RESULTS OF MAGNETIC OBSERVATIONS MADE BY THE UNITED STATES COAST AND GEODETIC SURVEY AT THE TIME OF THE SOLAR ECLIPSE OF OCTOBER 10, 1912.

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These results were obtained in response to a circular letter received from the Director of the Department of Terrestrial Magnetism of the Carnegie Institution of Washington requesting co-operation in magnetic and allied observations at the time of the solar eclipse of October 10, 1912.

The magnetic observers in charge of the observatories were directed to exercise especial care to have the magnetographs in good working order on October 10, and for several days before and after that date.

The observatories are all supplied with magnetographs of the Eschenhagen type. The instrument rooms are well insulated and the daily range of temperature is so small that the effect of change of temperature on the magnets during the period of the eclipse can therefore be neglected.

The locations of the observatories and the necessary data regarding the variometers are as follows:

Location of magnetic observatories.

Station	State	Lat. ° ' ''	Long. ° ' ''	Observer-in-charge
Vieques,	Porto Rico,	18 08.8	65 26.9	C. F. Woodyard
Cheltenham,	Maryland,	38 44.0	76 50.5	George Hartnell
Tucson,	Arizona,	32 14.8	110 50.1	A. F. Beal
Sitka,	Alaska,	57 03.0	135 20.1	F. L. Adams
Honolulu,	Hawaii,	21 19.2	158 03.8	J. W. Green

Magnetic elements and scale values.

Observatory	Approximate Magnetic Elements			Scale Values of Mag'graphs		
	D, ° ' ''	H, ° ' ''	Z, ° ' ''	D, ° ' ''	H, ° ' ''	Z, ° ' ''
Porto Rico,	2 42W	28630	34350	1.0	4.75	3.92
Cheltenham,	5 51W	19680	56070	1.0	2.36	5.39
Tucson,	13 34 E	27310	46100	1.0	2.75	3.82
Sitka,	30 22 E	15620	56210	1.0	4.43	5.50
Honolulu,	9 36 E	29115	24115	1.0	2.41	2.84

In the following tables (Nos. I, II, and III) are given the values of the declination (D), horizontal intensity (H), and vertical intensity (Z) for each five minutes Greenwich mean time from 11^h to 16^h on October 10, based on the photographic records of the magnetographs. The ordinates were read from the magnetograms in such manner that each tabular result is approximately the average value for the five-minute period of which the tabular time is in the middle.

Tables IV to VI contain the normal diurnal variation of D , H and Z for October, based upon a few selected quiet days throughout the month.

The curves shown in the illustrations are the graphical reproductions of the numerical data given in the tabulations of the magnetic elements. The curves marked Dm , Hm , and Zm show the normal diurnal variation of D , H and Z during the month of October; the curves marked D , H , and Z show the variation of those elements on October 10, 1912, from 11 hours to 16 hours Greenwich civil mean time, which covers the period of the eclipse at the observatories, Porto Rico, however, being the only one within any part of the shadow. The vertical hachured lines on the Porto Rico curves show the approximate time of beginning and ending of the eclipse at that station. The arrows on the diagrams point to easterly motion in declination and to increasing horizontal and vertical intensity.

*United States Coast and Geodetic Survey,
Washington, D. C.*

TABLE I.
Declination, October 10, 1912.

