

KG
11365
140

F. II

Terrestrial Magnetism.
from
1858. March 25th to.

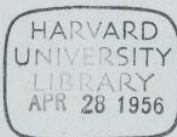
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1859 MAR. PROJ. 1488



KG 11365.140

KG 11365.140



Whiston
Calculation of Solar Eclipses

London 1724 12 mo.

p. 92

Dip at Boston New England $68^{\circ} 22'$ in 1722.

Observed by Capt. Beal. (Othniel Beal)

Instrument used was devised by Whiston.

The statement is not entirely satisfactory

For Vinals see p. 63

In an account of the transit of Venus in 1769 I find in a foot-note an obs of Variation at Providence $6^{\circ} 30'$ W. with very good data for direction of meridian.

Eliot p 52

Fox Dip Circle made by Troughton & Simms.

1858 -

March 25th - Instrument placed on tripod in the work room, leveled and telescope directed to the north meridian mark.

When the mid. wire bisected the mark - the azimuth circle East. ver. reads $150^{\circ} 35'$

West side of mark - $150^{\circ} 37'$ East side 150.34

East of mid. mark $+ 15'$
true mer. - 150.50

" 37 - " - 35

150.37

$150.34.30$

Breadth of mark taken at 7 feet -

Lat - 42° East of Transit Circle = $15'$ East of the middle north mark

East. vernier reads for the geodetic meridian - 150.50

$+ 90.00$

Reading perpendicular to the meridian -

240.50 face south

Needle No 3 -

(No 3.)

face South -

face West

face East

a. - $90.0 - 230.15$

140.15

a - 73.50

$140.15 - a. - 74.45$

b. - 90.0

b - 74.00

b. - 74.40

face North

West 73.55

$74.42.30$

a. - $90.0 - 229.30$

East - $74.42.30$

b. - 90.0

$2/8.37.30$

mean Dip - $74.18.45$

Reading when Needle No 3 is vertical - 229.30

Reading of true meridian - 240.50

Magnetic Declination - West - 11.20

} Face south

Reading when Needle No 3 is vertical - 230.15

Reading when true meridian - 240.50

10.35

21.55

Mean Dec.

$10.57.30$

} Face North

Reading for the mag. mer. March 25th - 11th Am. 229.52 by Needle No 3 -

With these zeros, and in reversed positions

Needle No 1 - gave - Dip - 74.32 or Face East - 74.55 Face West - 74.10 readjusted

" " 2 " " - $74.14.15$ " " - 75.06 " " - $73.22.30$

Fox Dip Circle. in the work room.

1858. March. 27th - 10 Am.

Position of the Instrument - dist. 3.3 from the west side of the Room.

$5\frac{1}{2}$ from the south side of the Room

The instrument is 38.7 East of the Transit Circle.

Mid. wire of the telescope bisects the North mer. Mark - reading azimuth $150^{\circ}.35'$

Mark is west of a Chimney of the house next west of Jon^a Feil's on

the Charlestown Road to West Cambridge the reading for the chimney was. 157.15

Chimney East of the mer. mark 40

Mid. mark west of the meridian of the position of the instrument -15

The chimney is East of the mer. of the instrument. 25

Present reading of the azimuth circle for the true meridian 150.50

Assumed Magnetic Declination 10.50

Azimuth reading for the Magnetic meridian 140.00

Needle No. 3.

1858. March 30 - 9 Am.

W - 75.12 - 75.20

S $6-90^{\circ}$ 229.30

141- E - 73.45 - 73.40

N $6-90^{\circ}$ 235.06

74.28 - 74.30

232.18

Reversed the Pivots

E - 74.45 - 74.30

S $6-90^{\circ}$ 234.44

141- W - 73.35 - 73.50

N $6-90^{\circ}$ 228.13

74.10 - 74.10

$231.28.30$

74.28 - 74.30

$232.18.00$

Mean 74.19 - 74.20

$231.53.15$

2nd Mean Incl. $74.19.30$ by No. 3.

-90

Mag. plane $141.53.15$

Mer - $150.46.05$

Dec. $W. 8 - 52.50$

Needle No. 2.

E. 75.20 - 75.20

S $6-90^{\circ}$ 228.00

141- W. 74.20 - 74.20

N $6-90^{\circ}$ 237.32

$74.50.00$

232.46

Reversed pivots

E - 74.40 - 74.30

S $6-90^{\circ}$ 233.40

141- W. 72.40 - 72.52

N $6-90^{\circ}$ 229.53

73.40 - $73.42.30$

$231.46.30$

Mean. $73.41.15$

$232.46.00$

$232.16.15$

-90

$142.16.15$

$150.46.05$

$8.29.50$

This Needle is very sluggish

1858. March. 29. Began at 4.30 Am. closed at noon. For Dip Circle.

Needle No 3.

Reading of the Azimuth circle

Preparation.

Bisects the North meridian mark - at $-150^{\circ} 35'$ - Right $150^{\circ} 34'$ - left $36'$
 $150^{\circ} 35'$ " - $150^{\circ} 34'$ - " - $36'$
 " - $150^{\circ} 34'$ - " - $36'$

White Chimney on house East of mer. mark - $157^{\circ} 13' 15''$ reading on the Azimuth circle

Chimney East of the mer. mark 38.15

Mark West of station 11.05

Δ Chimney East of the meridian of station 27.10

Azimuth reading for the Chimney - $157^{\circ} 13' 15''$

Chimney East of meridian -27.10

Present reading for the true meridian $150^{\circ} 46.05$

Assumed magnetic Declination $-10.46.05$

Estimated magnetic meridian $140.00.00 + 96^{\circ} = 230.00.00$

F.S. 90° 229.41 - F.N. 90° 234.33 = F.N. 90° 232.07

F.E. $74^{\circ} 25' - 74.10$ } $73^{\circ} 47' 30''$ adjusted
 F.W. $73.15 - 73.10$

Reversed

S 90° 234.42

N 90° 229.45

4.27

232.13.30

90°
 142.13.30

150.46.0

8.33.30

S 90° 238.05

90°

N 90° 225.55

4.00

232.00

N 90° 232.53

S 90° 228.24

1.17

230.38

239.56

Dec - 9.18

above below

141° E $73.30 - 73.30$

W - $75.00 - 75.00$

8.38.00 - 8.30.00

mean $74.01.15$

above below

141-9° E $74.40 - 74.30$

W. $73.10 - 73.15$

7.50 7.45

73.55 $73.52.30$

$73.53.45$

adjusted

Reversed Pivots.

