Service

Journal.

Distance from lens

Journal for recording Memoranda relating to the Time Service of Harvard College Observatory; beginning February 10. 1877.

Assistant Leonard Waldo at that date assuming the duty of transmitting the time signals as agreed upon between the Observatory and its customers.

The abbreviation O.B. refers to the observing book.
" " L.C.B. " " " letter copying book.
" " L.R.B " " " blank book in which are pasted the official letters received in relation to the time service.
" " R.T. refers to the Russian Transit.
" " Cl " " clock.
" " Cr " " Chronometer.

Ridley – Entries by dates.

2

4

8

1877. February 10.

The Russian Transit is replaced after having a new frame for its glass scale, mounted in its eyepiece by Alvan Clark & Sons. It is believed the collimation will now remain constant for several consecutive days.

The instrument is overhauled, oiled when necessary with clock oil, and the level, azimuth, and collimation adjusted as near as may be.

The magnifying power of its 3 eyepieces determined with the Dolland dynamometer. (See for method of using - Eq. Recs. 1876. Vol I)

		I	II			
R.T. Eyepiece	No. 1	1.080 8.930 7.85	1.170 8.920 7.75	Mean	7.80	Mag. power 35.5
" "	No. 2.	2.98 7.11 4.13	~~2.98~~ 2.97 ~~7.10~~ 7.10 4.13	"	4.13	" " 67.
" "	No 3.	3.64 6.42 2.79	3.65 6.45 2.80	"	2.80	" " 99.

Clear aperture measured = $\frac{5^{in}.53}{2} = 2^{in}.77$

Feb. 13. Obs. to determine value of azimuth scale (approximately).

R.T. set with A, on Collimator.		E_5 on Collimator
Scale reads	24.9	27.4
	25.0	27.3
means	24.95	27.35
		24.95
		2.40

2.4 divisions = $99^s.204$ (See p. 192) ∴ 1 div. = $41^s.33$ = 10′ 20″

Feb. 8. A. Howard, on behalf of the firm, assents his willingness to assume one third of the cost of building the clock room proposed, provided each third does not exceed $100.00

1877.

Feb. 9. Mr Stevens takes the work to build the clock room, with the understanding that the cost shall not exceed $200.

Mr. Clinch has Bond 312 taken down without expense to the observatory for its removal to the new clock room, when such clock room shall be completed. It being part of his work toward putting 312 in good order, as per an old understanding with the observatory.

Plans submitted to Mr. Stevens for the clock room.

Feb — Negotiations entered into with reference to having a time ball dropped by the U.S. Signal Service from the Equitable Life Ins. Co. building.

Feb 17. E Howard & Co. agree to remove their present clock, and at their instance, to replace 141 by a first class movement & pendulum. The removal to take place Monday next.

Rcvd of Vitalis Hummer — 1 clock movement $20.
(See L.S.B. p.5) 1 Pendulum. Mercury — $35 $55.

Feb 16. Piers for clocks in cellar finished and in place. For description etc see p. 180.

Feb 17. $9^h.1$ a.m.

	Howard 141				Fir 1327				Howard 141.
	9^h	8^m	$10^s.0$	=	19	1	42.0		added 40 grammes to the pendulum.
	9	10	56.6				− 10.6		
∴ Error 141		− 2	46.6		19 [43]	1	31.4		$21^h\ 14^m\ 25^s.4$
					21	47	6.0		− 3 28.8
									21 10 56.6

18 $9^h.5$ a.m.

	9	32	35.0	=	19	29	52.0		Removed " " from the "
	21	35	6.4				− 10.3		
		− 2	31.4		19 [43]	29	41.7		$21^h\ 38^m\ 39^s.1$
					21	51	2.6		− 3 32.7
									21 35 06.4

19 $10^h.3$ a.m.

	10	15	25.0	=	20	16	48.0	
	22	17	59.0				− 10.0	
		2	34.0		20 [43]	16	38.0	
					21	54	59.2	22 21 38.8
								− 3 39.8
								22 17 59.0

$19^s\ 10^h.3 = -2^m\ 34.0$
$18\ 9.5 = -2\ 31.4$
$1^s\ 0.8 = -2.6$ without 40gr.
$1^s\ 0.4 = +15.2$ with 40gr.

$\frac{-2.6}{24.8} = -0^s.11$ ∴ 40 gr. causes Howard 141 to gain $0^s.77$ per hour.

$\frac{+15.2}{24.4} = +0^s.66$
$+0^s.77$ ∴ 1 gr. caus Howard 141 to gain $0^s.02$ per hour.

1877.

February 23. Interview with Mr George of Stearns & George, who is to furnish me with estimates as follows:

1. What is the amount he will offer us for the 32. cells of battery now at 39 Pearl St.
2. The amount he would charge per year, if for taking care of the Cambridge line alone.
3. The basis on which he will sell us supplies, telegraphic.

