

LETTERS TO EDITOR

MAGNETIC DECLINATIONS OBSERVED NEAR THE SPITZBERGEN ISLANDS IN 1894.—A REPORT.¹

DURING the summer of 1894, while acting as astronomer for the Wellman Polar Expedition, I succeeded in making a few observations to determine the declination of the magnetic needle in the region of the Spitzbergen Islands, the results of which I enclose herewith for use in any way you may wish, and hoping they will be of some little value to any one interested in the subject.

MAGNETIC DECLINATIONS NEAR THE SPITZBERGEN ISLANDS.

No. of Sta.	Date, Civil	Hour	Latitude North	Longitude from Greenwich	Declination
		Local M. T.			
		h m			
1	May 10	6 00 p. m.	79° 40'	10° 35' E.	17° 28' W.
2	May 18	7 30 p. m.	80 38	19 42 E.	9 38 W.
3	June 8	11 00 a. m.	80 32	23 10 E.	5 35 W.
4	June 19	11 30 a. m.	80 26.1	23 18 E.	5 17 W.
4	June 19	1 15 p. m.	80 26.1	23 18 E.	5 54 W.
5	June 24	9 00 a. m.	80 25.7	24 16 E.	4 49 W.
5	June 24	1 30 p. m.	80 25.7	24 16 E.	5 33 W.

DESCRIPTION OF STATIONS.

1. The instrument was mounted on the rocks just east of the house belonging to Mr. Pike on Dane's Island, one of the small islands on the northwest side of the Spitzbergen group.

2. Instrument was set on the ice near the north point of Walden Island, not more than 150 feet from the rocks of the island. Walden Island is the most southwestern of the Seven Islands, the group just north of Spitzbergen Islands.

3. Instrument was mounted on the ice about a half a mile north of Cape Platen.

4. This station was located on the first prominent point east of Cape Platen and distant about four miles therefrom.

5. This station was on the extreme north point of the Inner Rep Island, Outer Rep being about two miles to the northward.

¹This report was made at my request for communication to the JOURNAL—C. A. Schott, U. S. Coast and Geodetic Survey.

INSTRUMENTS USED.

For the determination of the latitude, local time and azimuth a small four-inch, Casella theodolite was used. It was mounted on a tripod and fairly stable and steady. Both the circles were graduated to half degrees and read by two verniers to minutes.

For the determination of the declination of the magnetic needle, a compass declinometer was used, being mounted on the tripod, in place of the theodolite, for the purpose. This compass declinometer is somewhat similar to a prismatic compass having a graduated circle about five inches in diameter, reading by two pointers to minutes. A reversible needle about three inches long is enclosed in a glass covered box. The prism for pointing on the needle end, the vertical thread for pointing on a distant mark, and the pointers for reading the circle are all attached to a movable plate for use in any direction.

Difference in longitude was obtained by means of several watches carried by different members of the expedition. Only two, however, were utilized in the computations, as they showed rates very similar; during the four months between comparisons with Greenwich time, one lost about twenty seconds, the other forty seconds.

CHARACTER OF THE OBSERVATIONS.

All observations for position were made on the Sun's center, the diaphragm of the telescope having a square cut on it, so that the corners just touched the circumference of the Sun. The usual method of proceeding was to take readings on a mark with telescope, both direct and reversed, and then two pointings on the Sun, noting the time and reading both circles each time, then reverse telescope and take two more pointings and readings, thus making a "set." This was followed immediately by another set, then the theodolite was dismounted and compass declinometer put in its place. A set of observations for declination consisted in two pointings on the mark reading both pointers, then two pointings on each end of the needle reading both pointers; then after removing top of box, inverting needle, and replacing top so that circle is reversed, repeating the observations already made.

At stations one and two the determination of the latitude is very weak, as the Sun was very near the prime vertical. At Dane's Island only one set was observed, and hence the latitude may be in error 8' or 10'. Longitude and azimuth are very fair however.

At stations four and five the latitudes were obtained from circum-meridian altitudes, and are very good, seven determinations at No. 4 having a range of only 1' and six at No. 5, only 0' .8 range. The two

results for azimuth at each of these stations differ by only a half minute, the longitudes being correspondingly good.

The observations for declination were made at irregular periods of the day. As no observations were made to determine the diurnal range they could not be reduced to mean of day. It was the intention of the observer to make a complete set of observations hourly during the whole twenty-four hours on several days, but numerous other duties prevented.

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WASHINGTON, D. C., Nov. 29, 1895.

OLD MAGNETIC DECLINATIONS.

Mr. Schott writes: "I have before me a work which contains a collection of magnetic declinations in parts of Europe, America, Asia and Islands, published originally at Amsterdam in 1599. The title of the book is 'Clavdii Aeliani *Tactica sive*,' etc. Lugdvni Batavorum Apud Ludovicum, Elzevirium, anno CIOIOCXIII [1613]. This is a treatise on ancient warfare. Our special interest centers in the second part of the book with the sub-title: 'AIMENETPETIKH sive Portunus investigandorum ratio;' by Hugo Grotius (de Groot). In the table latitudes and longitudes are given along with the declination, but no clue to the dates can be obtained, except that they must pre-date 1599. As it contains no place on our coast I have paid no further attention to it."

Van Bemmelen's search for old magnetic declinations. High praise must be accorded Dr. van Bemmelen for his most painstaking and fruitful labors in this direction. Only one who has been engaged in a similar task can fully appreciate the amount of true patience and skill needed. It is a labor of love for which every magnetician owes Dr. van Bemmelen a large debt of gratitude. Since writing the letter which appeared in the first number of the JOURNAL, he informs us that during a trip to London he has found additional valuable material. He hopes soon to be able to present the readers of the JOURNAL with an improved series of isogonic maps of the sixteenth and seventeenth centuries.

There are doubtless many others in a position to contribute valuable data were they to follow his example. *Such researches are absolutely essential if we wish to make continued progress in the study of the secular variation and the distribution of terrestrial magnetism.* Too many have the false impression that an old observation with a probable error of a degree, or of several degrees, is absolutely worthless, whereas, really the probable error is often but a small fraction of the total secular variation during the time interval considered. Likewise a large systematic error running through a series of observations does not affect the *relative* distribution. We trust that those engaged in similar researches will put themselves in communication with Dr. van Bemmelen, assistant director of the Royal Meteorological Institute of the Netherlands, Utrecht.