

ON THE IMPLEMENTATION OF ABSOLUTE MERIDIAN OBSERVATIONS IN LOW LATITUDE STATIONS

Li Dong-ming
Beijing Observatory, Academia Sinica

Mao et al. (1983) have originally stated that in order to record the transit times of a star at meridian transit as well as at prime verticale transit the chassis of the instrument would have to have two pairs of supports. In my opinion, it may be difficult to develop such an instrument with the required aperture of 20 cm and a focal length of over two meters, especially when the declination system must be very stable.

We suggest as an alternative an instrument with one pair of supports, but in addition equipped with a supplementary optical system which permits one to use it also for observation of prime verticale transits. This simpler may produce better results and is easier to construct. This new absolute method may also be applicable to conventional transit circles operating in low latitudes.

In particular, this supplementary optical system could simply be a transit instrument for prime vertical observations, whose horizontal axis is along the line of sight of the transit circle, with a plane mirror fastened at one end. The ϵ value of (Mao et al. 1983), that is the position of the transit instrument's horizontal axis in the field of view of the transit circle may then be precisely determined by auto-collimation.

An even simpler supplementary system would be that shown in fig. 1. The prism ABC may be rotated on the horizontal axis which lies in the north-south direction. By rotating the prism, stars in the prime vertical at different zenith distances may be brought into the field of the transit circle for observations.

For relating observations on the prime verticle to those on the meridian, the orientation of the horizontal axis relative to the collimation line of the transit circle, and the collimation error

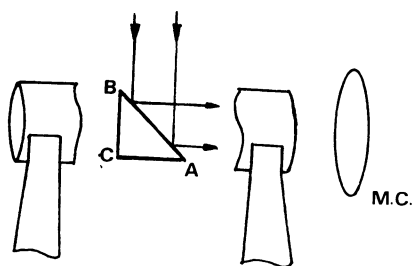


Figure 1

of the supplementary optical system must be known in addition to the inclination i of the system.

These parameters may be determined precisely by the auto-collimation. The first can be determined by means of the reflected image from the lateral side of the prism, and a mercury horizon should be placed beneath the prism for measuring the second.

In contrast to the four supports system suggested by Mao et al. (1983), the long-term stability of the parameter ϵ is not required for the supplementary optical systems proposed here. Such systems make it possible to relate meridian observations precisely to the prime vertical observations and achieve the same results as Mao's instrument.

Reference

- (1) Mao, Wei et al. 1983. *Acta Astronomica Sinica*. 24, p. 169.