24. Interview with Mr Stearns (B. & W. R.) Pres. Fitchburg R.R. who promises to bring the matter of standard time before the board for their action, and whose line of argument against such a change I have recapitulated in substance in the memorandum I have sent him (Feb.) in letter book p. 8.

Interview with F. A. Fish, Supt. Equitable Life Ins. buildings, Boston, who is personally interested in an experiment in dropping a time ball from the top of the building, and who asks me to lay the matter before him in a communication.

March 2. The clock room is completed, see p. 180, and Mr. Aston puts up Bond 312 on the middle pier. about $\frac{1}{4}$ lb CaCl is put inside its clock case, to absorb moisture, and about $\frac{3}{4}$ lb CaCl is put on the shelf.

3. The connections and other miscellaneous work, moving the Ellicott clock etc. are finished.

9. Time signals completely interrupted by the heavy storm.

10. Clock Bond 394 is taken down and to Boston to be cleaned and have a means of control applied to its pendulum. (Aings).

Time signals from Bond & Boston clock received here at or before 11.30 A.M. Error of Bond's clock =

1877.

Feb 26. Note addressed to J. A. Fell – Supt. Equitable Ins. Co. Buildings – and signed by Prof. Pickering, relating to cooperation with us in dropping a time ball. S.C.B. p. 14.

Mch. 13. C. F. Wood is addressed by letter, and asked upon what conditions the W. U. Tel. Company will cooperate with us in sending time signals and superintending our line. S.C.B. 19.

Feb. 26. Letter from the acting signal officer offering cooperation of his office in the matter of dropping the time ball.

Mach 8. Letter from Theodore Weston offering the cooperation of his office (Equitable Life Ins. Co) in dropping the ball.
Letter from Stearns & Gerge offering to perform the ordinary service of taking care of the time service lines, for $500 for the year ending Jan. 1878.

Mch. 16. The marble top for 394 is set by a marble cutter, and a hole is cut in the top of the Russ. Tr. pier for a collimator.

Mch. 19. Bond 394 set up in clock room by Mr Aster, after being cleaned and having beat at 58th second repaired. The round brass weights again adapted to 394, which must be wound twice per week or it will run down. The magnet and its attached arm which has been added to ~~mg~~ alter the error of the clock by Airy's plan, weighs about 1½ ounces (estimated) and swings about 1/10 of an inch above a coil which I should think has about 7 ohms resistance. – These data will be found elsewhere when accurately determined.
Note: Magnet weighs 10 dwt. Arm for carrying same, 2 dwt. 14 grains.

Mch 21. Bd 394 seems to be gaining about $0^s.6$ per hour.
Moved the pendulum bob down 1 rev. ~~of its bob~~.
Its rate now seems to be about $0^s.15$ per hour losing.
Added 5 grammes to the pendulum bob.

Mch. 24. Completed the alterations in the E. Transit room, and received from Williams the Relays etc after time service, sent for him to put in order.

Mch 26. Completed the connections in the W. wing. See p. 188-189.

April 14 Bond 394 finally replaced in the clock room, and at 3 P.M the Bond Clock in Boston was thrown out of circuit, and Bond 394 was thrown in.

May 24.40 Changed the relays and adjustments of the wires
" so that the circuit would be made, at each clock beat. Hereafter the difference in time between H.C.O. and the Boston to be taken at $15^s.50$ instead of $16^s.00$ as used before. This refers the Boston Time to the Dome of the State house.

July 2nd Mean time Clock Bond 394 stopped at $7^h 36^m 30^s$ July 2nd 1877. It was wound June 30th 20^h. Also July 1st 20^h as is the Custom.
The stop was discovered at $9^h 45^m$ and at that time the pendulum was swinging through an arc of about 1°.
Next morning went to get Mr. Aston to come and fix the clock. Put Bonds Boston Clock in circuit

at about 21^h 30^m. Made comparison with Chron. Frodsham 3451, and Bonds Clock was ~~xx~~ correct ~~to~~ within 1/10 of a second at 20^h.
Mr. Asten then came out and took the case off of the clock and found the works very rusty. He scraped some of the rust off of the most necessary parts, and oiled the clock a little then ~~xx~~ at 0^h 4^m 14^s July 3^d, Mr. Asten set Bond 394 going. This was set by Chron. Frodsham 3451, and on comparing 394 with Clock Frodsham 1327 I found it slow $.05^s$.
Put Bond 394 in circuit again ~~at~~ July 3^d 1^h, but Bonds Boston Clock was evidently not ~~xx~~ taken out of circuit until July 3^d 3^{hrs}.

Sept. 1st Mr Frank Waldo began to observe and made this last observation August 5d. 90. Mr. Winslow Upton was then engaged and observed from August 6d. 84 to August 27d. 83

Aug 30 Bond 394 and Bond 312 Removed from the clock room in the basement preparatory to being cleaned and leaving the clock Room made dry.

