

Report of Magnetical Observations at Falmouth Observatory for the Year 1894. Latitude $50^{\circ} 9' 0''$ N. and Longitude $5^{\circ} 4' 35''$ W. ; height, 167 feet above mean sea-level.

These observations have been made by instruments purchased from the Government Grant Fund administered by the Royal Society.

The Observatory having been comparatively recently established, the Vertical Force self-recording instrument is not yet in thorough working order. It is hoped in future to publish complete records of all three elements.

Photographic curves of Magnetic Declination and of Horizontal Force variations have been taken regularly throughout the past year, and the magnets have worked satisfactorily.

The scale values of the instruments were determined on 1st January, 1895. The following values of the ordinates of the photographic curves were then found :—

Declination, 1 cm. = $0^{\circ} 11' 7$.

Bifilar, for 1 cm. $\delta H.$, = 0.00050 C.G.S. unit.

The principal magnetic disturbances recorded during the year occurred on the following dates :—January 4, February 21, 23, 24, 25, March 30, 31, April 17, June 10, July 20, August 20, and September 14, 15.

Observations with the Absolute Instruments have been made monthly, of which the following is a summary :—

Determinations of Horizontal Intensity, 35.

„ Inclination, 34 sets of four.

„ absolute Declination, 36.

Following the method adopted in the three previous years, it is intended that the observations be reduced, and that the Declination and Horizontal Force curves for five quiet days in each month of the year—selected by the Astronomer Royal—be tabulated and prepared for publication, in accordance with the International scheme. The results will be printed in the Royal Cornwall Polytechnic Society's Annual Report, and also in the "Proceedings" of the Royal Society.

The following are the principal results of the magnetic elements for the year 1894 :—

Mean Westerly Declination, $19^{\circ} 0' 8$.

Mean Inclination, $67^{\circ} 2' 4$.

Mean Horizontal Force, 0.18511 C.G.S. unit.

The Declination and Horizontal Force are deduced from hourly readings of the photographic curves, and so are corrected for the diurnal variation.

The Inclination is the mean of the absolute observations, the mean time of which is 3 p.m.

In Table V, X is the mean of the absolute values observed during the month (generally three in number), uncorrected for diurnal variations and for any disturbance. Y is the mean of the products of the Dips and X.

The results in the following tables, Nos. I, II, III, IV, are deduced from the magnetograph curves which have been standardised by observations of deflection and vibration. These were made with the Collimator Magnet marked 66A, and the Declinometer Magnet marked 66c in the Unifilar Magnetometer by Elliott Brothers, of London. Table No. V is deduced from these observations.

The temperature correction (which is probably very small) has not been applied owing to temporary change in the relation of the curve to the base line, caused by additions to the external gas-pipes.

The Inclination was observed with the Inclinator No. 86, by Dover, of Charlton, Kent, and needles 1 and 2, which are $3\frac{1}{2}$ ins. in length, the results of which appear in Table VI.

The Declination and Horizontal Force values given in Tables I to IV are prepared in accordance with the suggestions made in the fifth report of the Committee of the British Association on comparing and reducing magnetic observations, and the time given is Greenwich mean time, which is 20 min. 18 sec. earlier than local time.

The following is a list of the days during the year 1894 which were selected by the Astronomer Royal, as suitable for the determination of the magnetic diurnal variations, and which have been employed in the preparation of the magnetic tables:—

January	9, 15, 19, 20, 27.
February	8, 10, 11, 14, 17.
March	5, 7, 13, 28, 29.
April.....	4, 11, 16, 22, 23.
May	6, 11, 12, 19, 27.
June	7, 13, 15, 26, 27.
July	7, 10, 14, 26, 31.
August.....	2, 10, 17, 18, 28.
September	3, 4, 6, 13, 26.
October.....	10, 11, 12, 23, 28.
November.....	4, 5, 12, 21, 22.
December.....	4, 11, 25, 26, 27.

The whole of the instruments have been maintained in good order. The Magnetic Chamber and the Magnetic Hut in the garden have been kept in a satisfactory state of dryness during the year, save for six days in November, when the Chamber was flooded owing to excessive rainfall.

Table I.—Hourly Means of Declination, at the Falmouth on five selected quiet Days in

(19° ± West.)

