

IX. Experiments to determine the difference in the number of vibrations made by an Invariable Pendulum in the Royal Observatory at Greenwich, and in the house in London in which Captain KATER'S experiments were made. By Captain EDWARD SABINE of the Royal Artillery, Secretary to the Royal Society. Communicated by the President and Council.

Read December 11, 1828.

THESE experiments were made in compliance with a wish of the Council of the Royal Society, expressed in the following minute, dated December 13th 1827: "That Captain SABINE be requested to ascertain the difference in the number of vibrations of a pendulum between Mr. BROWNE'S house in London and the Royal Observatory at Greenwich."

The invariable pendulum employed to accomplish the proposed object was of the usual materials and form, new for the occasion, and numbered 12. The thermometer was the same that I had used in my former pendulum experiments; its graduation is described in the volume containing the account of those experiments, pages 182—187. The ball of the thermometer was suspended at both stations midway between the knife edge and the centre of the weight of the pendulum. The height of the barometer in the observations at Greenwich was taken by the standard barometer of the Observatory, which is in a room on the same floor as the pendulum room: in those at London it was taken by Mr. BROWNE'S barometer placed in the room in which the observations were made. Mr. BROWNE'S barometer being compared with the standard of the Greenwich observatory, by means of an intermediate portable barometer, was found to require a correction of + 0.066 to make it agree with the indications of the Greenwich standard corrected for capillary action. This correction is consequently applied.

The pendulum was first employed in experiments in Mr. BROWNE'S house from the 17th to the 20th of March inclusive: the rate of Mr. BROWNE'S clock

by CUMMING was furnished by himself. The observations are detailed in the Table A. at the close of the paper :—the following abstract exhibits the results :

London ; March 1828 ; Experiments with Pendulum 12.

	Barom.		Therm.		Vibrations at 62°.
March 17.	30.132	. . . . .	63.22	. . . . .	85963.85
17.	30.129	. . . . .	63.45	. . . . .	85963.61
18.	30.125	. . . . .	62.82	. . . . .	85963.52
18.	30.040	. . . . .	63.175	. . . . .	85963.60
19.	29.480	. . . . .	62.32	. . . . .	85963.56
19.	29.485	. . . . .	62.42	. . . . .	85963.55
20.	29.375	. . . . .	61.15	. . . . .	85963.55
20.	29.270	. . . . .	61.32	. . . . .	85963.55
	<u>29.975</u>	. . . . .	<u>62.5</u>	. . . . .	<u>85963.60</u>

The height of the barometer corrected to the standard and reduced to 32° is 29.952.

The mean result is 85963.60 vibrations in a mean solar day, the pendulum being at 62°, the air at 62°.5, the barometer 29.952 inches, and the mercury 32°.

To reduce this result to the number of vibrations which would have been made had the pendulum vibrated in a vacuum, I have introduced for the first time a reduction obtained by direct experiment ; namely, by vibrating the pendulum alternately in the air and in a rarefied medium very nearly approaching to a vacuum. The particulars of this experiment I hope shortly to communicate to the Royal Society ; and may state in the mean time as its result, that the barometer being at 30 inches, the mercury at 32°, and the air at 45°, a pendulum, similar in form and materials to the one used on the present occasion, made 10.36 vibrations per diem less than when vibrating in a vacuum.

To adapt this reduction to the variations which the meteorological instruments undergo in different experiments, it will be remembered, that the specific gravity of air varies directly as the height of the barometer, and inversely as its expansion of $\frac{1}{480}$ th part of its bulk for each degree of FAHRENHEIT.

The reduction in the present case, for barometer 29.952 inches, and thermometer 62°.5, is + 9.97 ; making 85973.57 vibrations at 62°.

In May the temperature in the room assigned by the Astronomer Royal for pendulum experiments, which is the western half of the quadrant room, having arrived nearly at the same height as during the experiments in London, a corresponding series was made at Greenwich on the 15th, 17th, 18th, and 19th of May, and 5th of June. The clock employed was one belonging to the observatory, made by GRAHAM, and was fixed against the south wall: its rate was supplied by Mr. THOMAS GLANVILLE TAYLOR, assistant at the Royal Observatory, by comparisons with the Greenwich transit clock, accomplished in the manner described in the memorandum B. annexed at the close of the paper. I am also indebted to Mr. TAYLOR for his zealous cooperation in these and the subsequent experiments at Greenwich: the observations made by him are distinguished by his name in Tables C. and F: the abstract of the results in Table C. is as follows:

Greenwich; May and June 1828; Experiments with Pendulum 12.