Sept. 22 clock room complete. It now has a shut of lead inserted under its entire structure. The piers of 394 have been raised and the lead passes entirely under them, but the piers for 312 and the Harvard Clock pier being ~~xx~~ several feet in the ground were not raised. Instead both

have been chiselled into at the level of the lead, and have the lead put in and then cemented thus:

Sept. 22d 12m put in the room 200 gr. $CaCl_2$
and put in the cellar 200 gr. $CaCl_2$

Test the comparative dryness outside and in.

Sept. 26. Saw Mr. C. F. Woods who seemed disinclined to offer much encouragement about the W. U. Company's transmitting the signals or in any proposed Extension of the Time Service.
Mr Clinch, S.

Sept. 27d 22h Weighed the $CaCl_2$ in the clock room = 300 grammes.
" " " " " cellar = 400 grammes
∴ The Cellar portion has increased 100 % in 5 days 10 hrs
∴ The clock room " " " 50 % in 5 " 10 " .

27d 23h Put in clock room, cellar and prime vert. room each 200 grams.
Oct 3 4d 24h (Mon Oct. 4)
Took from Clock Room 420 grammes $CaCl_2$ + H_2O
" " Cellar 480 " "
" " Prime Vert. Room 520 " " " .

∴ in $6^d\ 2^h$ Clock Room absorbed 220 grammes
~~Cellar~~ " 280 " Prime Vest. Room
~~Prime Vest. Room~~ " 320 " & Cellar

These two comparisons may be expressed as follows

	I	II
Time	$5^d.42$	$6^d.1$
Cl. Room.	50%	110 ~~120~~ %
Cellar.	100 %	160°
Prime Vest.		140 ~~180~~ %

∴ in both trials the clock room contained 50% less moisture than the adjoining cellar, and

Oct 8d. 22h 35m Observations to determine relative humidity

E wind and raining.

		Dry Bulb	Wet Bulb.
	~~Cas 3235~~	~~54.0~~	~~7~~
Outside air	No. 4	54.7	Cas 3235 = 54.0
Between the piers - pr. bed - Room	Cas 29563	56.3	3235 = 54.5
Clock Room		67.3	64.5
clock Room		67.4	64.7

Cellar

2 P.M.

	July 20	21	22	23
No 4	79.0 ~~81.0~~	~~83.0~~		
Ans 3235.	81.0	83.0	80.0	79.8
Ans 29563.				

No 4 2 P.M.	82.5	84.6	81.0	81.1
29563	81.0	83.0	80.0	79.8
∴ No 4 reads too high by	1°.5	1°.6	1°.0	1°.3

S. W. thinks as nearly as he can see from the obs.

October 16th

	394		3451
No Contact ? 3h	$11^m\ 0^s.0$	=	47^s
	14 0.0	=	47.5
$A_1\ B_1$	16 30.0	=	18.0
$A_3\ B_3$	20 0.0	=	48.5

$\therefore\ 0^s.5$ in 6^m = $0^s.16$ in 1^m = $A_1 B_1$

	312				345		
22^h	27^m	$30^s.0$	=	22	27	22.5^m	
1	30	0.0		1	29	40.5	2 23.0
	2	$30^s.0$			Lower fund. bot 3 revs		

	394				345	
11	48	20.0	=	1	31	41.5

	312				345	
10	22	0.0	=	10	21	55
1	30	0.0	=	1	29	45.5
8	52	0.0	=	8	52	9.5
	—	$9^s.5$			—	
=	—	$1^s.1$ per hour				

	394				345	
		~~43.5~~ =				32.
20	38	0.0	=	10	23	11.5
11	48	20.0	=	1	31	41.5
8^h	49^m	$40^s.0$	=	8^h	51^m	$30^s.0$
					1	27.1
				8^h	50^m	$2^s.9$
					49	40.0
						+ $22^s.9$
						$\therefore 2^s.6$ per hour.

∴ 394 Loses $2^s.6$ per hour.

Oct 17. Raised pend. bob 2 revs.

	394			3451	
21	50	0.0 =	11	36	10.3
26	12	40.0 =	15	1	32.2
4^h	22^m	40.0 =	4^m	25	22.
				0	43
4	22	40		24	39

∴ gains $9^s.1$ per hour.

2.6

6.5 per hour = 2 revs ∴ 1 rev = $3^s.25$ per hour.

3.25) 9.100 (2.8 revs back.

6 50

2600

2600

$28^s.0$ per hour

36

25^s " " = 2 revs.

24.4 ∴ 1 rev = $12^s.2$

∴ Mond bob back 2.20 revs

Chrisper

	3451				394	
16	53	44^s	=	3^h	5	30.0 (?)
	57	45	=		9	40.0
17	2	46	=		14	40.0
		39		3	28	30.0

$+0^s.73$ in $0^h.22$ = $+3^s.5$ per hour.