90° S. 235.18 F.E. $73.40 - 73.35$

90° N. 227.35 F.W. $75.10 - 75.20$

2.53 $2/8.50 - 8.55$

231.26.30 $74.25.74.27$

74.27

$74.26.30$ $74.26.30$

$2/8.20.85$

Needle No. 1. Inclination. $74.22.30 - \text{Dec. } 9.0.35$

" 2 " " $73.41.15 - " 8.31.45$

" 3 " " $74.19.30 - " 8.52.50$ Mean Dip

" 3 " " $74.10.07 - " 9.18.0$

Needle No 2. should be retouched.

Barrow. Dip Circle No. 26.

Needle No. 2. Intensity, in work room. A North Pole

1858 April 9th noon.

Level'd

H. I. 90° 20' 00" F. E. 74° 35'
F. W. 74° 33'

F. S. 90° 18' 54"

Marked side of Needle No. 2. East.

19° 27'

In the magnetic meridian.

Deflection
arc.

- 1 Face West - 1 pin, inner hole. B - none A $13^{\circ} 12' - 74^{\circ} 33' = 61^{\circ} 21'$
- 2 " 2 pins B, none A $76^{\circ} 38' + 74^{\circ} 33' = 150^{\circ} 11'$
- 3 " 2 pins B one pin in A inner $34^{\circ} 07' + 74^{\circ} 33' = 108^{\circ} 40'$
- 4 " 2 pins B - 1 in outer A $13^{\circ} 36' - 74^{\circ} 33' = 61^{\circ} 03'$

Needle No. 2. marked side West.

- 5 Face East - 2 pins. B - 1 pin in outer A $13^{\circ} 14' - 74^{\circ} 35' = 61^{\circ} 21'$
- 6 " 2 pins B - 1 pin inner A $32^{\circ} 00' + 74^{\circ} 35' = 106^{\circ} 35'$
- 7 " 2 pins B none - A $75^{\circ} 35' + 74^{\circ} 35' = 150^{\circ} 10'$
- 8 " 1 pin B inner, none A $12^{\circ} 45' - 74^{\circ} 35' = 61^{\circ} 50'$

Mean of 1 & 8 $61^{\circ} 35' 30''$

" 2 & 7 $150^{\circ} 40' 30''$

" 3 & 6 $107^{\circ} 37' 30''$

" 4 & 5 $61^{\circ} 12' 00''$

May 23. 1859. Variation Transit

West Transit Room

The Instrument has been cleaned this morning
and the clamping apparatus filed so that the
vernier now holds the circular bottom-piece.

Collimation of Telescope of V. Transit

Ill. East	First Trial	7"	W of S.
	Second "	0	
	Third "	3"	E of S.
	Fourth "	2"	E of S.
	Fifth "	1"	E of S.
	Sixth "	1"	E of S.

Collimating Lens adjusted.

Mid Wire of Transit in coincidence with mark on
South pole of Needle. Ill. East.

Vernier Readings.			
A	349°	29	11° 11'
B	229	34	11 9
C	109	36	11 9

Mid Wire in coincidence with mark on North pole

A	349°	10	11 30
B	229	14	11 29
C	109	16	11 29

May 23. 1859 Variation Transit

W. Transit Room Instrument Reversed. H. W.

Mid Wire in coincidence with mark on North pole.

A	349°	6'	11 34
B	229	9	11 34
C	109	13	11 32

Mid Wire in coincidence with mark on South pole

A	349°	31'	11 09
B	229	36	11 07
C	109	37	11 08

Reading for True Meridian.

A	360°	40'
B	240	43
C	120	45

Results from Two preceding pages

				Dec.
He E	Coin mid-wire	N	mark of needle	11° 29'
" W	"	N	"	11 34
He E	"	S	"	11 10
" W	"	S	"	11 29
Mean.				11 20

10 to 12 AM May 24. 1859

In West Transit Room

Adjusted the Collimation of the T. & S. Transit

Collimation, Ill. East.

Telescope points E. of S. one quarter of the breadth of
the mid wire.

Magnetism.

Instrument purposely not clamped

Reading of Variation Transit for coincidence with the
T. & S. Transit

A 360° 39' }
B 240 44 } Inst. clamped.
C 120 44 }

A 360° 39' }
B 240 44 } ~~Inst. unclamped.~~
C 120 44 }

Ill. East. Coincidence with mark on north end of Needle

A	349	19	11° 20'
B	229	24	11 20
C	109	27	11 17

Ill. East. Coincidence with mark on south end of Needle

A	349	39	11 00
B	229	48	11 00
C	109	46	10 58

May 24. 1839.

Magnetism

W. Tr Room

Ill. West. Coincidence with mark on South end of Needle.

A	349°	51'	10	49
B	229	56	10	47
C	109	57	10	48

Ill. N. Coincidence with mark on North end of Needle

A	349	27	11	13
B	229	32	11	11
C	109	33	11	12

Coincidence with 78 D. Transit mid-wire

A	360	40
B	240	43
C	<u>120</u>	<u>45</u>

Results from Two last pages

Dec.

Ill E.	Coin. mid wire & N. mark of needle	11° 19
" W	" N "	10 43
Ill E	" S "	11 00
W	" S "	10 49
		21
	Mean	<u>11 05</u>

May 24 1859 Magnetism W. Yr. Room

Readings when fixed line cut
on studs coincides with mark on needle.

A	349	21
B	229	24
C	109	<u>26</u>

Coincidence with Mid-wire of
4 ft Transit

A	360	40
B	240	43
C	120	<u>45</u>

By Markers on needles
and on Studs- Makers Name - ?
not noted -

{	11	19
{	11	19
{	11	19

1859 May 24th Magnetic Variation

Station B. about 100 feet S. of Transit Circle & on its meridian.
Merid. determined by wires of Tr Circle

Merid. of Tr. Circle	A	302	0
	B	182	4
	C	62	7

N Mark of Needle S. W

A	291	16
B	171	20
C	51	22

Col. lens altered.

S Mark of Needle S. W

A	291	15
B	71	20
C	51	22

S " Sta E

A	291	12
B	171	18
C	51	19

N " Sta E

A	290	48
B	170	52
C	50	55

Merid. of Tr. Circle

A
B
C

Station B. continued.

