offered to visiting astronomers for the period September 1st 1969 to March 1st 1970. The instrumentation then available consisted of the coudé spectrograph and a Cassegrain spectrograph from Marseille Observatory, aimed at radial velocity measurements. Later, an echelle spectrograph was installed at the coudé focus, working with an electronographic device and providing a resolution down to 0.015 nm. This spectrograph is present-

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ly being modified so as to receive a CCD detector and be remotely controlled. A Boller and Chivens spectrograph was purchased for the Cassegrain focus. It was first equipped with an Image Tube, then with the Image Dissector Scanner (1978) and a reticon device, and since March 1987, works with a CCD detector. A set of gratings allows to reach resolutions from 0.1 to 1.35 nm for an entrance slit of 3 arcsec.

The Need for an Upgrading

Firstly, an instrument twenty years old has necessarily suffered from ageing: some mechanical and optical parts in particular must be replaced. Secondly, the technology for telescope building and the observing conditions have changed rapidly: no doubt that a short tour at the various telescopes on La Silla would convince you of this fact. And finally, requirements of the astronomers have changed according to technological progress. Remember that a pointing accuracy of about 2 arcmin was seen as acceptable by the time the 1.52-metre telescope was planned, while now we are all looking for much better performances . . .

As far as possible, all instruments on La Silla should meet these requirements which aim at a better efficiency and reliability. Along this line of thinking, an upgrading of the 1.52-metre telescope appeared to be necessary and was initiated recently. In a similar way the 1 metre photometric telescope has benefited by a complete check-up and has been modernized at the same time.

It should be realized that such a task is not as easy as it looks at first sight: precisely because the technological aspects have changed so much! Modernizing a telescope from the sixties can be time consuming and expensive. However, many interesting results are to be expected from small to medium size telescopes if these are efficient and well equipped. Indeed, they can provide the large amounts of data which are requested to perform serious research on variability projects or survey projects. To be competitive these telescopes need an accurate computer-controlled pointing, a precise and automatic guiding and must be equipped with fast and high quality instrumentation.

What Do the 1.52-m Telescope Users Think?

In order to estimate which support to this upgrading could be expected from the users community, an inquiry was sent around last April to the 55 astronomers having observed at the 1.52-metre telescope during the period April 1, 1986 to April 1, 1987. This inquiry consisted of a set of questions regarding (i) the telescope itself and the general observing conditions, and (ii) more specifically the Image Dissector Scanner because this detector recently showed serious signs of degradation. A total of 43 astronomers replied to this inquiry, i.e. 78 %: we thank them very much for their help. From their answers the following conclusions could be drawn:

Regarding point (i), 65 % of the observers are not satisfied with the present observing conditions. The rating for suggested improvements went as: 93 % are in favour of a computer-controlled pointing, 74 % would appreciate the access to an automatic guiding system, 58 % also favour a computer-controlled dome motion and 58 % see the need for observing from a side-room. Finally, an impressive proportion of observers, 90 %, would accept a close-down of the instrument during two months if this could speed up the upgrading – even if this close-down disturbs temporarily their scientific programmes.

As far as point (ii) is concerned, only a subset of the astronomers sample answered this part of the inquiry, those having used the detector on the Boller and Chivens spectrograph (24 of them). The answers are strongly dependent on the epoch at which the IDS was used, since its impressive failures started last December 1986. Most IDS users from December 1986 to March 1987 notice stability problems, an increase of the noise, the appearance of spikes and a spectacular loss in sensitivity. To the suggestion of replacing the dying IDS by a CCD detector, 83 % of the users agree while 17 % raise arguments in favour of the IDS (real-time data display, small size files, homogeneity of data . . .) although they have no serious objection to the CCD.

This inquiry has shown, if necessary, that the astronomical community strongly supports the upgrading of the 1.52-metre telescope and that a speeding up of the action would be welcome.

Which Improvements Have Been Implemented Already?

On the side of the telescope, up to now the modifications have been mainly of mechanical nature and are related to the modernization of the telescope drive.

Additional improvements have been achieved for the auxiliary functions: (i) a new mirror 3 support has been implemented which does allow for easy and well aligned optical configuration changes between Cassegrain and cloudé focii, (ii) four motorized sliding counter-weights are now along the delta tube (iii) one motorized offset counter-weight is for the hour angle axis, (iv) a balancing counter-weight ring has been installed below the mirror cell (v) there is a new motorized rotator for the Cassegrain instrumentation and, (vi) telescope blocking devices have been mounted in order to ensure safer and faster instrument exchanges.

On the side of the instrumentation, a new CCD detector has been attached to the Boller and Chivens spectrograph.

Future Upgrading

The telescope will get new servo-motor drives at both axes. These will allow for accurate tracking and off-setting. A high resolution encoder with an absolute position read-out feature will be installed. Automatic telescope and dome presetting will be implemented. An automatic guiding system for Cassegrain observing and possibly coudé as well, will be available. It is intended to develop an autonomous safety system for the telescope, in order to prevent collision with the pillars and the platform. The telescope and instrumentation cabling will be renewed and a cabling twist system will be incorporated. Finally, a new control room will be installed at the floor below the telescope. Regarding the instrumentation, the optics of the Boller and Chivens spectrograph will be improved in order to overcome the geometrical aberrations. It is also planned to reactivate the echelec spectrograph with a CCD detector.

While you are reading these lines, part of this *future* upgrading has allready become past upgrading . . . .

Thinking of the future of small or medium size telescopes, one route is towards modernized efficient instruments with only a few high quality equipments. One might direct the effort, at the 1.52-metre telescope, in having the echelle spectrograph equipped with a CCD at the coudé focus, and the improved Boller and Chivens spectrograph at the Cassegrain focus, also with a CCD detector. This would lead to a better set-up of the instrumentation because of less frequent change-over. This whole upgrading is intended to raise the 1.52-metre telescope to the same quality standard as now found on the site.

A large fraction of the TRS staff at La Silla is presently involved in this task, particularly W. Eckert and his workshop crew for the mechanical modifications, M. Maugis for the new encoder interfaces, J. Alonso for the servo-drives and G. Andreoni for the telescope control software. *La Silla, June 29th 1987*