Adjusting 394. Continued

	3451				394	
h	m	s		h	m	s

17	29	0.5	=	3	40	50.0 (*?)
17	2	46.0	=		14	40.0
	26	14.5	=		26	10.0
		4.29				

$26^m\ 10^s.21 = 26\ 10.0$ ∴ 394 has gained $0^s.21$ in 26^m
$= 0^s.5$ per hour.

Check

17	44	55		8	56	40.0
16^h	57^m	$45^s.$	=	3^h	9^m	$40^s.0$
	47^m	10^s	=		47	0.0
		7.73				
	47^m	$2^s.27$	=		47	0.0

= losing 2.27 in 47^m = $-2^s.84 \pm$ per hour.

	s.t			m.t	
17	56	47.5	= 3	68	30.0
17	2	46.0	=	14	40.0
	54	1.5	=	53	50.0
		8.85			
	53	52.65	=		50.0

= losing $2^s.65$ in 54^m = $-2^s.92 \pm$ per hour.

~~17~~
Mount pend. bob. upwards about $\frac{1}{6}$ sec. arc $(1^\circ\ 58')$ 2

18	48	15.0	= 4	57	0.0
19	24	22.5	= 5	33	0.0
	36	7.5	=	36^s	0.0
		5.90			
	36	11.60			

= losing $1^s.60$ in $0^h.6$ = $-2^s.66$

∴ Results of yesterday have some disturbing element.

~~Mean bob up~~ =

Mean bob up = 1 rev. arc 2(1° 58')

	3451				394		
Oct 18d	19	40	36.0	=	5	48	48
	12	46	30.5	=	23	51	30
	+ 24				22		
	36	46	30.5	=	~~23~~	51	30
	19	40	36.0	=	5	48	48
					17		
	17	5	54.5		~~18~~	2	42
corr for rate			− 0.4				
	17	5	54.1				
		2	48.1				
	17hr	3m	6s.0	=		2	42
		2	42.0				
			− 24.0	in	17hrs	= losing	1s.41 per hour.

Rained bob 1 revs. arc (1° 58')2

	3451						
	12	59	12.0	=	23	3	40.0
	19	45	1.0	=	7	28	0.
	21	47	51.5	=	7	50	50.0
	21	47	51.5		31	50	50.0
	12	59	12.0		23	3	40.0
	8h	48m	39.5s		8h	47m	10.0s
			−0.2				
	8	48	39.3	=	8	47	10.0
		1	26.5				
	8h	47m	12.8s	=	8	47	10.0

∴ 394 turns 2s.8 in 8h.8

= 0s.32 per hour.

10 grammes = 0s.27 per hour.
2 " = 0.054

∴ 12 grammes = 0s.324

Oct. 18th Hourly Rate 394 = − 2.66 for 1hr
Raised bob 1 rev.

" " 394 = − 1.41 for 17hrs
Raised bob 1 rev.

" " 394 = − 0.32

∴ To raise the bob 1 revolution while the arc of vibration is 1° 58′ causes the clock to gain 1s.2 per hour.

Oct. 18th 9hrs added to pendulum bob for permanent compensation 11 grammes

Set clocks with Berlin Clock

	3451					
22	55	27.0 =	9	5	0.0	$A_1 B_1$
23	20	12.0 =	9	29	40.0	
	24	45.0 = 4.05		24	40.0	∴ 394 loses 0s.95 in in 0h.4 = 2s.37 per hour
	24	40.95 =		24	40.0	$A_1 B_1$
23	22	52.5 =	9	32	20.0	$A_3 B_3$
23	26	33.0 =	9	36	0.0	
23	50	35.5 =	10	0	0.0	
	24m	2.5 3.93 =		24	0.0	∴ 394 gains 1s.43 in 0h.4
	23	58.57			58.57 / 1.43	$A_3 B_3$ = 3s.57 per hour
23	50	35.5 =	10	0	0.0	
	65	38.0 =		15	0.0	$A_2 B_2$
0	48	31.02 =	10	57	46.0	
	42	53.02 7.02				
	42	46. =			46.0	

∴ With $A_1 B_1$ 394 Loses $2^s.4$ per hour = $0^s.04$ in 1^m
$A_2 B_2$ 394 " 0.0 " " = 0.00 in 1^m
$A_3 B_3$ 394 Gains 3.6 " " = 0.06 in 1^m

October 19th. 10 Aug. (civil time) Rmd 394 Put back in Circuit. Error $0^s.0$

Oct 25.87 312 394
~~21~~ ~~24~~ 0.0 = 1
11 52 6.0 = 21 24 0.0

October 25 The letter and Circular on "Standard Public time" issued.