G. M. T.	Vieques	Cheltenham	Tucson	Sitka	Honolulu
^h ^m	° /	° /	° /	° /	° /
11 00	2 41.1W	5 49.9W	13 34.5 E	30 21.8 E	9 35.4 E
05	41.0	49.8	34.5	21.8	35.4
10	41.0	49.8	34.5	21.4	35.4
15	40.8	49.8	34.5	21.2	35.4
20	40.7	49.7	34.5	21.1	35.3
25	40.7	49.0	34.6	21.1	35.4
30	40.7	49.0	34.6	21.6	35.4
35	40.6	48.9	34.6	22.0	35.4
40	40.6	48.9	34.6	22.1	35.5
45	40.5	48.9	34.6	22.1	35.6
50	40.4	48.8	34.7	22.1	35.6
55	40.4	48.8	34.7	22.1	35.6
12 00	40.4	48.8	34.7	22.1	35.6
05	40.1	48.8	34.7	22.1	35.6
10	39.9	48.9	34.6	22.1	35.6
15	39.8	48.3	34.5	21.8	35.6
20	39.8	47.8	34.6	21.4	35.5
25	39.9	47.8	34.8	21.6	35.6
30	39.9	48.4	35.1	22.4	35.7
35	39.8	48.5	35.1	22.8	35.7
40	39.8	48.3	35.1	22.6	35.8
45	39.8	48.1	35.1	22.4	35.7
50	39.8	47.9	35.2	22.3	35.7
55	39.7	47.8	35.2	22.4	35.7
13 00	39.7	47.8	35.3	22.6	35.7
05	39.7	47.8	35.4	22.4	35.7
10	39.7	47.8	35.4	22.6	35.7
15	39.7	47.7	35.5	22.7	35.7
20	39.8	47.5	35.6	22.7	35.8
25	39.8	47.7	35.6	22.8	35.8
30	39.8	47.8	35.7	22.9	35.8
35	39.8	47.8	35.7	22.6	35.9
40	39.8	47.8	35.7	22.2	35.9
45	39.8	47.8	36.0	21.7	35.9
50	39.8	47.8	36.3	21.5	35.9
55	39.9	47.8	36.4	21.8	35.9
14 00	39.9	47.8	36.4	21.8	36.0
05	39.9	47.8	36.4	21.9	36.0
10	39.9	47.8	36.5	22.0	36.0
15	40.0	47.9	36.5	22.0	36.0
20	40.1	47.8	36.6	22.3	36.0
25	40.2	47.8	36.7	22.6	36.0
30	40.4	48.0	36.6	22.9	36.0
35	40.5	48.1	36.6	23.0	36.0
40	40.6	48.4	36.6	22.9	36.0
45	40.7	48.5	36.5	22.5	36.0
50	40.7	48.7	36.5	22.2	36.0
55	40.7	48.8	36.5	22.3	36.0
15 00	40.8	48.8	36.5	22.4	36.0
05	40.8	48.9	36.5	22.7	36.0
10	40.9	49.0	36.5	23.0	36.1
15	41.0	49.1	36.5	23.2	36.1
20	41.1	49.6	36.4	23.3	36.1
25	41.3	49.7	36.4	23.4	36.1
30	41.5	49.8	36.4	23.2	36.1
35	41.7	49.8	36.4	22.8	36.1
40	41.7	49.9	36.4	22.7	36.1
45	41.7	50.2	36.4	22.9	36.1
50	41.7	50.6	36.3	23.6	36.2
55	41.8	50.8	36.2	24.1	36.3
16 00	41.8	50.9	35.9	24.4	36.3

TABLE II.

Horizontal Intensity, October 10, 1912.