Hours	Mid.	1	2	3	4	5	6	7	8	9	10	11
Winter.												
1894.	'	'	'	'	'	'	'	'	'	'	'	'
Months.	'	'	'	'	'	'	'	'	'	'	'	'
Jan. ..	1·8	2·2	2·2	2·8	2·5	2·3	2·0	2·0	1·4	0·8	1·4	3·0
Feb. ..	0·6	0·6	0·6	1·3	1·3	1·5	1·5	1·2	0·7	0·3	0·9	2·7
*March ..	2·6	3·2	3·4	3·4	3·0	3·0	2·6	1·5	0·0	-0·9	0·6	4·1
Oct. ..	-3·4	-2·5	-1·9	-2·2	-2·2	-2·4	-2·8	-2·7	-4·0	-3·6	-3·5	-0·6
†Nov. ..	-1·4	-1·1	-0·9	-0·9	-0·7	-1·5	-2·2	-2·0	-2·8	-3·5	-2·1	-0·2
Dec. ..	-3·4	-3·3	-3·3	-3·4	-3·3	-3·4	-3·7	-3·8	-3·9	-4·0	-3·5	-2·6
Means	-0·5	-0·2	0·0	0·2	0·1	-0·1	-0·4	-0·6	-1·4	-1·8	-1·0	1·1
Summer.												
†April ..	0·1	-0·2	-0·4	-0·7	-0·6	-0·4	-1·2	-2·5	-4·2	-5·2	-3·4	-0·1
May ..	0·2	-0·3	-0·5	-0·6	-1·1	-2·0	-3·3	-5·0	-5·2	-4·0	-0·9	1·3
June ..	0·6	0·5	0·0	-0·7	-1·1	-2·1	-3·3	-4·2	-4·2	-3·2	-1·5	0·5
July ..	0·1	-0·1	-0·1	0·1	0·0	-1·2	-2·8	-3·0	-3·9	-3·3	-1·2	1·3
§Aug. ..	0·0	-0·3	-0·4	-0·8	-1·3	-1·6	-3·1	-4·3	-4·9	-4·0	-0·6	3·2
Sept. ..	-2·8	-2·7	-2·4	-1·9	-2·1	-2·5	-3·0	-4·0	-4·5	-3·7	-1·4	1·9
Means	-0·3	-0·5	-0·6	-0·8	-1·0	-1·6	-2·8	-3·8	-4·5	-3·9	-1·5	1·4

* Mean of four days, 7th, 13th, 28th, and 29th.

† Mean of four days, 4th, 5th, 21st, and 22nd.

‡ Mean of four days, 11th, 16th, 22nd, and 23rd.

§ Mean of four days, 2nd, 10th, 17th, and 28th.

Table II.—Solar Diurnal Range of the Falmouth

Hours	Mid.	1	2	3	4	5	6	7	8	9	10	11
Summer mean.												
	'	'	'	'	'	'	'	'	'	'	'	'
	-1·0	-1·2	-1·3	-1·5	-1·7	-2·3	-3·5	-4·5	-5·2	-4·6	-2·2	+0·7
Winter mean.												
	'	'	'	'	'	'	'	'	'	'	'	'
	-1·5	-1·2	-1·0	-0·8	-0·9	-1·1	-1·4	-1·6	-2·4	-2·8	-2·0	+0·1
Annual mean.												
	'	'	'	'	'	'	'	'	'	'	'	'
	-1·3	-1·2	-1·2	-1·2	-1·3	-1·7	-2·5	-3·1	-3·8	-3·7	-2·1	+0·4

NOTE.—When the sign is + the magnet

Observatory determined from the Magnetograph Curves
each Month during the Year 1894.