1877. Nov 23. Investigation of diff. of long. between the State House Boston and Harvard College observatory, the Large Dome (center).

C. S. Report 1852 p. ~~274~~ 204.

Boston State House	71°	03'	30".00 =	4^h	44^m	$14^s.00$
H.C.O. dome	71	07	22.88 =	4	44	29.525
						15.525
					=	15.53

N. A. 1879.

Gr. E. fwash (C.S.)	5	8	12.09
Cam.b E. " "		23	41.11
	4	44	30.98

W. U. Circular "Standard Time" 1877.

State House E. of Washington	0	23	56.74
H.C.O dome " " "		23	41.11
from W. U. Circular			15.63, which probably

should be 15s.53.

∴ Longitude of State House E. of Center of large dome
15s.53 E of Transit pier

15s.53 + 0s.0

10" = 250
5" = 125
15" = 375 yds
1s = 1125 ft.

Mchauc C. S. Report 1874 p. 182.

Cambridge W of Gr.. =	4^h	44^m	$30^s.98 \pm 0.04$
" E of Wash =		23^m	41.11 ± 0.03
			15.50
Bost. St. House =	4^h	44	15.48

Diff. Longitude &c –

Diff. Longitude &c.

1878. March 2d.o

d'.W.

The following are the results of the experience with the magnet for altering the error of Bond 3944.

1. A trace of residuary magnetism is shown by the fact that the tendency of the error the next day is in the direction in which the clock was corrected. This should be overcome by reversing the poles of the magnet shortly after altering the clock error.

2. The magnet, placed at a distance from the pend. rod causes a vibration of the pendulum. This should be overcome by placing the magnet centrally beneath the rod.

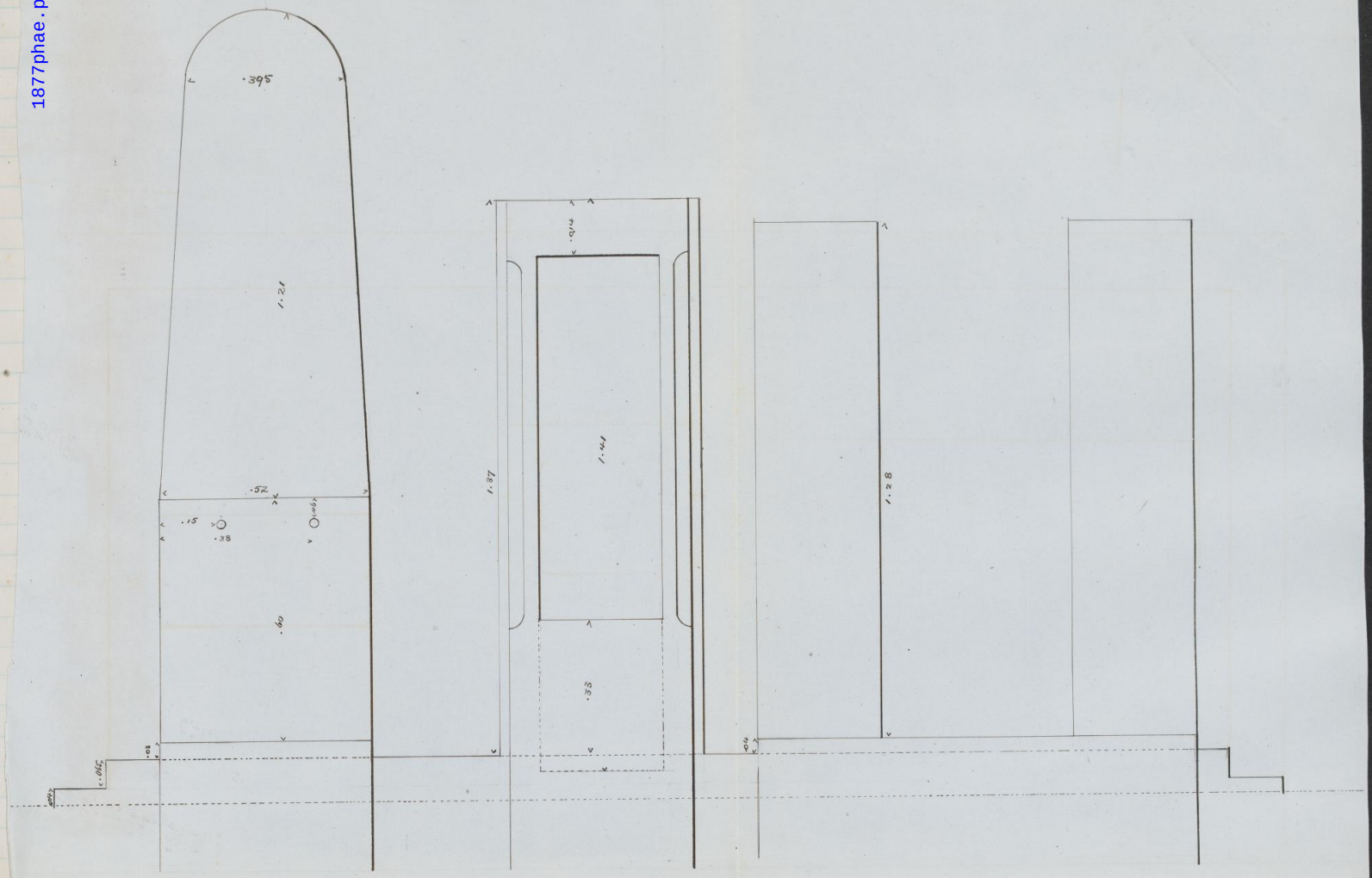
May 8 The Time Ball dropped for the first time on the top of the Equitable Life Assurance Company's building, Boston.