G. M. T.	Vieques	Cheltenham	Tucson	Sitka	Honolulu
h m	γ	γ	γ	γ	γ
11 00	28625	19684	27320	15623	29111
05	25	83	20	23	11
10	26	83	20	24	12
15	27	84	21	25	13
20	27	83	22	27	13
25	28	83	21	27	13
30	29	83	21	27	12
35	29	83	21	27	12
40	29	82	21	27	12
45	29	81	21	27	13
50	30	81	21	27	12
55	30	81	21	27	12
12 00	30	80	21	27	12
05	31	79	20	27	13
10	32	78	21	27	14
15	33	77	22	28	14
20	34	76	21	28	14
25	35	76	21	27	14
30	35	77	22	27	14
35	35	76	22	27	14
40	36	74	21	27	13
45	36	74	21	27	14
50	37	72	21	27	14
55	37	71	21	27	14
13 00	37	70	21	27	14
05	38	69	21	27	14
10	38	68	21	28	14
15	37	67	21	28	14
20	35	65	21	27	14
25	35	64	20	27	14
30	35	63	19	27	14
35	35	61	19	27	14
40	35	60	19	27	15
45	34	59	18	25	16
50	34	58	17	24	16
55	34	57	17	24	16
14 00	33	57	16	24	16
05	33	55	16	24	16
10	32	54	16	25	16
15	32	53	15	27	16
20	31	54	14	27	15
25	31	52	14	27	15
30	30	52	13	26	14
35	30	52	12	26	14
40	29	52	11	25	14
45	29	51	11	25	14
50	29	52	11	26	14
55	29	51	10	26	14
15 00	27	50	09	24	14
05	27	50	08	22	14
10	27	51	08	23	14
15	26	51	08	23	14
20	26	51	07	23	14
25	26	52	07	23	14
30	26	53	06	23	14
35	27	53	04	22	14
40	27	53	03	22	14
45	27	53	02	22	14
50	26	53	02	22	13
55	26	53	01	23	13
16 00	26	53	01	23	13

TABLE III.
Vertical Intensity, October 10, 1912.

G. M. T.	Vieques	Cheltenham	Tucson	Sitka	Honolulu
^h ^m	γ	γ	γ	γ	γ
11 00	34360	56069	46109	56214	24120
05	60	69	09	15	20
10	59	69	09	16	20
15	58	69	09	18	20
20	57	69	09	18	20
25	57	70	09	18	20
30	57	70	09	17	20
35	56	70	09	17	20
40	56	70	09	17	20
45	55	70	09	17	20
50	54	69	09	18	20
55	54	69	09	18	20
12 00	54	70	09	18	20
05	54	70	09	18	20
10	54	70	09	18	20
15	53	70	09	18	20
20	53	70	09	19	19
25	53	71	09	18	19
30	53	71	09	17	19
35	53	71	09	16	20
40	53	70	09	16	19
45	53	71	09	17	19
50	52	71	10	17	19
55	52	70	10	17	19
13 00	51	70	10	17	19
05	51	71	10	17	19
10	50	70	10	17	19
15	50	70	10	17	19
20	49	70	11	17	19
25	49	70	11	16	19
30	49	70	11	16	19
35	47	69	12	16	19
40	46	69	12	16	19
45	46	69	12	18	19
50	46	69	12	18	19
55	45	68	12	17	19
14 00	45	67	12	16	19
05	45	66	12	15	19
10	45	65	12	14	19
15	45	64	12	14	19
20	45	64	12	14	19
25	45	64	12	14	19
30	45	63	11	14	19
35	45	62	11	14	19
40	45	62	11	14	19
45	45	61	11	14	18
50	46	61	11	15	18
55	46	60	11	15	18
15 00	46	59	11	14	18
05	46	59	11	14	18
10	46	59	11	14	19
15	46	59	11	14	19
20	46	59	11	14	19
25	47	58	11	14	19
30	47	58	12	14	19
35	49	57	12	15	19
40	49	56	12	15	18
45	49	56	12	14	19
50	49	55	12	14	19
55	49	55	12	13	19
16 00	49	55	12	11	20

TABLE IV.

Diurnal variation of declination, October, 1912.

