A Photographic Astrometric Telescope for Brazil

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Abstract

This paper describes a short focus Astrometric Telescope (D=40cm; F=200cm) at the astronomical station of Campinas, in the State of Sao Paulo, which is a joint operation including the Federal University of Rio de Janeiro, the State University of Campinas, the Catholic University of Campinas and the Municipal Government of Campinas City.

1. Introduction

The Valongo Observatory of the Federal University of Rio de Janeiro received from the Ministry Education and Culture a grant for the purchase of astrometric equipment. Considering the financial possibilities and climatic conditions, the following instruments were selected: a short focus Astrometric Telescope (D=40cm; F=200 cm), and an Ascorecord coordinatograph (reading microscope precision of 0.1 micron) and a blink plate comparator, all manufactured by V.e.B. Carl Zeiss, Jena. The latter two instruments have been installed and are regularly used at the Valongo Observatory. The Astrometric telescope has arrived in Brazil; the building which will house it is in the final stages of construction. An 8 meter diameter dome, also from Carls Zeiss, was chosen, and 16cm × 16cm photographic plates will be used. The telescope is designed to give good images over a field of 30cm × 30cm, though. The telescope will be located near Campinas City (λ=-40°49'41?2", ϕ=-22°53'59", H=1050m). The measuring equipment is located in Rio de Janeiro, 500 km (about a 7 hour drive) from Campinas.

2. Historical

The Astrometric Group of the Valongo Observatory was created in 1978 with the help of Dr. Henri Debehogne of the Royal Observatory of Belgium, a visiting professor in our University. The cooperation with Belgium has enabled Brazilian astronomers to work at the ESO at La Silla, Chile, since 1978 until the present. The observations in Chile resulted in the publication of more than 20 papers in international scientific journals. The latest visit occurred in July, 1983, at the Astrometric Telescope (D=50cm; F=375cm) of the Felix Aguillar Observatory at San Juan, Argentina.

H. K. Eichhorn and R. J. Leacock (eds.), Astrometric Techniques, 229–230.

3. Observation Techniques

Every plate is exposed three times for 8 minutes, with intervals of 4 minutes between exposures. Between the first and the second exposure, the telescope is slightly displaced in declination and between the second and third, the telescope is displaced by a somewhat larger amount in order to facilitate the identification of the exposure sequence. The particulars of the exposure sequences, including the exposure lengths are, of course, ultimately determined by the rate with which the objects under observation (mostly minor planets) move with respect to the stars, their magnitudes and the focal length of the instrument. The motions of the celestial bodies in relation to the stellar background are quite conspicious, and this technique minimizes misjudgements caused by defects in the photographic plates. The three exposure method, on the other hand, allows us to obtain three positions on only one plate. For faint objects we have been using the Trepied-Metcalfe Method.

4. Reduction Technique

On each photographic plate we select five reference stars and measure their rectangular coordinates as well as those of the target object on the Ascorecord Coordinatograph. The reference stars are measured once and the target object twice. The measurements are reduced by the method of dependences on the Burroughs B6700 computer of the Federal University of Rio de Janeiro.

5. The Astrometric Telescope Work Program

Due to the climatic conditions at the Campinas observatory site and the technical characteristics of the telescope, we plan systematic observations for 15 to 20 days per month during the most favorable season, that is, from March to October. We intend to observe bright Minor Planets (Leningrad Program) and the observations of Minor Planets from the Ephemeridi Malikh Planet, limited to a photographic magnitude of 17. This includes, of course, participation in the International Halley Watch. Other celestial bodies such as variable stars, flare stars, novae, etc., can also be observed on request.

6. Conclusion

The Astrometric Telescope will close, for photograhic astrometry, a gap in our country. It will allow a systematic observation of Minor Planets and Comets. Naturally, the telescope will be at the disposal of the national and international astronomical community, probably by the middle of 1985. The extremely limited budget and governmental import restrictions on photographic plates may pose a severe handicap to our intended program.

Discussion:

EICHHORN: Congratulations on getting an astrometric telescope established in the southern hemisphere. Dirk Brouwer once said that there is no way that the southern hemisphere sky could be overobserved.

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