Merid of Tr Circle

A	302°	2'
B	182	6
C	62	8

N Mark Needle Sll W

A	290	51	11° 10'
B	170	54	11 10
C	50	57	11 10

S " Sll W

A	291	10	10 50
B	171	14	10 50
C	51	16	10 51

N " Sll E

A	290	53	11 8
B	170	58	11 6
C	51	0	11 7

S " Sll E

A	291	8	10 53
B	171	13	10 51
C	51	15	10 52

Merid of Tr Circle

A	302	0
B	182	3
C	62	7

Mean

Results from Obs on this page

Sll E	Com. mid wire & N mark of needle	11° 7'
" W	" " "	11 10

" E	"	S	"	10 52
-----	---	---	---	-------

" W	"	S	"	10 50
-----	---	---	---	-------

Mean

10. 59.8

Study not used
for this obs.

Cor for error of zero mark on Studs
" mag. axis of needle

10	59.8	} vide p 22
- 3.2		

West Boon. May 24. 1859

4 ft Transit
Merid. of ~~Tr. Circle~~ { A 180 38,
B 60 42
C 300 43

N. Mark, Needle Ill. W.

A 169 51 10° 49'
B 49 55 10 47
C 289 56 10 47

S. Mark, Needle Ill. W

A 169 17 11 21
B 49 21 11 21
C 289 22 11 21

ok. " " Ill. E.

A 169 31 11 7
B 49 34 11 8
C 289 35 11 8

S " " Ill. E.

A 169 12 11 26
B 49 16 11 26
C 289 18 11 25

4 ft Transit
Merid. of ~~Tr. Circle~~ { A 180 38
B 60 42
C 300 43

Results from this page

Ill E Canis. wire & N mark of Needle 11° 8'
W " " " 10 47

Ill E " S " 11 26
W " S " 11 21
Mean 11 13

W Mag. Declination May 24 1859
West Transit Room.

By method ~~without~~ used in 1858 by com. of Marks on Stud.

Coincidence of Mark on Needle
with mark on Stud.

A.	169	13
B	49	18
C	289	18

Coincidence with mid wire
of 4 ft Transit.

A	180	38
B	60	42
C	300	43

10	25
11	24
11	25

B	49	14	S end
	49	12	N "
	49	22	S "
	49	16	N
		64	
	49	16	
	60	42	
	11	26	

Coincidence of marks with Studs S & Mean

Results from Obs on this page

Declination by coincidence with Studs

Name of Marker	South	11° 26'	4 obs
"	North	11 39	
Mean		11 32	

229	11	N End
229	8	S "
228	54	N "
228	57	S
	10	
226	2	
240	41	
11	39	

Meridian

Magnetic Variation.

After repeated trials I am persuaded that there is danger of a considerable influence upon the needle of the Variation Transit in the West Wing from the large bars of iron in the shutters of the meridian opening.

May 25. A.M. 1859. Magnetic Variation.

Old Method

Coincidence of Marks on Needle with Marks on Standards,	{	B	229°	13'	S
		B	229	08	N
		B	229	7	S
		B	229	13	N
Name of Maker (J & S)					
North.	Mean	B	229°	10'	

Mid.	B	240	42
Variation		11	32

		B	49	14	S
		B	49	3	N
		B	49	14	S
		B	49	0	N
Name of Maker (J & S)					
South	Mean	B	49	8	

	60	42
Variation	11	34
	11	32
Mean	11°	33'

May 25. A.M. 1859. Magnetic Variation

Ill. East

Coincidence of Wire with Mark	B.	49°	29'	N. End
on Needle North End	{	49	32	N.
Makes Name South		49	24	N.
Mean		49	29	N.

Coincidence of Wire with Mark	B	49	12	S. End
on Needle, South End,		49	14	S.
Makes Name South		49	3	S.
Mean		49	10	
Mid		60	42	
Vari.		11	32	
Instrument Reversed.		11	13	
		11	22	

Ill. West

Coincidence of wire with Mark	B	49	3	S. End
on Needle		49	4	S.
Makes Name South		49	0	S.
	B	49	2	
		11	40	

Coincidence of wire with Mark	B	49	28	N. End
on Needle		49	29	N.
Makes Name South		49	27	
Mean		49	28	
		11	14	
		11	27	
		11	22	
Mean		11	24	

4 M May 25. 1859.

Magnetic Variation.

Ill. East.

Coincidence of Wire with Mark on Needle.	B	229°	9'	N. End
		228	54	N.
Maker's Name North		229	10	N.
Mean		229	4	
Merid.		240	42	
Variation		11	38	

Coincidence of Wire with Mark on Needle	B	229	33	S. End
		229	19	S.
Maker's Name North		229	36	S.
Mean		229	29	
Merid.		240	42	
		11	13	

Ill. West

Coincidence of Wire with Mark on Needle	B	229	8	N. End
		229	3	
Maker's Name North		229	11	
Mean		229	7	
Merid.		240	42	
		11	35	

Coincidence of Wire with Mark on Needle	B	229	23	S. End
		229	37	S.
Maker's Name North		229	28	S.
Mean		229	29	
Merid.		240	42	
		11	13	
Mean		11°	25'	

Magnetic Variation

May 25 1859

The following results have been obtained with the Variation Transit at Station A. (West Wing meridian.) without changing the Poles of the instrument needle and before adjusting the studs having the marks on the centre pivot. both of which remained up to this date without alteration as far as I know for several years past. After the foregoing observations they were altered as related subsequently.

The condition of the iron in the building being unchanged from what it has been for some years past. (except in the removal of a large tin casing which did not change the pointing of the needle when examined to test its effect.) it will be necessary to apply a correction of as subsequently ascertained to all variations obtained in the West Wing meridian.

Magnetic Variation

Results for Correction of Stud - marks of old adjustment
 1859 (= $-0^{\circ} 01.0$) - Cor. for magnetic axis of needle when poles have
 not been reversed (= $-0^{\circ} 3.2$) Cor. for influence of Iron of shutter ($-0^{\circ} 42.3$)

1859 May 17 3 P.M. Mr Hall by old method of using marks,
 on studs without reversal of Poles - West wing meridian.

N. end of needle the north pole Variation $11^{\circ} 30'$

By 4 complete obs with maker's name on the
 ax - circle north & south so as to eliminate
 error of centre of pivot.

