

FIRST RESULTS FROM THE NEW MICROMETER ON THE CARLSBERG AUTOMATIC MERIDIAN CIRCLE

C. Fabricius, L. Helmer, O.H. Einicke
(Copenhagen University Observatory,
Brorfeldevej 23, DK-4340 Tølløse, Denmark)
L.V. Morrison, M.E. Buontempo, R.W. Argyle
(Royal Greenwich Observatory. U.K.)
L. Quijano, J.L. Muñoz (Real Instituto y
Observatorio de la Armada en San Fernando. Spain)

ABSTRACT. A new micrometer has been in operation on the Carlsberg Automatic Meridian Circle since May 1988. The zenith mean error for one observation has improved from $0''.19$ to $0''.14$ and the limiting magnitude from $13^m.2$ to $14^m.8$. The first meridian observations of Pluto and observations of nine extragalactic objects are briefly discussed.

1. INTRODUCTION

The Carlsberg Automatic Meridian Circle has been in operation on La Palma since May 1984. A new photoelectric slit-micrometer has been in use since May 1988, introducing several new ideas. The slit plate, which includes the moving part of a linear encoder, is polished underneath and slides on two fixed pads. A diaphragm uncovers shorter or longer sections of either of the two slits. The photomultiplier tube is cooled to -30°C , and the double window in the cooling box comprises a Fabry lense and a filter. The small number of optical surfaces, all coated, ensures the maximum transmission of light.

2. PERFORMANCE OF THE MICROMETER

Significant improvements have been obtained in limiting magnitude as well as in mean error. The limiting magnitude is now about $14^m.8$ as compared with $13^m.2$ for the previous micrometer. The mean error for one observation of a star brighter than $m_v = 11$ and near the zenith is now $0''.143$ for right ascension and declination and $0''.042$ for the magnitude. The old micrometer gave $0''.188$ in position and $0''.073$ in magnitude. Further improvements of the micrometer are planned and it is hoped to reach a limiting magnitude of $15^m.5$ in 1991.

3. MERIDIAN OBSERVATIONS OF PLUTO

Between February and June 1989, 32 observations of Pluto were carried out. Pluto was about $m_v = 14.0$ and was observed 30° from the zenith. A preliminary comparison with the JPL integration gives residuals, CAMC-DE200, of $+1.7$ in R.A. and -0.4 in DEC. Observations made in 1987 by Barbieri et al. (1988), using AGK3 reference stars, yield residuals of $+0.79$ and -0.17 (there is an error in their printed residuals). A new ephemeris (Standish 1989), DE202, shows a difference, DE202-DE200, for 1989 of $+1.2$ and -0.5 for R.A. and DEC. Standish estimates that DE202 could be off by 0.5 due to systematic errors in the astrometric catalogues. This vindicates the CAMC results and demonstrates the need to get positions directly in the FK5 system.

4. OBSERVATIONS OF EXTRAGALACTIC OBJECTS

In the program for the new micrometer a list of QSO's and BL Lac's was included. Nearly all objects in the list of Argue et al. (1984) are too faint for meridian circles and most alternative objects lack accurate radio astrometry. Table 1 below gives the nine objects observed so far, and a preliminary comparison with radio astrometry from Walter (1989). Five of the objects are known to be radio sources.

TABLE 1. QSO's and BL Lac's observed with the CAMC

Name	m_v	$\Delta\alpha$	$\Delta\delta$	Remarks
0754+394	14.39			Radio
0844+349	14.71			
1101+384	13.55			Radio, BL Lac
1211+143	14.11			
3C273B	12.97	$+09$	-16	CMC4-Walter
3C273B	13.01	$+20$	$+01$	CMC5-Walter
1254+571	13.88			Radio
1440+356	14.63			
1652+398	13.86	$+21$	$+22$	CMC5-Walter
1718+481	14.45			

5. REFERENCES

- Argue, A.N. et al.: 1984, *Astron Astrophys* 130, 191
 Barbieri, C., Benacchio, L., Capaccioli, M. and Gemmo, A.G.:
 1988, *Astron. J.* 96, 396
Carlsberg Meridian Catalogue, La Palma, No.4 and No.5: 1989-1990, CUO, RGO and ROA, (in prep.)
 Standish, E.M.: 1989, (private communication)
 Walter, H.G.: 1989, *Astron Astrophys Suppl Ser* 79, 283

Discussion

STANDISH: What determines which asteroids are observed? That is, is it possible to request observations of specific asteroids?

FABRICIUS:: Yes, proposals are welcome.

MORRISON: To supplement the reply by Fabricius, there are at present 62 of the brighter asteroids in the CAMC programme which are included in the HIPPARCOS mission.

MORANDO: Actually, the number of asteroids in the HIPPARCOS mission has been reduced from 62 to 48.

YATSKIV: What is your limiting magnitude?

FABRICIUS: The limiting magnitude is 14.8.

PINIGIN: How do you guide CAMC for such weak objects?

FABRICIUS: It is done automatically with pre-calculated ephemerides for the telescope pointing positions.