

THE ASTROGRAPH OF THE VALONGO OBSERVATORY (UFRJ)
AND THE ASTROMETRY PROGRAM AT CAMPINAS, SÃO PAULO
BRAZIL.

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RESUMO. Trata-se de breve comunicação sobre a futura instalação em 1985 na cidade de Campinas, São Paulo, Brasil (latitude = $22^{\circ}53'59''$ S; longitude = $46^{\circ}49'41''$ W; altitude = 1050m) do telescópio astrométrico, Carl Zeiss, Jena (D=40cm; F=200cm) do Observatório do Valongo da Universidade Federal do Rio de Janeiro, com a descrição sumária do programa astrométrico a ser desenvolvido. Menciona-se, igualmente, a integração do telescópio ao "International Halley Watch".

ABSTRACT. This is a brief communication about the installation, during 1985, in Campinas, State of São Paulo, Brazil (latitude = $-22^{\circ}53'59''$; longitude = $46^{\circ}49'41''$ W; altitude = 1050 meters) of the Astrometric Telescope Zeiss, Jena (D= 40cm ; F= 200cm), of the Valongo Observatory , Federal University of Rio de Janeiro, and its possible integration in the International Halley Watch.

Key words: astrograph - astrometry program

I. INTRODUCTION

As presented in IAU Symposium 109 - Astrometric Techniques - Gainesville, Florida , USA, January 9-12, 1984 (Machado, 1984), the Valongo Observatory of the Federal University of Rio de Janeiro received from the Education and Culture Ministry a set of astrometric equipments to work with. Considering the financial possibilities and climate conditions, it had been selected a short focus Astrometric Telescope (D=40cm ; F=200cm), an Ascorecord Coordinatograph (reading microscope precision of 0,1 micron) and a Blink Plate Comparator, all instruments from Veb Carl Zeiss, Jena. The last two equipments are already installed and working in the Valongo Observatory. The Astrometric telescope is already in Brazil and the building where the equipment will be installed is in its final stage of construction. It was chosen an 8 meter diameter dome also from Carl Zeiss Jena and it has been considered the utilization of 16cm x 16cm photographic plates instead of the original 30cm x 30cm. The telescope will be located near Campinas City in the State of São Paulo (longitude = $46^{\circ}49'41''$ w, latitude = $-22^{\circ}53'59''$; altitude = 1050 meters) in one of the best astrometric sites in the world (Teleki, 1982). The reading and measuring photographic plates equipment, as, we already mentioned, are located in Rio de Janeiro, which is far from Campinas about 500km, nearly 7 hours driving.

II. HISTORIC

The Astrometric Group of the Valongo Observatory was created in 1978 with the help of Dr. Henri Debehogne, a Visiting Professor in our University, from the Royal Observatory of Belgium. The cooperation with Belgium allowed, with a certain regularity, the work of Brazilian astronomers in the European Southern Observatory, La Silla, Chile, since 1978 until now. The missions in Chile resulted in the publication of more than 20 papers in international scientific journals. The last mission was done in february/march 1984. In July 1983 we also made observations with the Astrometric Telescope (D= 50cm ; F=375cm) at the "Estacion de Altura El Leoncito", San Juan, Argentina.

3. OBSERVATION TECHNIQUES

The techniques acquired from the experiences with the observations in La Silla, Chile, and El Leoncito, Argentina, will be applied to the Astrometric telescope in Campinas. In each photographic plate three expositions are made each with duration of 8 minutes, taken at intervals of 4 minutes between them. Between the first and the second expositions a small decalation in declination is given and between the second and the third exposition a little bigger decalation in the same direction is given to make easier the identification of the exposition sequence. Of course, the apparent velocities, the magnitudes, the focal distance of the telescope, its optic qualities, its driving gear and the atmospheric conditions, decide about the selection of the exposition times and its intervals. The motions of the celestial bodies in relation to stars are easily detected, and this technique minizes misjudgements caused by defects in the photographic plates. The three exposition method, on the other hand, allows the obtention of 3 positions in only one plate. For faint objects, with knownd motions, it has been used the Trépied-Metcalf Method.

4. REDUCTION TECHNIQUES

In each photographic plate five reference stars are selected, and the rectangular coordinates of the stars and of the object that will be observed are measured at the coordinatograph. The reference stars are measured once and the object twice to obtain a mean value. The reduction from rectangular to equatorial coordinates is made by the methods of least squares and dependences. It is used a computer program in the Burroughs B-6700 computer of the Federal University of Rio de Janeiro.

5. THE ASTROMETRIC TELESCOPE WORK PROGRAM

Due to the climate conditions of the observatory site in Campinas and the technical characteristics of the telescope, there will be systematic observations during 15 to 20 days, each month, during the most favourable epoch of the year, that is from March to October. The observation of Bright Minor Planets (Leningrad Program) and the observation of Minor Planets from the Ephemeridi Malik Planet, will be made limited to a photographic magnitude of 17. The accessible comets to the local latitude will be also photographed. Other celestial bodies like variable stars, flare stars, novae, etc., can be also observed, under request. It has been programmed to join the International Halley Watch. According to the letter published in Circular nº 2, The Large-Scale Phenomena Network of the I.H.W., the installation of the Astrometric Telescope in Campinas, São Paulo, fulfills one of the observational voids in the Southern hemisphere. In the same Circular, it is mentioned that,

" still, there are longitude zones embracing land-such as Western China, India, Afghanistan, Central Africa, and Eastern Brazil - Where not enough wide-field coverage presently exists in the network."

Meeting the desires expressed in the above mentioned Circular we hope to fill at least one of these areas soon.

CONCLUSION

The Astrometric Telescope will fulfill, in the domain of the optical 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 at the end of 1985. Certainly it can be included in the programs related to the Halley Comet. Finally, we see a problem with the acquisition of photographic plates due to the actual Brazilian Government restriction of importation and due, of course, to our limited budget and to the exchange variations on our currency, compared to the U.S. dollar.

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