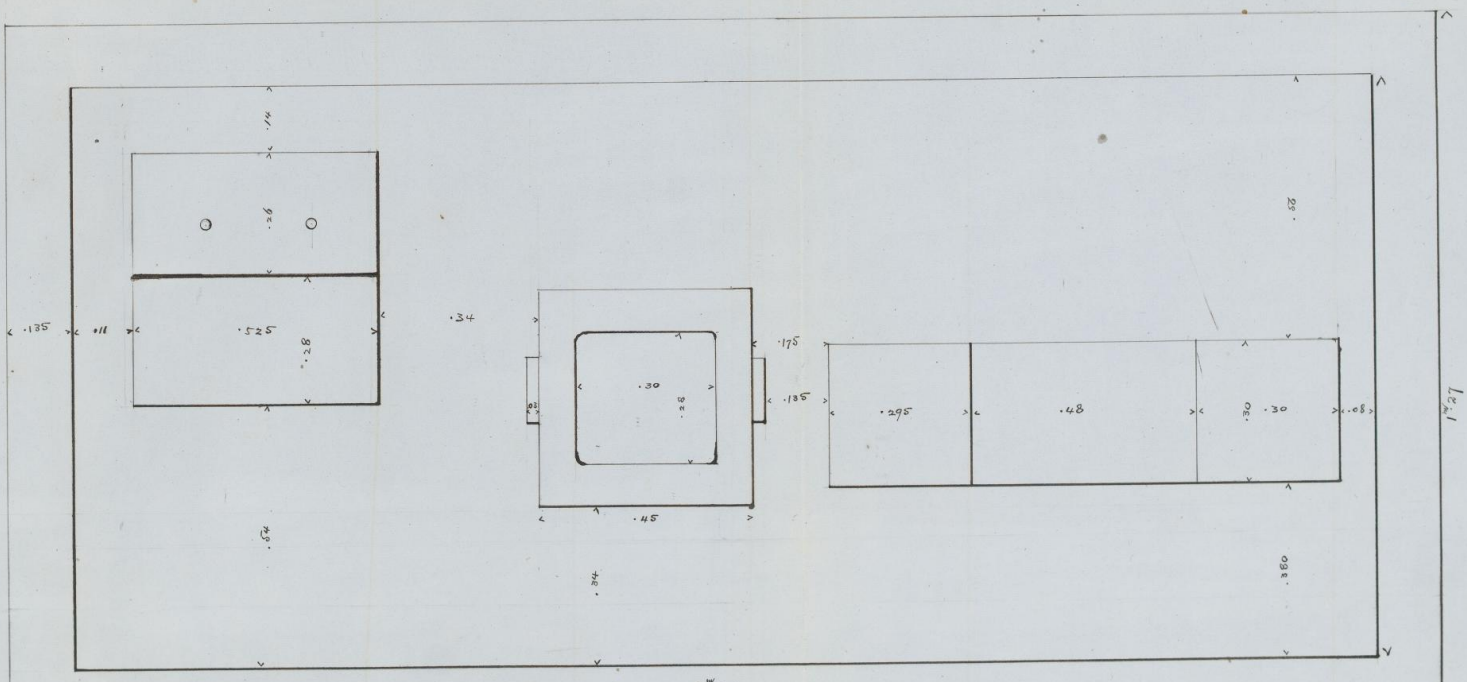
May 29. The Howard Clock 191 Put in its place in the Northern pier in the clock room.
(Sup. 220. N.C.O. Time Service Companions for 1878) in and the preliminary companions gave for the regulation of the clock on its rate

1 rev. of the ring above the bob upwards causes 191 to gain 0s.019 per hour.
14 div. of the grad. circle at bottom of pend. " " " "