1859 May 24. G.P.B. same method 4 x 2 obs. $11 \quad 32$

" 25 " " " 4 x 2 obs. $11 \quad 33$
 Mean $11 \quad 31.7$

Variation at Station B. 100 ft. S of Tr. Circle $10 \quad 45.2$

Cor. for influence of iron of shutter & for deviation (-3.2) of magnetic axis from axis of beam. Cor. for studs $-0.1.0$
 -0.465
 To be applied to previous obs. made in

The West Transit Room at the stand of the Variation
 Transit. Without reversal of Poles

When the Poles have been reversed Cor = $-0^{\circ} 43.3$

At any Station without local attraction Poles not reversed
 Cor = $-0^{\circ} 3.2 - 0^{\circ} 1.0$
 $= -0^{\circ} 4.2$

Poles reversed
 Cor = $0^{\circ} 1.9$
 for Study.

Magnetic Variation

May 25th P.M. After conclusion of the foregoing observations I adjusted the marks on the studs & the centre of pivot in the following way-

1st Examined the collimation of the Var. Transit & found it as by previous adjustments - to be insensible $\angle 2''$

2nd Adjusted the collimating lens, which is fitted in front of object glass to bring the rays from the needle & stud marks to parallelism. By rotating the lens a point was found where if the collimation of the compound lens (the object glass & small lens together) was small. This was marked by a new mark near that made by the makers.

3rd The marks on the studs were then examined by reversing the telescope in its Y, taking care to test & allow for the end play of the axis in the Y. The fixed mark that nearest to maker's name (T. & S.) was found to be $1' \text{ E of N}$ of its true place that is of the point of intersection with ~~plane~~ of collimation of telescope of transit

This mark was left as it was without alteration

The adjustable stud was next brought into the line of collimation of axis.

4) The pivot was moved to west. The name of maker on az circle standing north - by about $\frac{1}{2}$ or $\frac{3}{4}$ of a turn of the centering screws on each side - which brought the marks on the north & south ends of needle to coincidence with the lines on studs.

With the old adjustment the lines on needle were brought to coincidence with lines on permanent stud as well as the other & by reversal of 180° in azimuth by rotating the azimuth circle 180° as was always practiced the error of centre was eliminated - hence the old results are correct to within $\pm 1'$, the error of permanent stud. Saving the influence of local disturbances from iron of shutters when the instrument was used in W. Wing - for which a correction of $-0^\circ 42'.3$ must be applied to observed variations

The Stud marks for coincidence of needle
of Variation Transit brought into the plane of the
axis of collimation of the Telescope and the Pivot re-
centered. before the following Obs. were taken.

May 26. 1859

Magnetic Variation.

Instrument placed about ^{5 or 6} rods south of Meridian
buckle.

Ill. West

Merid of Merid buckle

{	B	122° 29'
		122 29

Coincidence of Mark on Needle with
Mark on Stand
Maki's Name South

{	B	111 43 N. End
		111 40 N.
		111 41 N.
		Mean 111 41
	Var.	10 48

" " " "

{	B	111 38 S. End
		111 41 S.
		111 43 S.
		Mean 111 41
	Variation	10 48

Ill. East

coincidence of Mark on Needle
with mark on Stand.
Maki's Name South

{	B	111 38 North End
		111 41 N.
		111 40 N.
		Mean 111 40

" " "

Variation 10 49

" " "

{	B	111 43 South End
		111 42 S.
		111 43 S.
		Mean 111 43

Variation 10 46
122° 29'

Merid

May 26, 1859.

Magnetic Variation

Ill. East
 coincidence with mark on Needle } B 291° 45' South End
 with mark on Stand. } 291 41 S.
 Make's Name North } 291 42 S.
 291 43
 Variation 10 46

" " " } B 291 34 North End
 " " " } 291 33 N.
 " " " } 291 37 N.
 291 35
 Variation 10 54

Ill West
 coincidence of mark on Needle with } B 291 43 South End
 mark on Stand } 291 42 S.
 Make's North } 291 43 S.
 291 43
 Variation 10 46

" " " } B 291 38 North End
 " " " } 291 40 N.
 " " " } 291 37 N.
 291 38
 Variation 10 51

Merid.

302° 29'

May 26. 1859.

Magnetic Variation

Reversed the Poles of Needle

Merid

B.	30 2°	24'
	30 2	24

Ill East
 coincidence of Mark on Needle
 with mark on Stand
 Maker's Name North

B.	291	37	South End
	291	38	S.
	291	44	S.
	291	40	
Variation	10	44	

"

"

"

B.	291	41	North End
	291	40	N.
	291	39	N.
	291	40	
Variation	10	44	

Ill West
 coincidence of mark on Needle with
 mark on Stand
 Maker's Name North

B.	291	33	South End
	291	40.5	
	291	35.5	
	291	36	
Variation	10	48	

"

"

"

B.	291	40	North End
	291	41	N.
	291	37	N.
	291	39	
Variation	10	45	

Merid

30 2°	23'
-------	-----

May 26, 1859. Magnetic Variation

Ill East

Coincidence of mark on Needle with B 111° 44' South End
 mark on Line 111 42 S.
 Makes Name South 111 39.5

variation 111 42
 10 41

" " " B 111 45 North End

111 46 N.

111 45 N.

111 45

variation 10 38

Ill West

Coincidence of mark on Needle B 111 44 South End
 with mark on Line 111 40 S

111 40.3

111 41

variation 10 42

" " " B 111 45 North End

111 52 N.

111 50 N.

111 49

Variation 10 34

10 48

48

46

38

10 45

Merid

B 122° 23'

122 23

May 26. 1859.

Magnetic Variation

Station about 100 feet South of Transit Circle

Ill. West.	Mark	Name of Maker		
"	North End	South	10° 48'	
"	South "	"	10 48	
East	North "	"	10 49	
"	South "	"	10 46	
"	"	North	10 46	10 47.7
"	North	"	10 54	
West	South	"	10 46	
"	North	"	10 51	
		Mean	10 48.5	10 49.2
	Poles Reversed		<u>10 48.5</u>	10 49.2

Ill. East	South End	North		
"	North "	South	10 44	
"	South "	"	10 44	
West	North "	"	10 48	
"	South "	"	10 45	
East	North "	South	10 41	10 45.2
"	South "	"	10 38	
West	North "	South	10 42	
"	South "	"	10 34	
		Mean	<u>10 42.0</u>	10 38.8

Magnetic Variation - May 26th 1859. Result 10° 45' 2

This is I think as good a result as the instrument is capable of affording.

By above obs. May 26	10° 45' 2	wt. 3
By obs p. 13 " 24	<u>10 56.6</u>	" 1
May Dec. Adopted result.	<u>10 48.0</u>	

Computed by Schott's formula
See next page

11 11.6

Mag. Dec

Observed values at Cambridge Communicated
to Mr Schott by Prof. Lowry

Obs'd by W.C.B.