	Barom.		Therm.		Vibrations at 62°.
May 15.	29.765		60.07		85964.31
15.	29.755		61.15		85964.52
17.	29.705		59.70		85963.91
17.	29.715		60.68		85964.14
17.	29.700		61.32		85964.10
18.	29.695		59.28		85963.91
18.	29.715		60.05		85963.85
18.	29.705		59.77		85963.80
19.	29.710		57.85		85963.90
19.	29.710		58.70		85963.90
19.	29.700		59.00		85964.04
June 5.	29.335		54.92		85964.71
5.	29.360		55.75		85964.64
5.	29.385		56.65		85964.70
	<u>29.639</u>		<u>58.92</u>		<u>85964.17</u>

The height of the barometer, reduced to 32°, and corrected for capillary action, +0.019, (being the amount assigned by Mr. DANIELL for capillary depression in a boiled tube of 0.26 inch. diameter,) is 29.580.

The mean result is 85964.17 vibrations in a mean solar day, the pendulum

being at 62° , the air at $58^\circ.92$, the barometer at 29.580, and the mercury 32° . The reduction to a vacuum is + 9.92, making 85974.09 vibrations in a vacuum at 62° .

We have thus the vibrations of this pendulum at London and at Greenwich as follows.

London	85973.57
Greenwich.	85974.09

Difference	0.52

Showing an acceleration at Greenwich of 0.52 parts of a vibration per diem.

Now as the latitude of the Royal Observatory is $2' 28''$ south of Mr. BROWNÉ'S house in London, and as its height above the sea is also about 50 feet more, a retardation from these causes combined of about 0.3 of a vibration per diem was to have been expected at Greenwich, instead of an acceleration of 0.52 of a vibration. The result appeared therefore sufficiently remarkable to make it desirable to verify it by repetition.

The pendulum having remained at Greenwich a few days after the experiments were completed, the knife edge became slightly corroded with rust, in consequence of the great damp which prevails in the observatory at that season. The knife edge having been ground and figured afresh, the pendulum was again conveyed to Portland Place, and the experiments (Appendix D.) made with it on the 8th and 9th of July, the thermometer employed being the same as before, and suspended in a similar manner: the results were as follows.

London July 1828; Experiments with Pendulum 12.

	Barom.	Therm.	
July 8. Mean of 7 exp.	29.670	72.07	85955.42 vibrations at 72° .
July 9. Mean of 7 exp.	29.490	71.73	85955.40 vibrations at 72° .
	_____	_____	_____
	29.580	71.9	85955.41 vibrations at 72° .

The height of the barometer corrected to the standard and reduced to 32° is 29.533 inches.

The mean result being that the pendulum, having had its knife edge ground and figured afresh, made 85955.41 vibrations at 72° , equivalent to 85959.71

vibrations at 62°, the temperature of the air being 71°·9, the barometer 29.533, and the mercury 32°. The reduction to a vacuum is + 9.63, making 85969.34 vibrations at 62°.

The second series at Greenwich was commenced on the 21st of July, and continued to the 26th, both days included. The clock and thermometer employed were the same as on the former occasion; the rate of the clock was supplied by Mr. THOMAS GLANVILLE TAYLOR, by comparison with the transit clock of the observatory, as shown in the memorandum E. The experiments are given at length in the Table F, and their results collected in one view are as follows.

Greenwich, July 1828; Experiments with Pendulum 12.

	Barom.		Therm.		Vibrations at 62°.
July 21.	29.375	. . . . .	61.49	. . . . .	85960.16
22.	29.465	. . . . .	60.17	. . . . .	85959.70
23.	29.590	. . . . .	61.45	. . . . .	85959.89
24.	29.525	. . . . .	61.93	. . . . .	85959.82
25.	29.475	. . . . .	62.24	. . . . .	85960.04
26.	29.640	. . . . .	61.63	. . . . .	85960.15
	<u>29.512</u>	. . . . .	<u>61.5</u>	. . . . .	<u>85959.96</u>

The height of the barometer corrected for capillary action and reduced to 32° is 29.446.