Date 1877	max	min	mean	$CaCl_2$ Liquid removed	$CaCl_2$ Solid Replaced	Remarks.
~~Oct. 28. 87~~					800 grammes	
Oct 28.87	73.5	59.5		2300 grammes	800 grammes	1st white pride clover harebell pathos
Nov 4.87	75	68				
Nov. 8.87				50 fl.oz.	800 grammes	(Refl. 2 cups $CaCl_2$ in white, 1 cup in ea. yellow)
11.87	75	62			800 gr	
18.87					800 gr.	
25.87					800 gr.	
Dec 2.87					800 gr	
9.87	69.0	65.0			800 gr.	
1878						
March 1.9	73.0	55.0				76 days' interval. observ'n ill.
3.9				Changed $CaCl_2$		

The walls of the clock room are 6in thick, and filled with sand.
The top " " " " is " " " " " sawdust.
The inner door " " " is filled partly with sawdust, and the lower part with sand.
The piers rest on a clay formation, and are brought up to the surface without rigid contact with the formations. i.e. the space is filled with sand up to the ground level, and then a thin layer of cement connects the pier with the floor level.
The formations are of brick, laid solid, in cement.
Clock Bmd 312 has its top set in Plaster of Paris.





Scale 1:10.
Dimensions expressed in Metres.

For altering clock error.

Bond 394. H_2 or 1 $D_2 C_2$ $\begin{cases} B_3 A_3 & + \\ \text{or} & \\ B_1 A_1 & - \end{cases}$?

Howard H_2 or 1 $B_2 A_2$ $\begin{cases} D_3 C_3 & + \\ \text{or} & \\ D_1 C_1 & - \end{cases}$?

Transmission and Comparisons.