Computed

1844	9° 39' = 9.65	9.68	} Vide C. S. Rep 1855.
52	10 8 = 10.13	10.44	
54	10 39 = 10.65	10.65	
55	10 54 = 10.90	10.76	

On p 32	59	10 48 = 10.80	11.19 = 11° 11.6
40	60	10 37	
61	61	10 48	

See also pages 55 to 63.

Extract from Coast Survey Report 1859, page 303.

Mag. Dec = +10° 06', July, 1856, by Karl Friesach, Imp. Academy, Vienna, Vol. XXIX, 1858.

Out of Building

1858 April 17	Dec	10° 38.5	- 1.0 - 3.2	= +10° 34.3
" 19	"	10 40.4	"	10 36.2
" 12	"	11 18.0	- "	11 13.8

In West Wing

Dec 11° 30' about

At various dates since 1857 & with different instru-
ments

For Dip $I' = I \frac{\sin V}{\sin V'}$

Gravell wheel

Narrow Dip $I' = I \frac{\sin V}{\sin V'} \frac{\cos(A'-V')}{\cos(A-V)}$

Prism

I, A, V = Intensity Dip & Deflection at Primary

Station -

Aug. 26, 1859.

Fox Dip Circle

Observations for Declination

Station 100 ft. South of Transit Circle

Reading for True Merid $28^{\circ} 35'$ Alt. Ther. $+25.0$ Cent.

Face North	Lower End	88.0
	Upper "	88.05
Face "	Low	87 40
	Up. "	87 50
Face "	Low	87 40
	Up "	87 50
Face "	Low	87 50
	Up. "	88 00

The Lower End of Needle is west of 90°

Face South	Lower End	86.00
	Up. "	85 50
Face "	Low	86 40
	Up "	86 50
Face "	Low	86 10
	Up. "	86 00
Face "	Low	85 50
	up "	85 40

284	16	28
202	35	28
70	41	28
11	20	28
284	28	28
202	35	28
70	41	28
11	20	28

Magnetic Needle at Cambridge, from 1750 to 1850

Computed	Observed	Year	Computed	Observed	Year
7° 33'		1750	7° 07'		1801
7 30		1751	7 09		1802
7 28		1752	7 12		1803
7 26		1753	7 13		1804
7 24		1754	7 15		1805
7 22		1755	7 18		1806
7 19		1756	7 19		1807
7 17	7° 20'	1757	7 22		1808
7 15		1758	7 24		1809
7 13		1759	7 26	7° 30'	1810
7 11		1760	7 29		1811
7 08	7 14	1761	7 32		1812
7 07		1762	7 35		1813
7 06	7 00	1763	7 38		1814
7 05		1764	7 41		1815
7 03		1765	7 43		1816
7 01		1766	7 46		1817

Magnetic Variation at Cambridge

1730
18618° 40' West of North
10 48

6 53		1780	9 00		
6 53		1786	9 05	9 09	1837
6 53		1787	9 10		1838
6 53	6 38	1788	9 15		1839
6 54		1789	9 18	9 18	1840
6 54		1790	9 24		1841
6 55		1791	9 30	9 34	1842
6 56		1792	9 36		1843
6 57		1793	9 41	9 39	1844
6 58		1794	9 47		1845
7 00		1795	9 52		1846
7 01		1796	9 58		1847
7 03		1797	10 03		1848
7 04		1798	10 09		1849
7 05		1799	10 15		1850
7 06		1800			

Magnetic Needle at Cambridge, from 1750 to 1850

Computed	Observed	Year	Computed	Observed	Year
7° 33'		1750	7° 07'		1801
7 30		1751	7 09		1802
7 28		1752	7 12		1803
7 26		1753	7 13		1804
7 24		1754	7 15		1805
7 22		1755	7 18		1806
7 19		1756	7 19		1807
7 17	7° 20'	1757	7 22		1808
7 15		1758	7 24		1809
7 13		1759	7 26	7° 30'	1810
7 11		1760	7 29		1811
7 08	7 14	1761	7 32		1812
7 07		1762	7 35		1813
7 06	7 00	1763	7 38		1814
7 05		1764	7 41		1815
7 03		1765	7 43		1816
7 01		1766	7 46		1817
7 00		1767	7 49		1818
6 58		1768	7 53		1819
6 57		1769	7 55		1820
6 56		1770	7 59		1821
6 55		1771	8 05		1822
6 55		1772	8 08		1823
6 54		1773	8 11		1824
6 54		1774	8 14		1825
6 53		1775	8 18		1826
6 53		1776	8 21		1827
6 52		1777	8 25		1828
6 52		1778	8 29		1829
6 51		1779	8 33		1830
6 51	7 02	1780	8 37		1831
6 51		1781	8 42		1832
6 51	6 46	1782	8 47		1833
6 52	6 52	1783	8 52		1834
6 52		1784	8 56	8 51	1835
6 53		1785	8 60		1836
6 53		1786	9 05	9 09	1837
6 53		1787	9 10		1838
6 53	6 38	1788	9 15		1839
6 54		1789	9 18	9 18	1840
6 54		1790	9 24		1841
6 55		1791	9 30	9 34	1842
6 56		1792	9 36		1843
6 57		1793	9 41	9 39	1844
6 58		1794	9 47		1845
7 00		1795	9 52		1846
7 01		1796	9 58		1847
7 03		1797	10 03		1848
7 04		1798	10 09		1849
7 05		1799	10 15		1850
7 06		1800			

Aug. 27. 1859.

Fox Dip Circle

Instrument placed about 25 ft. from centre of pier which supports the Gr. Equatorial

The iron window shutters prevent the action of the Needle.

Aug. 27. P.M.

Fox Dip Circle

Instrument placed on the round stone ^{north} west of Observatory about 4 rods.

On South Side of Stone

Face South $202^{\circ} 42'$ 90° Above & Below

Face West	292 42	Above	$73^{\circ} 10'$	Below	$73^{\circ} 20'$
"	"		$73^{\circ} 05'$		$73^{\circ} 20'$
"	"		$73^{\circ} 00'$		$73^{\circ} 10'$
"	"		$72^{\circ} 50'$		$73^{\circ} 05'$
			$73^{\circ} 1'$		$73^{\circ} 18'$

On West Side of Stone

Face South $178^{\circ} 35'$ 90° Above & Below

Face West	268 35	Above	$73^{\circ} 13'$	Below	$73^{\circ} 25'$
"	"		$73^{\circ} 8'$		$73^{\circ} 20'$
"	"		$73^{\circ} 8'$		$73^{\circ} 20'$
"	"		$73^{\circ} 15'$		$73^{\circ} 25'$
			$73^{\circ} 15'$		$73^{\circ} 22'$

Aug. 27. 1859.

