DETERMINATION OF THE LONGITUDE OF THE MANILA CENTRAL OBSERVATORY BY WIRELESS TELEGRAPHY

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1. INTRODUCTION

The purpose of this work was three-fold.—(1) To coöperate with the other Observatories in the World Longitude Determination; (2) To obtain a value of the longitude of the Observatory itself, in order that, comparing it with the former value, a test may be made not only of the permanency of the relative position of the Observatory but also of certain possibilities as to the movement of the earth's crust; (3) To test the accuracy and to study the transmission of time signals by the radio wave. A decision as to the latter points must await the final results of other Observatories. The meridian herein referred to is the meridian passing through the center of the Transit pier of the Observatory.

The entire work of observing and reducing the star transits and of receiving the radio signals was accomplished by Reverend Francis J. Heyden, S. J., Chief, Astronomical Division, from December, 1931 to July, 1934; at which time he was succeeded by the writer. The writer took up the computations and the unifying of the results.

Credit is due to Reverend Charles E. Deppermann, S. J., Assistant Director of the Observatory, for his many helpful hints and for reviewing these pages; also to the staff of the Observatory, Mr. Anselmo T. Alquinto, Mr. Pablo F. Carpio and Mr. Alfredo Peckson for their untiring efforts in checking and rechecking the computations; also to Mr. Mariano Herrera, the observatory mechanic, for his excellent care of the clocks.

2. APPARATUS

(A) **Transit.**—The instrument used was a Repsold Broken Transit (1913), diameter of objective 7.5 cm., focal length 78 cm. The instrument is reversible and equipped with an impersonal micrometer, hand-driven, making 12 contacts on each side, giving 24 observations on each star.

(B) **Clocks.**—Three master clocks were used. Shortt Synchronome No. 33; Riefler No. 42, and Riefler No. 251. The Shortt Synchronome and Riefler No. 42 beat mean Time while Riefler No. 251 keeps Local Sidereal Time. All three clocks are kept in a constant temperature vault, temperature 30° C, and all three clocks are under constant pressure. Due to the inability of the two Rieflers to maintain an even contact, the Shortt Synchronome was used for the star transits and for receiving the radio signals. However, at each star transit and each reception of radio signals the three master clocks were put on the chronograph in order to make a comparison. The time of reception was computed from the mean correction to the three clocks.

(C) **Chronograph.**—The chronograph used was of the ordinary revolving drum type, with two speeds, giving a distance of one or two centimeters between seconds' beats. It has but one pen; however the armature of the carriage had been doubly wound so that the beginning of the beat of each second of each clock was clearly distinguishable even when in coincidence.

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