Noon	1	2	3	4	5	6	7	8	9	10	11	Mid.
Winter.												
/	/	/	/	/	/	/	/	/	/	/	/	/
5.1	6.6	7.2	6.3	5.1	4.6	4.2	3.9	3.4	3.0	2.4	2.4	2.3
5.3	7.5	8.2	8.1	6.3	5.6	4.5	4.5	3.9	3.1	2.7	2.2	1.9
7.6	10.2	10.4	8.9	6.8	5.2	4.4	4.2	3.6	3.6	3.2	2.7	2.2
2.6	4.1	3.9	2.9	1.0	-0.1	-0.4	-0.9	-0.9	-1.8	-2.0	-2.4	-2.4
1.8	3.3	3.1	1.7	0.9	0.4	-0.4	-0.6	-0.8	-1.6	-1.7	-1.5	-1.7
-1.1	-0.1	0.1	-0.4	-1.1	-1.8	-2.4	-2.6	-3.0	-3.2	-3.7	-3.7	-3.5
3.6	5.3	5.5	4.6	3.2	2.3	1.7	1.4	1.0	0.5	0.2	-0.1	-0.2
Summer.												
/	/	/	/	/	/	/	/	/	/	/	/	/
4.3	7.5	8.1	6.8	5.2	3.7	2.2	1.3	1.5	1.5	1.6	0.8	0.4
4.6	6.8	7.8	6.6	5.2	3.8	2.4	1.5	1.4	0.7	0.6	0.3	-0.3
4.3	6.2	5.8	5.5	5.2	3.4	2.6	1.6	1.6	1.5	1.5	0.4	0.2
4.3	5.8	7.1	6.7	5.0	3.1	2.0	1.4	1.2	0.8	0.2	0.3	-0.3
6.4	8.2	8.3	3.6	4.2	1.7	0.4	0.3	0.0	0.0	-0.6	-0.6	-0.2
5.5	7.2	6.3	4.3	2.4	0.6	0.1	-0.3	-0.7	-0.5	-0.6	-0.9	-1.4
4.9	7.0	7.2	5.6	4.5	2.7	1.6	1.0	0.8	0.7	0.5	0.1	-0.3

Declination as derived from Table I.

Noon	1	2	3	4	5	6	7	8	9	10	11	Mid.
Summer mean.												
/	/	/	/	/	/	/	/	/	/	/	/	/
+4.2	+6.3	+6.5	+4.9	+3.8	+2.0	+0.9	+0.3	+0.1	0.0	-0.2	-0.6	-1.0
Winter mean.												
/	/	/	/	/	/	/	/	/	/	/	/	/
+2.6	+4.3	+4.5	+3.6	+2.2	+1.3	+0.7	+0.4	0.0	-0.5	-0.8	-1.1	-1.2
Annual mean.												
/	/	/	/	/	/	/	/	/	/	/	/	/
+3.4	+5.3	+5.5	+4.3	+3.0	+1.7	+0.8	+0.4	+0.1	-0.3	-0.5	-0.9	-1.1

points to the west of its mean position.

Table III.—Hourly Means of the Horizontal Force at Falmouth on five selected quiet Days in each

0° 18000 + (C.G.S. units.)

Hours	Mid.	1	2	3	4	5	6	7	8	9	10	11
Winter.												
1894. Months.												
Jan. ..	485	487	484	486	488	488	490	490	488	482	476	470
Feb. ..	499	496	496	497	500	504	505	508	506	499	489	482
*March ..	516	513	512	513	514	515	516	514	507	495	487	483
Oct. ..	517	517	518	520	521	525	527	521	515	505	494	489
†Nov. ..	523	525	525	525	528	531	532	530	523	513	504	498
Dec. ..	520	520	519	518	520	522	522	521	519	515	511	506
Means	510	510	509	510	512	514	515	514	510	502	494	488
Summer.												
April ..	512	511	511	510	511	511	512	505	496	481	472	466
May ..	533	530	526	524	524	524	521	512	504	495	490	488
June ..	531	530	532	529	528	527	519	511	502	499	490	489
July ..	518	517	515	516	515	513	507	504	496	485	478	479
Aug. ..	513	513	513	513	512	510	504	493	482	475	472	473
Sept. ..	523	520	519	518	518	517	514	508	498	487	480	484
Means	522	520	519	518	518	517	513	506	496	487	480	480

* Mean of four days, 7th, 13th, 28th, and 29th. † Mean of four days, 4th, 5th, 21st, and 22nd.
‡ Mean of four days, 11th, 16th, 22nd, and 23rd.

(C.G.S. units.)