Fox Dip Circle

On North Side of Stone

Face South $85^{\circ} 13'$ 90° Above & Below

Face West 175 13

Above $73^{\circ} 10'$ Below 73 20

" "

73 12 73 25

" "

73 10 73 22

" "

73 15 73 26

73 16 73 23

on East Side of Stone

Face South $355^{\circ} 26'$ 90° Above & Below

Face West 85 26

Above 73 00 Below 73 12

" "

73 20 73 30

" "

73 8 73 15

" "

73 55 73 8

73 6 73 16

18 ft East of Stone

Face South 64 42

 90° Above & Below

Face West 154 42

Above 73 8 Below 73 18

73 6 73 15

73 10 73 20

73 0 73 10

73 6 73 14

18 feet west of Stone

Face West South $106^{\circ} 46'$ Face West $196^{\circ} 46'$

Above Below

73.6 73.15

73.15 73.25

73.20 73.30

73.10 73.20

73.17 73.22

mean

mean

The observations on the two preceding pages were made
to ascertain whether the place of observing is free from
local attraction



Observations for Magnetic Declination

Apr. 28. 1860

Began at 2 1/2 o'clock P.M.

Ended at 4 o'clock ..

Variation Transit- 100 ft south of Merid. Circle

Obs.	Merid		Magn. Me	Sec	
B	364°	25'	353°	42	10° 40
B	366	4	355	22	10 42
B	366	4	355	29	10 35
Reversed the Needle					10° 38.1
B	186	5	175	30	10 35
B	186	5	175	27	10 38
B	186	5	175	29	10 36

Reversed the Poles,

10° 36.8

B	186	5	175	30	10 35
B	186	5	175	30	10 35
B	186	6	175	32	10 34
Reversed the Needle					10° 35.5
B	366	4	355	30	10 34
B	366	4	355	29	10 37
B	366	4	355	26	10 38

The wires in the Merid. Instrument were very distinctly seen. The Var. Transit was set in the true Meridian each time.

A. M.

Apr. 30, 1860

The Director compared the pointing of the telescope of the Variation Transit and the line joining the marks of the studs. - In getting the Declination the marks on the Needle are made to coincide with the marks on the studs.

The difference between the pointing of the telescope and this line can not exceed $1'$.

The Collimation of the cross wires in the telescope was also examined and found to be $1'$ or less. I then, by means of reversing and moving the screws, eliminated the collimation as nearly as I could.

A.H.

The direction of the marks on studs was found to coincide with pointing of telescope by laying a straight edge on the studs in a direction parallel to marks on studs. An error of $1'$ or $2'$ at most would be perceptible.

Fox Dip Circle.

June 21. 1860

Alt. obs.

Inclination.

$$15^{\circ} 8' 26'' + 90^{\circ} = 248^{\circ} 26'$$

Above

Below

72° 0'

72° 0'

71 40

71 35

71 50

71 50

71 55

71 55

Reversed Face of Needle

71 50

72 0

71 50

71 55

71 40

71 50

71 50

72 0

$$15^{\circ} 26' 56'' = 248^{\circ} 26' + 180, 428^{\circ} 26'$$

79 5

79 5

79 10

79 5

79 10

79 10

79 5

79 5

These obs are good for nothing as I did not think to remove the horizontal needle; one reading with this removed gives 74° about,

Fox Dip Circle.

June 22, 1860

A. H. Obs.

Inclination.

Observations begun at 9^h 30^m a.m. Removed the horizontal magnet and levelled the Instrument. Brought the face of Instr- into the true meridian by means of the meridian Circle, then into the magnetic meridian by moving 10° 37' west.

Station 100ft south of Meridian Circle. Needle No. 2.

A clear, cool morning

Alt. Ther at 69.0

S. Merid	M. Merid	Above	Below	
206° 00' - 10 37' =	195° 23	74° 5'	74° 10'	
		74 20	74 20	face
		74 5	74 10	West
			74 12	

Turned 180° 37 5 23

74 40	74 35	
74 50	74 50	face
74 40	74 40	East

Reversed Face of Needle

74 43		
75 0	74 50	
75 0	74 50	face
74 55	74 40	East

Turned 180 19 5 23

74 52		
74 10	74 20	
74 10	74 20	face
74 10	74 20	West
74 15		

Result 74 30.

Did not observe position of needle.

Fox Dip Circle conti.-

June 22, 1860

Reversed the Poles of the Needle.

T. Merid	N. Merid	Above	Below	Face
206° 00' - 10' 37	195° 23'	74 40	74 45	West
		74 40	74 41	
		74 41	74 50	
			74 55	
Turned 180°	175° 23'	74 50	74 45	Face East
		55	50	
		74 50	74 41	Face East
			74 50	
Reversed Face of Needle				Face East
		74 10	74 0	
		74 20	74 10	
		74 25	74 15	
			74 13	
Turned 180	195° 32'	73 00	73 00	Face West
		72 50	73 0	
		72 50	73 0	
			72 58	
			166	
	Result	74 15		
		74 30		
	Final Result	74 22.5		

During the last observations "Face East" the Sun shone on the Instrument and through the glass on the needle. Alt. Sun = 81.0 at close of obs.

Fox Lip Circle.

Alt. Ther. 64.0

June 26, 1860 8 o'clock A.M. Intensity

A.H. Obs.

Station 100ft south of Merid Circle, Needle No 2.

Instrument placed in plane of Mag. Merid. with hooks but without

weights, reads

Above

Below

73° 10'

73° 10'

73 20

73 15

73 10

73 10

weight of 1 grain

Above

Below

50 30

50 30

50 20

50 20

50 40

50 30

changed weight to other
hook.

93 10

93 10

93 0

93 10

93 10

93 10

Face West

Turned in azimuth 180°

53° 30'

53° 40'

53 20

53 30

53 30

53 30

changed weight

96 40

96 40

96 40

96 40

96 40

96 30

Face East

without weights

76 20

76 10

76 10

76 10

76 20

76 20

Sept 26. 1860

Fox Dip Circle

Alt. Ther. 73°

1.8 clock P.M.

Station 110 ft south of Transit Circle. Bright Sunshine

Instrument Face West, true Merid reads 205 15

10 40

Mag Merid

194 35 + 180 374 35

Needle No 2 used with weights

For Intensity.

