

Report of Magnetical Observations at Falmouth Observatory for the Year 1893. 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 in April last. The following values of the ordinates of the photographic curves were then found:—

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

Bifilar, April 7th, for 1 cm. δ H., = 0.00055 C.G.S. unit.

This latter value not being in accordance with the prescribed standard scale, the sensibility of the magnet was increased, and a second series of deflections made on April 10th, when the value was determined for 1 cm. δ H. = 0.00050 C.G.S. unit.

No violent magnetic disturbances have been recorded during the year; the principal movements occurred on the following dates:—February 5, March 26, July 16, August 6, 7, 18, and November 1, 2.

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

Determinations of Horizontal Intensity, 34.

„ Inclination, 35 sets of four.

„ absolute Declination, 33.

The results in the following tables, Nos. 1, 2, 3, 4, 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. 5 is deduced from these observations.

* The records of the Falmouth Magnetic Observatory have hitherto been published in the 'Journal of the Royal Cornwall Polytechnic Society.' The committee of management having obtained leave to communicate their annual magnetic report to the Royal Society, it will henceforward be printed in the 'Proceedings.' The results are worked up in the same way as those obtained at Kew, and the reports of the two observatories will in future appear simultaneously.—R.

VOL. LVI.

2 P

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.												
1893. Months.	'	'	'	'	'	'	'	'	'	'	'	'
Jan. ..	7.2	7.7	8.4	9.1	9.0	9.0	10.2	9.1	8.9	8.7	9.2	11.0
Feb. ..	7.3	7.3	7.5	7.4	7.2	6.9	6.5	6.0	5.6	5.8	7.0	9.4
March ..	7.3	7.2	6.8	6.7	6.2	5.7	5.5	5.1	3.6	3.1	4.5	8.0
Oct. ..	3.6	3.7	3.5	3.6	3.9	3.8	3.4	2.3	0.6	0.2	1.7	4.9
*Nov. ..	3.9	4.7	4.4	4.4	4.4	4.4	4.4	3.5	2.9	2.2	3.6	6.7
Dec. ..	4.7	5.5	5.8	6.0	5.7	5.7	5.5	5.5	5.2	4.6	4.4	6.4
Means	5.7	6.0	6.1	6.2	6.1	5.9	5.9	5.2	4.5	4.1	5.1	7.7
Summer.												
April ..	'	'	'	'	'	'	'	'	'	'	'	'
†May ..	6.8	6.8	6.8	6.6	6.4	6.1	5.2	3.7	2.1	1.8	2.7	6.5
June ..	5.9	6.5	6.6	6.0	5.5	3.9	2.6	0.8	0.3	0.6	2.8	6.4
July ..	6.1	5.6	5.5	5.3	5.0	3.3	1.1	0.7	0.3	0.7	3.0	5.9
Aug. ..	4.5	4.6	4.2	4.1	3.7	2.4	0.8	-0.6	-0.9	-0.2	2.4	5.9
Sept. ..	4.5	4.6	4.3	4.1	3.4	2.6	1.0	-0.5	-0.5	0.3	2.8	6.4
Sept. ..	3.2	3.2	3.5	2.6	2.2	2.2	1.2	0.3	-0.6	0.3	2.7	5.9
Means	5.2	5.2	5.1	4.8	4.4	3.4	2.0	0.7	0.1	0.6	2.7	6.2

* Mean derived from 7th, 11th, and 21st.

† Mean of four days, 2nd, 14th, 21st, 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.												
	'	'	'	'	'	'	'	'	'	'	'	'
	-0.6	-0.6	-0.7	-1.1	-1.5	-2.4	-3.9	-5.2	-5.8	-5.3	-3.1	+0.4
Winter mean.												
	'	'	'	'	'	'	'	'	'	'	'	'
	-1.5	-1.2	-1.1	-1.0	-1.1	-1.3	-1.3	-2.0	-2.7	-3.1	-2.1	+0.5
Annual mean.												
	'	'	'	'	'	'	'	'	'	'	'	'
	-1.0	-0.9	-0.9	-1.0	-1.3	-1.8	-2.6	-3.6	-4.2	-4.2	-2.6	+0.4

NOTE.—When the sign is + the magnet

Observatory determined from the Magnetograph Curves
each Month during the Year 1893.

