

DETERMINATION OF THE LONGITUDE OF THE MANILA OBSERVATORY BY WIRELESS TELEGRAPHY, OCTOBER-NOVEMBER, 1926

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1. INTRODUCTION.—The purpose of this work was three-fold:—(a) to participate in a very modest way with other observatories in the World Longitude Determination; (b) to obtain a value for the longitude of the Observatory itself more accurate than that previously used, and to compare the value thus secured with the ones obtained by cable; (c) to test the accuracy of some of the usual ways of observing time signals.

The first purpose is best explained in the words of a memorandum sent out by the U. S. Naval Observatory:

There will be a World Longitude determination by radio signals, beginning 1 October, 1926, and ending 1 December, 1926 . . . The principal stations of the so-called "fundamental polygon" will be at the Naval Operating Base, San Diego, California, at the Algiers Observatory, and at the Shanghai Observatory. These stations are at nearly the same latitude, and are spaced approximately 8 hours apart in longitude. It is proposed to determine the differences of longitude at intervals sufficiently separated in time in order to test the permanency of their relative positions, and certain possibilities as to movement of the earth's crust . . . It is suggested and urged that as many astronomical observatories as can arrange to do so make time observations, and receive the signals, thus enabling them to establish their longitude with reference to one or more of these points of reference (i. e. Annapolis, Arlington or Bellevue, Honolulu, Saigon, Bordeaux, d'Issy (near Paris).)

It may be noted here that the Manila Station mentioned in some circulars regarding longitude is not the Manila Observatory, but a special and temporary station occupied by the Coast and Geodetic Survey.

2. APPARATUS.—(A) **Transit.**—All the time determinations were made by the Rev. Juan Comellas, S. J., the astronomer of the Observatory. The instrument used was a Repsold Broken Transit of the usual type, the same in fact as that used for the determination of the latitude of the Observatory (cf. Publications of Manila Observatory, Vol. I, No. 1). Although the instrument is equipped with an impersonal micrometer, the older method was used of tapping the chronograph key as the star was observed to cross each one of seven wires.

(B) **Clocks.**—At the time of taking transits, the Sidereal Riefler was switched into the chronograph circuit; at the time of the wireless reception of time signals, the Mean Time Riefler was used. The Sidereal Riefler is unprovided either with a vacuum case or a pressure-compensating aneroid; the Mean Time Riefler has a vacuum case, but at the time it was not used, since difficulty was experienced in maintaining a vacuum. Neither of the clocks are in a constant temperature vault, but they are so placed in the basement of the Observatory that the variation in temperature is at the most one degree a week.

The chronograph used was of the ordinary revolving drum type, with two speeds, giving a distance of one or two centimeters between seconds respectively.

(C) **Radio.**—The wireless receiving sets used were three in number:

(a) **Short Wave Set.**—This was of the usual type, the circuit being that of Schnell, and the range from 12 to 200 meters (cf. Diagram A.).