Table IV.—Diurnal Range of the Falmouth

Hours	Mid.	1	2	3	4	5	6	7	8	9	10	11
Summer mean.												
	+ '00009	+ '00007	+ '00006	+ '00005	+ '00005	+ '00004	'00000	- '00007	- '00017	- '00026	- '00033	- '00033
Winter mean.												
	+ '00001	+ '00001	'00000	+ '00001	+ '00003	+ '00005	+ '00006	+ '00005	+ '00001	- '00007	- '00015	- '00024
Annual mean.												
	+ '00005	+ '00004	+ '00003	+ '00003	+ '00004	+ '00005	+ '00003	- '00001	- '00008	- '00017	- '00024	- '00027

NOTE.—When the sign is + the

Observatory as determined from the Magnetograph Curves,
Month during the Year 1894.

Noon.	1	2	3	4	5	6	7	8	9	10	11	Mid.
Winter.												
468	470	475	479	480	484	490	495	496	495	494	494	492
483	485	490	496	502	507	510	514	515	513	513	511	511
485	493	502	510	516	517	515	518	519	517	515	517	514
495	502	509	513	513	521	524	527	527	527	524	523	525
499	504	513	516	521	527	530	533	532	532	529	529	528
506	510	516	517	521	525	527	530	528	526	522	523	521
489	494	501	505	509	514	516	520	520	518	516	516	515
Summer.												
467	475	483	496	503	511	517	521	520	518	514	513	512
490	498	509	519	534	544	544	541	541	543	538	535	530
498	505	513	531	545	544	545	549	545	543	542	536	534
483	488	499	512	521	529	529	529	529	527	523	525	519
481	491	499	508	515	519	523	524	523	520	517	515	515
493	504	507	510	511	516	522	526	528	528	527	526	525
485	494	502	513	522	527	530	532	531	530	527	525	523

Horizontal Force as deduced from Table III.

Noon	1	2	3	4	5	6	7	8	9	10	11	Mid.
Summer mean.												
-00023	-00019	-00011	-00000	+00009	+00014	+00017	+00019	+00018	+00017	+00014	+00012	+00010
Winter mean.												
-00020	-00015	-00008	-00004	-00000	+00005	+00007	+00011	+00011	+00009	+00007	+00007	+00006
Annual mean.												
-00024	-00017	-00010	-00002	+00005	+00010	+00012	+00015	+00015	+00013	+00011	+00010	+00008

reading is above the mean.

Table V.—Magnetic Intensity. Falmouth Observatory, 1894.

1894.	C.G.S. measure.	
	X or Horizontal force.	Y or Vertical force.
January	0·18474	0·43642
February	0·18475	0·43814
March	0·18507	0·43688
April	0·18494	0·43647
May	0·18489	0·43603
June	0·18519	0·43660
July	0·18513	0·43684
August	0·18500	0·43643
September	0·18500	0·43657
October	0·18502	0·43662
November	0·18492	0·43660
December	0·18516	0·43618
Means.....	0·18498	0·43665

Table VI.—Observations of Magnetic Inclination. Falmouth Observatory, 1894.

Month.	Mean.	Month.	Mean.
January 27.....	67 4·5	July 6.....	67 0·7
29.....	67 3·1	27.....	67 2·2
30.....	67 2·6	30.....	67 3·0
	<u>67 3·4</u>		<u>67 2·0</u>
February 21.....	67 9·9	August 13.....	67 2·4
23.....	67 7·4	19.....	67 1·0
24.....	67 7·2		<u>67 1·7</u>
	<u>67 8·2</u>	September 10.....	67 2·9
March 29.....	67 0·9	25.....	67 2·1
30.....	67 1·3	29.....	67 1·2
31.....	67 5·4		<u>67 2·1</u>
	<u>67 2·5</u>	October 8.....	67 1·6
April 28.....	67 2·6	19.....	67 3·3
30.....	67 1·9	29.....	67 1·4
	<u>67 2·2</u>		<u>67 2·1</u>
May 9.....	67 2·1	November 8.....	67 3·9
26.....	67 0·2	22.....	67 2·1
30.....	67 1·6	29.....	67 2·0
	<u>67 1·3</u>		<u>67 2·7</u>
June 9.....	66 59·9	December 11.....	66 59·4
21.....	67 2·2	21.....	67 0·6
29.....	67 0·6	29.....	66 59·8
	<u>67 0·9</u>		<u>66 59·9</u>