Noon	1	2	3	4	5	6	7	8	9	10	11	Mid.
Winter.												
/	/	/	/	/	/	/	/	/	/	/	/	/
12·6	14·0	13·6	12·7	12·5	11·9	11·3	10·7	10·0	9·5	9·2	8·7	8·8
11·4	12·5	12·6	11·5	10·2	9·2	8·7	8·6	8·2	8·0	7·6	7·3	7·4
12·0	14·9	15·5	13·9	11·8	9·2	8·7	8·1	7·6	7·4	7·5	7·5	7·4
8·5	10·2	10·2	11·0	7·4	6·2	5·3	4·8	4·5	3·7	3·4	3·6	3·2
9·3	10·6	9·9	8·5	7·7	6·7	6·7	6·6	5·2	4·7	4·3	4·5	5·1
8·6	8·7	9·8	9·5	8·8	7·7	7·3	6·9	5·6	5·2	5·0	5·1	4·2
10·4	11·8	11·9	11·2	9·7	8·5	8·0	7·6	6·8	6·4	6·2	6·2	6·0
Summer.												
/	/	/	/	/	/	/	/	/	/	/	/	/
10·8	14·0	15·1	13·7	11·5	9·7	7·9	7·5	7·4	7·3	7·4	7·0	6·9
11·1	13·1	13·7	12·2	9·9	8·3	7·1	6·6	6·6	6·6	6·6	6·6	6·8
9·8	12·2	12·4	11·2	9·8	8·2	7·2	6·1	5·8	5·5	5·9	5·7	5·9
9·3	10·9	11·9	11·6	9·7	7·4	5·9	4·7	4·6	4·6	5·3	5·1	4·8
10·1	12·7	12·7	11·1	8·9	6·6	4·9	4·7	4·5	4·3	4·2	4·3	4·5
9·8	11·8	11·8	10·2	7·7	6·0	5·0	4·6	4·2	4·2	3·9	3·4	3·2
10·2	12·5	12·9	11·7	9·6	7·7	6·3	5·7	5·5	5·4	5·5	5·3	5·3

Declination as derived from Table I.

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

points to the west of its mean position.

Table III.—Hourly Means of the Horizontal Force at Falmouth
(corrected for Temperature), on five
0·18000 + (C.G.S. units.)

Hours	Mid.	1	2	3	4	5	6	7	8	9	10	11
Winter.												
1893. Months.												
Jan. ..	430	430	433	435	437	439	440	440	439	435	429	423
Feb. ..	469	469	469	469	470	470	470	470	467	456	446	444
March ..	447	446	446	444	444	444	445	441	433	421	412	411
Oct. ..	472	469	469	471	471	470	468	467	458	449	440	435
Nov. ..	460	460	461	459	455	462	463	463	459	446	434	430
Dec. ..	455	454	454	457	458	460	464	464	461	456	449	443
Means	456	455	455	456	456	457	458	457	453	444	435	431
Summer.												
April ..	473	471	471	472	471	472	475	475	470	459	440	429
May ..	471	471	472	470	470	468	464	457	444	434	429	429
June ..	478	475	474	474	473	473	468	459	452	446	442	441
July ..	464	462	460	459	460	460	456	448	439	429	422	422
Aug. ..	464	464	464	464	465	463	459	449	439	430	422	422
Sept. ..	465	463	464	461	463	459	456	451	442	429	424	427
Means	469	468	467	467	467	466	463	456	444	438	430	428

(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.												
	+·00008	+·00007	+·00006	+·00006	+·00006	+·00005	+·00002	—·00005	—·00017	—·00023	—·00031	—·00033
Winter mean.												
	+·00004	+·00003	+·00003	+·00004	+·00004	+·00005	+·00006	+·00005	+·00001	—·00008	—·00017	—·00021
Annual mean.												
	+·00006	+·00005	+·00005	+·00005	+·00005	+·00005	+·00004	—00000	—·00008	—·00016	—·00024	—·00027

NOTE.—When the sign is + the

Observatory as determined from the Magnetograph Curves
selected quiet Days in each Month during the Year 1893.