The mean result is 85959.96 vibrations in a mean solar day at 62°; the temperature of the air being 61.5, the barometer 29.446, and the mercury 32°. The reduction to a vacuum is + 9.82, making 85969.78 vibrations at 62°.

We have thus a second series of the vibrations of Pendulum 12 at London and Greenwich, after its knife edge had been ground and figured afresh, as follows.

London.	85969.34
Greenwich.	85969.78
	<u>0.44</u>

Showing an acceleration at Greenwich of 0.44 of a vibration per diem. The former result was an acceleration of 0.52 of a vibration per diem. We may therefore assume finally, 0.48 of a vibration per diem as the difference in

the rate of an invariable pendulum between the Royal Observatory and Mr. BROWNE'S house in London ; the pendulum vibrating quicker in Greenwich than in London.

The retardation computed for the difference in latitude between the two stations is 0.15 of a vibration per diem, and for their difference in elevation being about 50 feet and employing Dr. YOUNG'S co-efficient of .6, is 0.12 of a vibration per diem. The sum of the two computed retardations is 0.27 ; which added to the acceleration 0.48 shown by the experiments, makes altogether 0.75 of a vibration per diem ; by which amount the result of experiment differs from what would have been anticipated, supposing that no previous experience had existed of the occurrence of such anomalies.

With regard to the fact, of the existence of this irregularity between Greenwich and London, it is one which admits of easy verification by persons who may be disposed to repeat the experiments : the stations are convenient and close at home ; and the magnitude of the irregularity is such as to preclude uncertainty, since with proper precautions, it is not difficult to determine the relative rates of an invariable pendulum to nearly $\frac{1}{7}$ th of the present irregularity.

With regard to its cause,—having already expressed the opinion that I had been led to form on the occurrence in my former pendulum experiments, of what I believe to have been irregularities of a similar nature,—it is unnecessary now to repeat that opinion ; and having since seen no occasion to alter it, on the contrary much to confirm it, I gladly leave the discussion to others whose opinions are entitled to more weight.

TABLE A.

Vibrations of Pendulum 12 in London, March 1828.

Memorandum of the rate of Mr. BROWNE's clock by CUMMING, from the 10th to the 24th of March: received from Mr. BROWNE.

March 10.	CUMMING fast 4.05	losing ^s 0.1 per diem.
11.	_____ 3.95	losing ^s 0.19 per diem.
13.	_____ 3.57	gaining 0.07 per diem.
14.	_____ 3.64	keeping Mean Time.
18.	_____ 3.63	keeping Mean Time.
19.	_____ 3.63	gaining ^s 0.07 per diem.
24.	_____ 4.01	

EXP. 1. March 17th 1828. Clock making 86400 Vibrations in a Mean Solar Day.											
Barom. { beginning 30.135 } 30.132 { ending 30.130 }											
Therm.	No. of Coincid.	Times of						Arc and Correction.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.
		Disapp.	Re-app.	Coincidence.							
		m s	m s	h m s	h m s	h m s					
62.9	1	50 55	50 58	10 50 56.5	} h m s 10 57 31.0	} 1.16	} + 0.99	} 394.83	} + 0.52	} 85963.85	
	2	57 29	57 33	10 57 31.0							
63.0	3	04 02	04 06	11 04 04.0							
63.5	25	28 48	28 55	1 28 51.5	} 1 35 26.5	} 0.45					
	26	35 24	35 29	1 35 26.5							
63.5	27	41 59	42 04	1 42 01.5							

EXP. 2. Fresh impulse given. Barom. { 30.130 } 30.129 { 30.128 }											
Therm.	No. of Coincid.	Times of						Arc and Correction.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.
		Disapp.	Re-app.	Coincidence.							
		m s	m s	h m s	h m s	h m s					
63.5	1	48 48	48 50	1 48 49.0	} h m s 1 55 22.0	} 1.28	} + 1.19	} 394.36	} + 0.62	} 85963.61	
	2	55 21	55 23	1 55 22.0							
63.5	3	01 54	01 56	2 01 55.0							
63.4	25	26 29	26 35	4 26 32.0	} 4 33 06.7	} 0.49					
	26	33 04	33 09	4 33 06.5							
63.4	27	39 38	39 45	4 39 41.5							

The reduction to a mean temperature of 62° is throughout computed in the proportion of 0.43 parts of a vibration per diem for each degree of FAHRENHEIT.

