DISCONTINUANCE OF THE BALDWIN MAGNETIC OBSERVATORY AND ESTABLISHMENT OF THE TUCSON MAGNETIC OBSERVATORY.¹

By R. L. Faris, Inspector of Magnetic Work, U. S. Coast and Geodetic Survey.

In the September (1907) number of this journal (Vol. XII, No. 4, page 184) it was stated that the Baldwin magnetic observatory of the United States Coast and Geodetic Survey would be kept in operation until another magnetic observatory could be established somewhere west of the Mississippi River to replace it.

During the early part of 1909 a site for a magnetic observatory was selected in the vicinity of Tucson, in the Territory of Arizona, after a careful inspection had been made of a number of possible locations, and after a magnetic survey was made of the finally adopted location. Construction work on the observatory buildings began in the latter part of June, 1909, and the buildings were ready for the installation of the magnetic instruments by the first of November, 1909.

As the instrumental equipment of the Baldwin magnetic observatory was to be used at the new observatory at Tucson, the operation of the Baldwin observatory was discontinued on the 22d of October, 1909, and the instruments dismounted and forwarded to the new observatory, where they were installed and put in operation on the 16th of November, 1909. Permanent reference marks were established at the Baldwin observatory site so that its occupation with portable field instruments may be made at any future time as may be desired.

The new observatory is located eight miles (12.9 kilometers) easterly of the city of Tucson, Arizona, in a comparatively level and open country, and at an elevation of approximately 770 meters above sea-level, and about 45 meters above the city of Tucson. This region possesses a very dry climate, the average annual relative humidity being probably less than 45 per cent. The approximate latitude of the observatory is 32° 14.8' North and longitude 110° 50.3' West of Greenwich. This observatory, accordingly, occupies about the mean geographic position of all of the magnetic observatories operated by the United States Coast and Geodetic Survey, these observatories covering a range in latitude of 39° and in longitude of more than 92°.

The variation observatory, like all the other Coast and Geodetic Survey magnetic observatories, is built entirely above ground, and is constructed of wood, no other materials being used, except for the foundation walls, which are eighteen inches (46 cm), where concrete

¹Published by permission of the Superintendent, United States Coast and Geodetic Survey.

THE TUCSON MAGNETIC OBSERVATORY OF THE UNITED STATES COAST
AND GEODETIC SURVEY.

Fig. 1. *Office and Dwelling.*

Fig. 2. *Variation and Absolute Buildings.*

was used. Specimens of the materials used in the concrete were tested for magnetic properties before being employed in the building of the foundation walls.

The design of the variation observatory building is essentially like that of the Cheltenham (Maryland) magnetic observatory, which is described in Volume VIII, No. 1, pages 10 to 28, of this Journal, except that it will accommodate only one set of variation instruments. The outside dimensions of the building are 9.7 meters by 8.5 meters; the inside of the instrument room is 4.9 meters by 3.7 meters, the total thickness of insulating walls, air spaces, and corridor thus being 2.4 meters in thickness.

The building for absolute observations, located about 25 meters to the northward of the magnetic variation observatory, is a wooden structure having double walls. The dimensions of the outside building, which is covered by a gable roof, are 3.7 meters by 4.9 meters by 3.0 meters high. The inside dimensions of the observing room are 2.4 meters by 3.7 meters by 2.4 meters high, thus making an air space of 0.6 meter between the walls of the inner and outer buildings of the structure. This partial temperature insulation is a good feature in this region, where the mid-day temperatures are quite high.

In this dry region of the United States the question of the necessary water supply is an important feature in the observatory equipment. There is no surface water or running streams in the region where the observatory is located, but there is an underground flow of good water, which is secured by means of dug wells. Water was obtained at the Tucson observatory at a depth of 33 meters. The water from this well is supplied to the office building and dark room by means of a $2\frac{1}{2}$ -H. P. gasoline engine and a 2,000-gallon storage tank. The capacity of the engine is about 900 gallons per hour. The engine and tank, which contains about 600 pounds of iron, are located at a distance of 215 meters from the variation observatory, thus being at such a distance that they can not exert any influence upon the magnetic instruments.

The magnetograph at this observatory is of the Eschenhagen type, recording photographically the variations of declination, horizontal intensity, and vertical intensity. The absolute instruments are a Cooke magnetometer and Dover dip circle. The Dover dip circle will be replaced by an earth inductor within the next year. It is also expected to install a seismograph at this station during the coming year.

It is furthermore proposed to make certain daily meteorological observations and daily reports to the local office of the United States Weather Bureau at Phoenix, Arizona, as soon as the necessary instruments and equipment can be installed.

Mr. W. F. Wallis, formerly in charge of the Honolulu magnetic observatory, installed the instruments and put the Tucson observatory in operation; he is the present observer-in-charge.

Coast and Geodetic Survey, Washington, D. C., December 29, 1909.