Noon	1	2	3	4	5	6	7	8	9	10	11	Mid.
Winter.												
424	431	435	435	436	436	439	442	442	443	443	443	442
447	452	457	460	462	463	468	471	472	472	470	470	470
411	420	431	439	445	442	445	448	450	450	450	449	448
442	446	451	459	462	464	471	472	474	476	476	475	475
433	439	447	454	458	464	466	467	471	472	471	468	468
442	445	448	453	455	456	460	464	464	465	463	460	457
433	439	445	450	453	454	458	461	462	463	462	461	460
Summer.												
427	434	446	461	469	474	474	476	479	476	477	476	475
431	448	460	471	476	480	482	482	483	483	479	479	481
446	454	463	470	478	484	489	493	490	488	488	484	483
431	436	443	455	462	469	475	476	471	472	469	466	465
432	443	454	459	466	466	468	473	473	474	472	469	468
434	441	451	455	455	458	464	466	470	471	471	471	467
433	443	453	462	468	472	475	478	478	477	476	474	473

Horizontal Force as deduced from Table III.

Noon	1	2	3	4	5	6	7	8	9	10	11	Mid.
Summer mean.												
- '00028	- '00018	- '00008	+ '00001	+ '00007	+ '00011	+ '00014	+ '00017	+ '00017	+ '00016	+ '00015	+ '00013	+ '00012
Winter mean.												
- '00019	- '00013	- '00007	- '00002	+ '00001	+ '00002	+ '00006	+ '00009	+ '00010	+ '00011	+ '00010	+ '00009	+ '00008
Annual mean.												
- '00024	- '00016	- '00008	- '00001	+ '00004	+ '00007	+ '00010	+ '00013	+ '00014	+ '00014	+ '00013	+ '00011	+ '00010

reading is above the mean.

The Inclination was observed with the Inclinator No. 86 by Dover, of Charlton, Kent, and needles 1 and 2, which are $3\frac{1}{2}$ inches 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 1893 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	7, 8, 15, 25, 26.
February	1, 11, 13, 26, 27.
March	10, 13, 18, 19, 20.
April.....	4, 9, 21, 22, 23.
May	2, 14, 17, 21, 28.
June	8, 13, 17, 22, 24.
July	5, 6, 10, 30, 31.
August.....	1, 9, 16, 17, 27.
September	4, 7, 13, 23, 24.
October.....	9, 11, 16, 21, 22.
November.....	7, 11, 15, 20, 21.
December.....	7, 13, 18, 21, 22.

The following are the principal results of the magnetic elements for the year 1893:—

Mean Westerly Declination, $19^{\circ} 6' 4''$.

Mean Inclination, $67^{\circ} 5' 3''$.

Mean Horizontal Force, 0.18455 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 noon.

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 tangents of the Dips and the corresponding values of X.

The whole of the instruments have been maintained in good order. The Magnetic Chamber has been kept in a satisfactory state of dryness, and the Magnetic Hut in the garden has been newly roofed during the year.

EDWARD KITTO,
Magnetic Observer.

Table V.—Magnetic Intensity. Falmouth Observatory, 1893.

1893.	C.G.S. measure.	
	X or Horizontal force.	Y or Vertical force.
January	0·18447	0·43621
February	0·18457	0·43662
March	0·18438	0·43688
April	0·18467	0·43682
May	0·18470	0·43675
June	0·18482	0·43696
July	0·18466	0·43683
August	0·18460	0·43679
September	0·18434	0·43653
October	0·18445	0·43658
November	0·18451	0·43644
December	0·18444	0·43628
Means.....	0·18455	0·43664

Table VI.—Observations of Magnetic Inclination. Falmouth Observatory, 1893.

Month.		Mean.	Month.		Mean.
January	28.....	67° 3'·7	July	28.....	67° 5'·8
	30.....	67 5·0		29.....	67 4·4
	31.....	67 5·5		31.....	67 5·0
		67 4·7			67 5·1
February	25.....	67 3·5	August	27.....	67 5·7
	27.....	67 6·2		28.....	67 5·2
	28.....	67 5·7			67 5·4
		67 5·1			67 5·4
March	25.....	67 6·2	September	26.....	67 8·5
	28.....	67 8·0		27.....	67 6·1
		67 7·1		28.....	67 4·7
		67 7·1			67 6·4
April	15.....	67 4·1	October	28.....	67 5·4
	28.....	67 5·6		30.....	67 6·5
	29.....	67 5·3		31.....	67 5·6
		67 5·0			67 5·8
May	25.....	67 5·1	November	28.....	67 5·1
	26.....	67 2·9		29.....	67 5·0
	27.....	67 5·8		30.....	67 5·0
		67 4·6			67 5·0
June	27.....	67 3·8	December	27.....	67 4·7
	28.....	67 3·9		28.....	67 5·9
	29.....	67 5·4		29.....	67 4·3
		67 4·4			67 5·0