Exp. 3. March 18th. Clock making 86400 Vibrations. Barom. $\left\{ \begin{matrix} 30.15 \\ 30.10 \end{matrix} \right\}$ 30.125

Therm.	No. of Coincid.	Times of						Arc and Correction.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.
		Disapp.	Re-app.	Coincidence.							
		m s	m s	h m s	h m s	h m s					
62.6	1	12 09	12 11	11 12 10.0	} h m s 11 18 43.17	} 1.22	} +1.17	} 394.51	} +0.35	} 85963.52	
	2	18 42	18 44	11 18 43.0							
62.8	3	25 15	25 18	11 25 16.5							
62.9	22	30 11	30 15	1 30 13.0	} 1 36 48.00	} 0.52					
	23	36 45	36 51	1 36 48.0							
63.0	24	43 22	43 24	1 43 23.0							

Exp. 4. Fresh impulse given. Barom. $\left\{ \begin{matrix} 30.08 \\ 30.00 \end{matrix} \right\}$ 30.04

Therm.	No. of Coincid.	Times of						Arc and Correction.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.
		Disapp.	Re-app.	Coincidence.							
		m s	m s	h m s	h m s	h m s					
63.2	1	13 05	13 07	2 13 06.0	} h m s 2 19 39.17	} 1.04	} +0.83	} 394.77	} +0.49	} 85963.60	
	2	19 38	19 40	2 19 39.0							
63.4	3	26 11	26 14	2 26 12.5							
63.0	23	37 45	37 53	4 37 49.0	} 4 44 24.17	} 0.43					
	24	44 21	44 28	4 44 24.5							
63.1	25	50 55	51 03	4 50 59.0							

Exp. 5. March 19th. Clock making 86400.07 Vibrations. Barom. $\left\{ \begin{matrix} 29.48 \\ 29.48 \end{matrix} \right\}$ 29.48

Therm.	No. of Coincid.	Times of						Arc and Correction.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.
		Disapp.	Re-app.	Coincidence.							
		m s	m s	h m s	h m s	h m s					
62.1	1	04 05	04 07	11 04 06.0	} h m s 11 10 39.33	} 1.05	} +0.91	} 394.92	} +0.14	} 85963.56	
	2	10 37	10 41	11 10 39.0							
62.2	3	17 11	17 15	11 17 13.0							
62.5	21	15 40	15 45	1 15 42.5	} 1 22 17.83	} 0.48					
	22	22 16	22 21	1 22 18.5							
62.5	23	28 50	28 55	1 28 52.5							

Exp. 6. Fresh impulse given. Barom. $\left\{ \begin{matrix} 29.48 \\ 29.49 \end{matrix} \right\}$ 29.485

Therm.	No. of Coincid.	Times of						Arc and Correction.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.
		Disapp.	Re-app.	Coincidence.							
		m s	m s	h m s	h m s	h m s					
62.5	1	35 27	35 28	1 35 27.5	} h m s 1 42 00.83	} 1.20	} +0.94	} 394.84	} +0.18	} 85963.55	
	2	41 59	42 02	1 42 00.5							
62.6	3	48 33	48 36	1 48 34.5							
62.3	30	46 12	46 19	4 46 15.5	} 4 52 51.33	} 0.39					
	31	52 48	52 55	4 52 51.5							
62.3	32	59 22	59 32	4 59 27.0							

