THE MAGNETIC OBSERVATORIES OF THE UNITED STATES COAST AND GEODETIC SURVEY.¹

By O. H. TITTMANN, *Superintendent.*

LOCATION.

In connection with the magnetic survey of the United States and countries under its jurisdiction, the Coast and Geodetic Survey is operating magnetic observatories at the following places:

Name	Place	Latitude North	Longitude W. of Gr.	Altitude meters
Cheltenham	Cheltenham, Maryland	38 44.0	76 50.5	72
Baldwin	Baldwin, Kansas	38 47.0	95 10.0	335
Sitka	Sitka, Alaska	57 02.9	135 20.2	15
Honolulu	Ewa, Oahu Island	21 19.2	158 03.8	15
Porto Rico ²	Vieques, Porto Rico	18 08.9	65 26.4	40

PURPOSE.

While these observatories are intended primarily to furnish the data for reducing to a common epoch the field observations made in the progress of the magnetic survey of the country, it will be seen that they are very well situated to contribute material needed for a general study of the variations of the Earth's magnetism.

ADMINISTRATION.

The direct supervision of the magnetic work of the Coast and Geodetic Survey is assigned to an assistant of the Superintendent, designated "Inspector of Magnetic Work". This position was filled by Dr. L. A. Bauer, from 1899 to September 1, 1906. Under his able direction the sites for the observatories were selected, buildings designed and erected, instruments purchased and installed, and the work was established on its present efficient basis. When Dr. Bauer resigned from the Coast and Geodetic Survey Mr. R. L. Faris was appointed to succeed him as Inspector of Magnetic Work.

¹ The Editor will be glad to receive similar information from other countries, so that a correct and reliable list of magnetic observatories can be published, with the desired statements as to instrumental outfits and the work undertaken.—*Ed.*

² The data given for this observatory apply to the old site. For location of new observatory, see this issue, p. 77.

At each observatory there is an observer-in-charge, assisted occasionally by one additional observer, and usually by one helper, to perform the manual work and to assist in the simpler forms of computation. The conditions at the Porto Rico and Honolulu observatories are such as to render an extended stay there undesirable, and the observers are therefore transferred from one observatory to another or assigned to field work, as the exigencies of the Survey may demand.

The records of the various observatories are transmitted as promptly as possible to the Office of the Coast and Geodetic Survey at Washington. *Hence, all requests for information regarding the observatories or for results of the observations should be addressed to the Superintendent Coast and Geodetic Survey, Washington, D. C., U. S. A., and not to the observers-in-charge.*

BUILDINGS.

All of the observatory buildings are above ground, except at Baldwin. At Cheltenham, Sitka, and Honolulu buildings were constructed for the variation instruments, especially designed to secure a very small diurnal range in temperature with gratifying success.¹ As the observatory at Baldwin was to be continued in operation only during the recent international antarctic work and while the survey in that section of the country was in progress, the variation instruments were mounted in an existing structure, partly underground. Observations at Baldwin will be discontinued at the end of the present year. At Vieques, Porto Rico, the instruments were mounted temporarily in a room in a large stone building, Fort Isabel, until it became possible to erect a building especially designed for the work. (See page 77 of this issue.)

MAGNETOGRAPHS.

At each observatory there is in continuous operation a magnetograph of the Eschenhagen-Edler pattern, recording photographically the variations of declination, horizontal intensity, and vertical intensity. The vertical intensity variometers were not installed until the end of 1904, owing to delay in receiving the instruments from the makers. At Cheltenham an old pattern Adie magnetograph has been kept in continuous operation also. It was intended primarily for eye-readings, but it has proved of great value in filling in the gaps when adjustments of the Eschenhagen magnetograph were being made, and in providing the data for a comparison of two instruments of different design, one having control magnets, and the other having none.

¹ See Appendix No. 5; Coast and Geodetic Survey Report for 1902, or this Journal Volume VIII, (1903), pp. 11-29. Here will be found also fuller information regarding the sites and construction of the various observatories, as likewise views of sites, buildings, and of instruments.

Absolute observations for determination of base line value are made at least once a week, and scale values are determined about once a month by means of deflection observations.

ABSOLUTE MAGNETIC INSTRUMENTS.

Cheltenham.—A large Wild-Edelmann combination instrument comprising magnetometer, declinometer, earth inductor, and galvanometer.

Porto Rico.—India Survey pattern magnetometer made by T. Cooke & Sons, and a Schulze earth inductor.

Baldwin.—Cooke magnetometer and Dover dip circle.

Sitka.—Eschenhagen-Tesdorpf magnetometer and dip circle up to the end of 1906, when a Cooke magnetometer and Schulze earth inductor were substituted.

Honolulu.—Wild-Edelmann combination instrument designed for use in the field, comprising magnetometer, earth inductor, and galvanometer.

SEISMOGRAPHS.

At Cheltenham, Porto Rico, and Sitka, Bosch-Omori seismographs are kept in continuous operation. Each consists of two horizontal pendulums, one recording east-west motion, the other north-south. At the Honolulu observatory there is a Milne seismograph recording east-west motion, the property of the Earthquake Investigation Committee of the British Association.

METEOROLOGICAL OBSERVATIONS.

At all of the observatories some meteorological observations are made, which are utilized in some cases by the United States Weather Bureau.

PUBLICATIONS.

The annual values of the magnetic elements at the observatories are published each year in the Annual Report of the Superintendent. No other results of the observatory work have as yet appeared in print. However, it is intended in the near future to publish the results for all of the observatories to the end of 1904.

ANNUAL VALUES OF THE MAGNETIC ELEMENTS.

For convenience of reference, the annual values for January 1 of each year are collected in the following table. These results will be modified somewhat when the reduction of the observations has been completed. *The results for horizontal intensity for Honolulu are 60 gammas greater than those heretofore published, as it was found that the value of H from the magnetometer there required a correction of that amount.*

Cheltenham. Observations began 1901, April. Present Observer-in-charge: *J. E. Burbank.*

Year (Jan. 1)	$\circ$ D	$\circ$ I	H γ
1902	5 05.4 W	70 21.8	20203
1903	08.2	23.2	173
1904	11.6	25.0	117
1905	15.7	25.3	090
1906	20.2	26.6	059
1907	23.8	28.0	010

Porto Rico. Observations began 1903, March. Present Observer-in-charge: *W. B. Keeling.*

1904	1 15.2 W	. . .	29040
1905	22.3	49 37.1	29010
1906	29.4	44.7	28964
1907	37.0	50.7	28890

Baldwin. Observations began 1900, July. Present Observer-in-charge: *S. A. Deel.*

1902	8 22.6 E	68 37.1	21967
1903	23.8	39.1	934
1904	25.8	39.9	875
1905	26.9	41.8	858
1906	29.2	44.4	824
1907	31.0	45.9	790

Honolulu. Observations began 1902, January. Present Observer-in-charge: *W. F. Wallis.*

1902	9 17.7 E	40 14.8	29308
1903	18.2	14.2	284
1904	19.2	12.2	236
1905	20.8	07.7	242
1906	21.0	03.1	233
1907	22.4	00.5	206

Sitka. Observations began 1902, January. Present Observer-in-charge: *H. M. W. Edmonds.*

1902	29 49.6 E	74 48.6	15420
1903	52.9	47.5	443
1904	55.8	44.4	448
1905	57.6	44.6	474
1906	30 01.5	42.4	494
1907	05.0	41.0	510