	Above	Below
Without Weights	73 50	73 40
	73 50	73 40
	73 40	73 30
Weight 1.5		
Face East	104 10	104 10
	104 20	104 15
	104 15	104 10
changed weight		
	38 40	38 40
	39 0	39 0
	38 50	38 50
Turned 180°		
	107 30	107 30
	107 40	107 30
	107 40	107 40
changed weight		
Face West	42 50	43 0
	42 40	42 40
	43 0	43 0

~~With Deflectors~~

Above	Below
41 20	41 20
41 15	41 15
41 20	41 20

Deflectors. Needle No 1.

Face East	Above	Below
	31 00	31 00
	30 55	30 50
	31 00	30 55
Moved Needle		
	118 50	118 40
	118 50	118 40
	118 55	118 40

Alt Ther. 73°

at close of obs.

Wind blows quite hard

Sept 26, 1860

Fox Dip Circle

Deflection Needle No. 2			Weights Needle No. 2	
Above	Below		Above	Below
30 0	30 10	Face East	28 40	28 50
30 0	30 10		28 50	29 00
30 5	30 10		28 40	28 50
Moved Needle		Weight 2.0	changed weight	
118 10	118 20		124 40	124 50
118 5	118 20		124 30	124 40
118 5	118 15		124 20	124 30
		Face West	Turned 180°	
			25 20	25 10
			25 20	25 10
			25 25	25 15
			changed weight	
			118 40	118 30
			118 40	118 30
			118 30	118 25

Att Ther. at close 62°

1861. June 5. 2 o'clock p. m. Alt. Thermo. 62°

Station one hundred feet south of Meridian Circle.

Variation Transit

True Meridian determined by means of Meridian Circle.

True Merid $359^{\circ} 42' 30''$ }
 $42' 30''$ }

Mag. Merid $168 \quad 54 \quad 20$ }
 $54 \quad 10$ }

$168 \quad 54 \quad 15$ }
 $168 \quad 53 \quad 25$ }

Turned 180°

Mag. Merid $348 \quad 54 \quad 20$ }
 $52 \quad 30$ }

Reversed Needle

Mag. Merid $348 \quad 54 \quad 0$ }
 $56 \quad 0$ }

$168 \quad 55 \quad 0$ }
 $168 \quad 56 \quad 0$ }

Turned 180°

Mag. Merid $168 \quad 55 \quad 0$ }
 $57 \quad 0$ }

Fin Pos. of Needle $168 \quad 53 \quad 50$ }
 Sec. " " $168 \quad 55 \quad 30$ }

Mean $168 \quad 54 \quad 40$
 True Merid. $179 \quad 42 \quad 30$ True Merid $179 \quad 42 \quad 30$

Declination West $10^{\circ} 47' 50''$

A. H. obs.

1842 Oct. 3 $10^h 30^m$ to $11^h 30^m$

Mag. Dip $74^\circ 19'.5$ by Lieut. Leffroy.

Mem. Am. Ac. Vol II p. 147.

Means of Mag. Dec. from
Mem. Am. Ac. Vol II p. 141

1841 Oct. Oct $9^\circ 28' 38''$
Nov Nov $9^\circ 33' 3$
Dec Dec $9^\circ 35' 9$

1842 Jan	$9^\circ 33' 1$	June	$9^\circ 35' 8$
Feb	$9^\circ 31' 10$	July	$9^\circ 35' 49$
Mar	$9^\circ 33' 52$	Aug	$9^\circ 35' 12$
Apr	$9^\circ 36' 44$	Sept	$9^\circ 34' 46$
May	$9^\circ 36' 3$	Oct	$9^\circ 34' 48$
		Nov	$9^\circ 37' 26$

For Variation $0^\circ 43' E$ at Eric Pelm in 1795
See Am. Ac. 1861

Good - Elliott -

Magnetic Declination.

Angles which the line of Collimation of the reading Telescope of the Declination Magnetometer makes with the true Meridian.

1841.	March	20 th	9° 18' 50"	} 9° 18' 00"
		24 th	9° 17' 10"	
	May	1 st	9° 17' 40"	
		28 th	9° 16' 45"	
				9° 17' 17"
	Nov.	7 th	9° 17' 50"	
		14 th	9° 17' 30"	
	Dec.	22 nd	9° 17' 30"	
1842.	Jan	19 th	9° 16' 30"	
	Feb	25 th	9° 15' 50"	
	March	23 rd	9° 15' 10"	
	April	20 th	9° 17' 50"	
	May	27 th	9° 26' 30"	
	June	22 nd	9° 26' 47"	
	July	21 st	9° 27' 00"	
	August	25 th	9° 27' 20"	
	September	18 th	9° 26' 10"	
	October	19 th	9° 26' 20"	
	November	25 th	9° 26' 20"	
	December	21 st	9° 26' 20"	
1843.	January	25 th	9° 26' 50"	
	February	24 th	9° 27' 20"	
	March	22 nd	9° 27' 30"	
	April	20 th	9° 27' 20"	
	May	26 th	9° 27' 45"	
	June	21 st	9° 27' 50"	
	July	3 rd	9° 28' 00"	

Absolute Declination
Magnetic axis 164
163.45
Mag. axis - 163.4

Magnetic Declination.

Absolute Declination. the first observation on each Term-day.

1841	March	24 th	9° 20' 50"
	April	21 st	9° 20' 12
	May	28 th	9° 19' 45
	June	23 rd	9° 21' 43
	July	21 st	9° 20' 43
	August	27 th	
	September	22 nd	9° 20' 05
	October	20 th	9° 29' 37
	November	26 th	9° 34' 48
	December	22 nd	9° 35' 18
1842.	January	19 th	9° 34' 24
	February	25 th	9° 30' 04
	March	23 rd	9° 40' 52
	April	20 th	9° 36' 40
	May	27 th	9° 37' 00
	June	22 nd	9° 38' 47
	July	20 th	9° 37' 03
	August	26 th	9° 36' 44
	September	21 st	9° 35' 43
	October	19 th	9° 36' 16
	November	25 th	9° 36' 38
	December	21 st	9° 36' 00
1843.	January	25 th	9° 36' 45
	February	24 th	9° 36' 18
	March	23 rd	9° 39' 11
	April	19 th	9° 36' 50
	May	26 th	9° 41' 15

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Magnetic Inclination - Cambridge