Exp. 7. March 20th. Clock making 86400.07 Vibrations. Barom. $\left\{ \begin{matrix} 29.42 \\ 29.33 \end{matrix} \right\}$ 29.375										
Therm.	No. of Coincid.	Times of					Arc and Correction.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.
		Disapp.	Re-app.	Coincidence.						
		m s	m s	h m s	h m s	h m s				
60.7	1	39 59	40 02	9 40 00.5	9 46 34.83	0.11	} +0.87	s 395.42	s -0.36	85963.55
....	2	46 34	46 36	9 46 35.0						
60.9	3	53 07	53 11	9 53 09.0						
61.5	27	31 17	31 24	12 31 20.5						
....	28	37 52	37 59	12 37 55.5	12 37 55.83	0.40				
61.5	29	44 28	44 35	12 44 31.5						

Exp. 8. Fresh impulse given. Barom. $\left\{ \begin{matrix} 29.33 \\ 29.21 \end{matrix} \right\}$ 29.27										
Therm.	No. of Coincid.	Times of					Arc and Correction.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.
		Disapp.	Re-app.	Coincidence.						
		m s	m s	h m s	h m s	h m s				
61.5	1	50 55	50 56	12 50 55.5	12 57 29.12	0.12	} +0.75	s 395.46	s -0.28	85963.55
....	2	57 29	57 30	12 57 29.5						
61.5	3	04 01	04 04	1 04 02.5						
61.1	34	28 19	28 27	4 28 23.0						
....	35	34 54	35 05	4 34 59.5	4 34 59.33	0.32				
61.2	36	41 30	41 41	4 41 35.5						

TABLE B.

Determination of the rate of the clock by GRAHAM at the Royal Observatory Greenwich, from the 15th to the 20th of May inclusive, and from the 4th to the 6th of June inclusive: by Mr. TAYLOR.

“The comparison of the clock with the Greenwich transit clock was effected by means of a machine constructed by HARDY for the purpose, it being capable of indicating 0^h.05 in time; and from the mean of 5 comparisons which was always employed, it is hoped the comparisons never err 0.03 from the truth; these comparisons were made at or near the time the observations were making for the rate of the transit clock, on the accurate determination of which must rest the accuracy of the rate of the clock used in the experiment.

For the rate of the transit clock the following observations have been selected from the Greenwich Observations.

1828.	Observed <i>R.</i>			Apparent <i>R.</i>			Error of Clock.	Means.	Rate in 24 hours.	
	h	m	s	h	m	s				
May 15.	Castor	7	24	8.57	7	23	37.76	+30.81	} at 7 ^h 29 ^m +30 ^s .72	
	Procyon	7	30	49.34	7	30	18.68	30.66		
	Pollux	7	35	18.54	7	34	47.85	30.69		
17.	Sirius	6	38	4.06	6	37	34.41	+29.65	} at 7 ^h 17 ^m +29 ^s .57	-0.58
	Castor	7	24	7.34	7	23	37.74	29.60		
	Procyon	7	30	48.06	7	30	18.66	29.40		
	Pollux	7	35	17.44	7	34	47.83	29.61		
18.	Castor	7	24	6.80	7	23	37.73	+29.07	} at 7 ^h 29 ^m +29 ^s .03	-0.53
	Procyon	7	30	47.64	7	30	18.65	28.99		
	Pollux	7	35	16.84	7	34	47.82	29.02		
19.	Castor	7	24	6.44	7	23	37.72	+28.72	} at 7 ^h 29 ^m +28 ^s .75	-0.28
	Procyon	7	30	47.33	7	30	18.64	28.69		
	Pollux	7	35	16.64	7	34	47.81	28.83		
18.	γ	19	38	36.68	19	38	7.36	+29.32	} at 19 ^h 43 ^m +29 ^s .35	
	α	19	42	55.22	19	42	25.85	29.37		
	β	19	47	23.62	19	46	54.27	29.35		
19.	γ	19	38	35.96	19	38	7.38	+28.58	} at 19 ^h 43 ^m +28 ^s .73	-0.62
	α	19	42	54.52	19	42	25.88	28.64		
	β	19	47	22.98	19	46	54.30	28.68		

In addition to these, we have the following observations of the Sun.