L. M. T.	Vieques	Cheltenham	Tucson	Sitka	Honolulu
^h	'	'	'	'	'
1	-0.3	-0.4	-0.2	-0.2	-0.3
2	-0.2	-0.1	-0.2	-0.1	-0.1
3	0.0	+0.2	-0.1	0.0	+0.1
4	+0.1	+0.3	+0.1	+0.8	+0.2
5	+0.2	+0.3	+0.4	+1.0	+0.4
6	+0.2	+1.2	+0.8	+1.5	+0.7
7	+0.8	+2.2	+2.0	+2.4	+1.6
8	+1.6	+3.2	+2.6	+3.0	+2.0
9	+2.0	+2.9	+2.0	+2.8	+1.4
10	+1.4	+1.4	+0.8	+2.1	+0.3
11	+0.4	-0.6	-0.6	0.0	-0.8
12	-0.5	-2.2	-1.8	-1.4	-1.3
13	-1.1	-2.9	-1.8	-2.0	-1.2
14	-1.4	-2.7	-1.3	-1.8	-0.9
15	-1.5	-1.7	-0.7	-1.8	-0.5
16	-1.1	-0.9	-0.4	-1.4	-0.3
17	-0.8	-0.3	-0.4	-1.1	-0.2
18	-0.3	-0.1	-0.3	-0.6	-0.1
19	0.0	0.0	-0.2	-0.6	0.0
20	+0.2	+0.2	-0.2	-0.6	0.0
21	+0.2	+0.2	-0.1	-0.6	-0.1
22	+0.1	0.0	-0.1	-0.6	-0.2
23	0.0	0.0	-0.2	-0.6	-0.3
24	-0.2	-0.2	-0.2	-0.3	-0.3

TABLE V.

Diurnal variation of horizontal intensity, October, 1912.

L. M. T.	Vieques	Cheltenham	Tucson	Sitka	Honolulu
^h	^γ	^γ	^γ	^γ	^γ
1	0	+4	+1	+5	-3
2	0	+5	+4	+6	-3
3	-1	+5	+4	+8	-2
4	-1	+5	+5	+6	-2
5	0	+6	+6	+7	-2
6	+3	+5	+6	+5	-1
7	+6	+3	+2	+3	-2
8	+10	-5	-4	-1	-4
9	+10	-12	-9	-7	-2
10	+7	-16	-10	-13	+2
11	+6	-20	-10	-13	+8
12	+5	-17	-8	-10	+11
13	0	-9	-3	-6	+10
14	-4	-3	+2	-3	+6
15	-9	+2	+4	-2	+3
16	-9	+6	+5	-2	+1
17	-13	+9	+3	0	0
18	-9	+8	+1	+1	-2
19	-5	+6	-1	+4	-3
20	-1	+4	-1	+3	-3
21	+1	+2	-2	+2	-3
22	+2	+3	-1	+2	-3
23	+2	+4	0	+2	-3
24	+1	+4	+1	+3	-3

TABLE VI.

Diurnal variation of vertical intensity, October, 1912.

L. M. T.	Vieques	Cheltenham	Tucson	Sitka	Honolulu
h	γ	γ	γ	γ	γ
1	0	0	+ 1	- 2	+ 3
2	0	0	+ 1	- 1	+ 4
3	+ 1	0	+ 1	- 2	+ 4
4	+ 2	0	+ 2	- 3	+ 4
5	+ 3	0	+ 2	- 6	+ 5
6	+ 2	0	+ 2	- 3	+ 5
7	0	+ 1	+ 3	- 2	+ 9
8	- 2	+ 1	0	- 2	+ 6
9	- 4	- 2	- 3	- 3	- 1
10	- 5	- 5	- 4	- 4	- 7
11	- 5	- 6	- 6	- 3	- 11
12	- 4	- 5	- 6	0	- 11
13	- 4	- 1	- 5	+ 1	- 8
14	- 2	+ 1	- 2	+ 2	- 6
15	0	+ 3	0	+ 3	- 4
16	+ 2	+ 4	0	+ 2	- 3
17	+ 5	+ 3	0	+ 4	- 2
18	+ 5	+ 2	+ 1	+ 3	0
19	+ 4	+ 1	+ 1	+ 3	+ 1
20	+ 2	0	+ 2	+ 3	+ 1
21	+ 1	0	+ 2	+ 3	+ 2
22	0	0	+ 2	+ 2	+ 2
23	- 1	0	+ 2	+ 2	+ 3
24	- 1	0	+ 2	+ 1	+ 3