1842. June 24th Gambey Dip Circle by W.C.B.

Am	"	"	"	"	a South "	74°.29	} 74°.22.7
"	"	"	"	"	a North "	74°.16	
"	"	"	"	"	a South "	74°.23	} 74°.22.5
"	"	"	"	"	a North "	74°.22	
"	"	"	"	"	a South "	74°.26	} 74°.20.3
"	"	"	"	"	a North "	74°.15	
"	"	"	"	"	a South "	74°.41.3	} 74°.21.9
"	"	"	"	"	a North "	74°.5.8	

1843. June 21st Am 9^h 30 Mean of both needles. Gambey 74°.23.3

1842. May 4th Dr Lock's observations. Yetts gave 74°.13'.81. his own instrument.

1842. July 20th W.C.B. Needle No 1

a North Pole	74°.33	} 74°.23.4
a South "	74°.13.8	

1841 May 28th

a North "	74°.45.6	} 74°.28.4
a South "	74°.11.3	

1840 May 18th

a North "	74°.40.7	} 74°.40.7 x
a South "	74°.39.7	

* See next

1840 June 22nd

a North "	74°.21.2	} 74°.23.7
a South "	74°.26.2	
a North "	74°.35.5	} mean 74°.24.7
a South "	74°.16.2	
a North "	74°.03.1	} 74°.25.8
a South "	74°.24.9	

" 23rd

No 1 mean of both
No 2

Dip Circle by Troughton & Simms. — Dorchester.

1839 June 7th 5 PM.

Full Set Needle A	74°.20.6
Gambey Needle No 1	74°.21.7
" " 2	74°.33.9
Mean	74°.25.4

Magnetic Declination. — Dorchester.

Magnetic horizontal Declination as observed with a Gambey apparatus
 1839. June 7th 5th M.S.E. Gambey apparatus 9° 9' 4"
 Troughton & Simms Variation Transit 9° 7' 0"

1838. Sept. 19th 5 PM Gambey apparatus 9° 8' 4" } Direct
 " " " second sett 9° 8' 0" } reversed
 " 20th 2 PM 9° 10' 0"

" 21th 6-7 AM. Inclination by Gambey Dip Circle
 Needle No 1. Mean 74° 13'
 " 2 " 74° 24' } 74° 48.5"
 Large no. }
 Observations }

1838. October 1st Observed with Dr Bowditch's
 Declination apparatus.

1 set 9° 25'
 2 " 9° 18' } in reversed
 By Gambey 3 " 8° 36' } Position
 9.07 4 " 9° 03'
 9° 06'

Dorchester.

1838. December 20th Troughton & Simms Variation Transit at upper transit
 of Polaris.

Observed Magnetic Declination 9° 22' 05"
 1839. August 18th 9.30 AM Gambey 9° 07'

1838. December 24th 9.30 AM. Observed Declination with Trough-
 ton & Simms Variation Transit 8° 58' 30"
 Gambey 8° 54' 30"

1838. 25th 1.30 PM. " 9° 57' 00"
 Troughton & Simms Var. Transit 9° 7' 40"

1838. 28th Noon " " 9° 4' 52"
 29th " " " 8° 59' 17"

Gambey 8° 53' 00"
 " 3.30 PM. Troughton & Simms Var. Transit 9° 02' 50"
 Gambey 9° 07' 00"

1838 Sept. 30th 8 AM Bowditch 9° 00'

1838. Oct 2^d 5 PM Gambey 8° 58'
 Bowditch 9° 15'
 Gambey 9° 03'

Magnetic Declination *Dorchester* -

1839 January 1 st		Troughton & Simms Far. Transit	Gambey	Mean of <i>Sturges</i>
22 ^h		8° 53' 30"	8° 53'	
23		9° 01' 10"	8° 59'	9° 11' 40"
2 ^o 0		9° 4' 0"	9° 04'	8° 57' 10"
1		9° 4' 0"	9° 03'	2° 50'
2		8° 59' 20"	9° 07'	9° 07' 25"
3		9° 11' 30"	9° 12'	
4		9° 11' 40"	9° 13'	Gambey. 8° 55'
5		9° 09' 50"	9° 06' 30"	9° 13'
6		8° 58' 50"	8° 57'	8
7		8° 58' 40"	8° 57'	9° 4' 0"
8		9° 02' 50"	8° 58'	
9		8° 57' 10"	8° 57'	
12	108	24° 30' (9° 02' 02")	12) 28° 30'	9° 02' 12"

2 ^o 20	8° 56' 50"	8° 57'
21	8° 57' 00"	8° 53'
22	8° 53' 50"	8° 53'
23	9° 01' 30"	9° 00'
3 ^o 0	9° 09' 30"	9° 07' 30"
1	9° 03' 20"	9° 09' 00"
2	9° 02' 00"	9° 04' 00"
3	9° 06' 10"	9° 05'
4	9° 02' 30"	9° 02'
5	9° 07' 20"	9° 20'
6	8° 58' 20"	9° 02'
7	8° 56' 00"	9° 02'
12	04° 20' (9° 00' 42")	13) 36° 30' (9° 03' 02")

Magnetic Variation

63

1840 Sept. 6th Dip 74° 11.5 By Maj. J.D.G. Dip Circle.
 " " 7th Am. Variation 9° 10 By Gambey in garden
 " " 12th M. Dip 79° 24.0 " "
 " May 13th Dip 74° 28.0 " Two needles

Copied from observing Book No 8. Same result (6° 30') is reported in Mem. American Academy Vol. II. p. 63.

Observations for Magnetic Variation (made probably at the West Street School-house Boston Mass. by John Vinal. 1644 observations). between March 1st 1792 to January 29th 1794.
 6° 29' 40.5

See old mss. also on file

1843. Nov 25th Dip. Gambey 74° 16.29 two needles.
 1839 June 7th Dorchester " In 5. 74° 20.26 Needle A
 " " " Gambey 74° 21.27 " 1
 " " " " 74° 33.29 " 2
 1840 May 18th 74° 40.27 two needles
 1839 Aug 18th Dorchester 74° 34.24 " "
 1842 April 25th Cambridge 74° 20.5 " " } Gambey.
 74° 19.9 " " } Poles secured
 Good

Intensity -

Lefroy in 1842. found intensity at Cambridge = 1.777
 1844 Dec 30th J.D.G. and H.C.B. (1.297 unit at Falmouth 1.000) or Intensity
 = 1.297 x 1.374 = 1.782
 23rd " " Dip 74° 18.2 For Dip. Good.

1859 June 30 [50] 140H