Bond 394 to register its beats on Relay I ~~~ E_1

" " " " " " I and S ~~~ F_1 and E_3

Howard " " " " " S ~~~ F_3

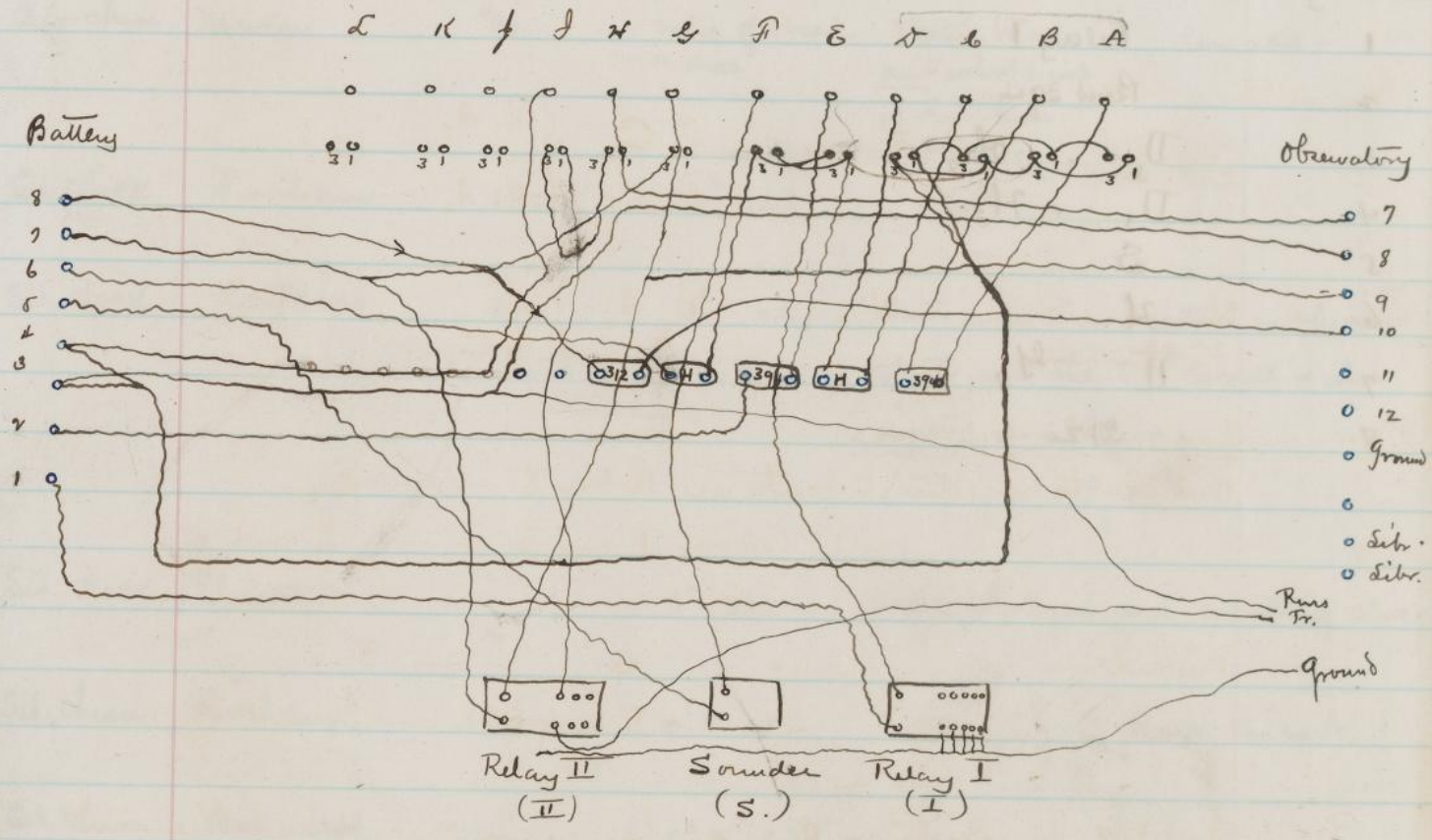
" " " " " " I and S ~~~ F_1 and E_3

Bond 312 to register on II and have main circuit go to the Observatory through O_9 O_{10} ~~~~~~~~~~~~~~ G_2 or 1

Bond 312 to omit II but go over O_9 O_{10} ~~ G_3

Bond 312 to Chron. in N. Transit Room – I_1

Battery over O_7 O_8 to E. Transit Room ~~~ H_3 D_2 or C_2 and B_2 or A_2



Sketch of Switch board and Connections in Working Cellar
March 26. 1877.

Battery Wires.	Destination.
1	Relay I
2	Bind 394.
3	D_3 . . Ob_8 .
4	D_1 . H_3 .
5	S.
6	H.
7	II G_3
8	312

Clocks and Chronometers in use at the Observatory.

Cl. or chron.	Maker	No.	value of 1 beat. on dial	Electric break omits what seconds on the chron. sheet.	Remarks.
Sid. clock	Fordham	1327	1^s s.t.	60th	
Sid. clock	Bond & Sons	312	1^s s.t.	Beats every 2^s as registered on chron. sheets and the 59th second is also inserted in addition.	
Sid. clock	Elicott		1^s s.t.	Used in the dome as a counting clock.	
Sid. chron.	Fordham	1327	$0^s.5$ s.t.	[59th ?]	Break circuit.
Sid. chron.	Bond & Sons	236	$0^s.5$ s.t.		
m.t. clock	Bond & Sons	394	$2^s.0$ m.t.	58th and every 5 minutes the beats usually sent between 44^s and 60^s exclusive.	
m.t. clock	Howard				Property of E. Howard & Co.
m.t. chron.	Johnson	1436	$0^s.4$ m.t.	(Private property of S.W. but sometimes used for comparisons and for Equatorial work.)	
Watch	Montandon	1263	$0^s.2$?	Counting watch, set to sid. or mt. as desired.	
Chron.	Barraud	151	$0^s.4$	Pocket chronometer presented by Mr Paine.	

Russian Transit Constants.

Constant.	Date of determination.	Authority.
Clear aperture = 2.in.77	2.in.77 1877. Feb. 10.	L. Waldo.
Magnifying power		
Eye piece No 1.	35.5 diameters, 1877 Feb 10.	L.W.
No 2.	67 " " "	L.W.
No 3.	99 " " "	L.W.

Value 1 div. Hanging level = 1".93 or 0s.129

Correction for inequality of pivots in half divisions of the level —
- Circle E. + 0.082
- " " + 0".079
- Circle W ∓ 0.082
- " " − 0".079

Value 1 rev. Microm. Screw = 92".862 or 6s.191

After setting the small auxiliary ~~screw~~ index of the Micrometer screw at 91.4 The corrections to be applied for the parts of a revolution from 0.00 to 1.00 are as follows:

Reading	Correction	Reading	Corr.	Reading	Corr.
.00	0.00	.35	−0.30	.70	−0.04
.05	.00	.40	−.37	.75	+0.02
.10	+.01	.45	−.41	.80	+0.04
.15	.00	.50	−.39	.85	+0.03
.20	−.04	.55	−.32	.90	+0.01
.25	−.11	.60	−.23	.95	.00
.30	−.20	.65	−.13	1.00	.00

Equatorial Interval fixed in glass. (See Merid. Circle Records 38)

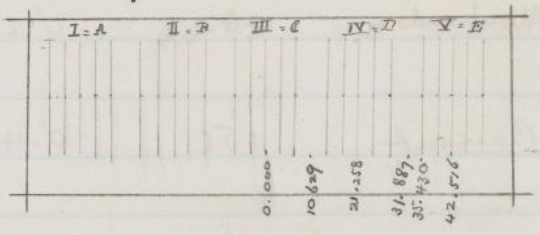
A_m to C_m = + 42s.516 — 1873. The Summer. — W. A. Rogers.

B_m to C_m = + 21.258

D_m to C_m = − 21.258 — Log = 1.32752

E_m to C_m = − 42.516

One thread interval = 3s.543.



1877

Memo. Oct. 22. W. A. R says the signals at 10 am showing the error of the clocks began at his suggestion