1828. May	Observed <i>R.</i>			Apparent <i>R.</i>			Error of Clock.	Rate in 24 hours.
	h	m	s	h	m	s		
14.	3	25	22.93	3	24	51.10	+31.83	s
16.	3	33	15.85	3	32	45.20	30.65	-0.59
18.	3	41	11.00	3	40	41.50	29.50	-0.57
19.	3	45	9.76	3	44	40.40	29.36	-0.14
20.	3	49	8.59	3	48	39.90	38.69	-0.67

Collecting the results in the two preceding tables, we have,

May.	15 to 16	16 to 17	17 to 18	18 to 19	19 to 20	
	-0.58	-0.58	... ..	... ..	... ..	By Castor, Procyon, and Pollux.
	... ..	... ..	-0.53	... ..	... ..	By Sirius, Castor, Procyon, and Pollux.
	... ..	... ..	... ..	-0.28	... ..	By Castor, Procyon, and Pollux.
	... ..	... ..	... ..	-0.62	... ..	By γ , α , and β Aquilæ.
	-0.59	-0.57	-0.57	-0.14	-0.67	By the Sun.
Means	-0.58	-0.57	-0.55	-0.35	-0.67	

The ill accordance of the rates on the 18th—19th and 19th—20th, arises in a great measure from an indifferent observation of the sun on the 19th; and further it appears, that about this time the transit instrument was very unsteady, requiring adjustment both with regard to the meridian mark and level. These circumstances, combined with the steady going of the clock before and since this period, seem to justify the taking -0.54 as a mean rate for the whole time; which has been accordingly employed with the following comparisons in the determination of the rate of the clock used in the experiments.

1828.	Time by Clock.			Time by Transit Clock.			Sidereal Interval.			Mean Interval.			Clock rate in 24 hours.
	h	m	s	h	m	s	h	m	s	h	m	s	
May 15.	23	15	0	4	18	35.85	24	23	52.85	24	19	53.58	+6.34
16.	23	35	0	4	42	28.70							
17.	0	31	30	5	42	57.78	25	0	29.08	24	56	23.82	+5.93
18.	1	44	30	6	59	59.51							
19.	1	55	30	7	14	51.20	24	14	51.69	24	10	53.89	+6.05
18.	19	34	0	0	52	20.31							
19.	8	17	0	13	37	22.10	12	45	1.79	12	42	56.75	+6.12

For the subsequent part of the experiments, the following transits have been selected from the Greenwich Observations.

1828.	Observed R.			Apparent R.			Error of Clock.	Means.	Rate in 24 hours.
	h	m	s	h	m	s			
June 4. Regulus . .	9	59	35.40	9	59	13.74	+21.66	} at 13 ^h 22 ^m +21 ^s .60	
β Leonis . .	11	40	40.46	11	40	18.82	+21.64		
Spica Virg. . .	13	16	33.10	13	16	11.29	+21.81		
η Urs. Maj. . .	13	41	8.92	13	40	47.35	+21.57		
ε Bootis . .	14	37	52.47	14	37	31.08	+21.39		
β Urs. Min. . .	14	51	42.00	14	51	20.42	+21.58		
α Cor. Bor. . .	15	27	48.80	15	27	27.23	+21.57	} at 11 ^h 53 ^m +21 ^s .21	-0.42
June 5. Regulus . .	9	59	34.96	9	59	13.73	+21.23		
α Urs. Maj. . .	10	53	24.47	10	53	3.33	+21.14		
2 α Libræ . .	14	41	47.23	14	41	25.96	+21.27	} at 14 ^h 30 ^m +20 ^s .28	-0.45
June 7. Arcturus . .	14	8	11.80	14	7	51.68	+20.12		
1 } α Libræ . . .	14	41	34.88	14	41	14.50	+20.38		
2 }	14	41	46.30	14	41	25.96	+20.34		

Using these rates of the transit clock with the following comparisons of the experimental clock, we get its rate.

June 4.	Time by Clock.			Time by Transit Clock.			Sidereal Interval.			Interval of Mean Time.			Clock rate in 24 hours.
	h	m	s	h	m	s	h	m	s	h	m	s	
	20	17	0	2	36	48.74	24	39	55.70	=24	35	53.68	+6.15
5.	20	53	0	3	16	44.44							
6.	23	08	0	5	27	54.65	26	11	10.21	=26	6	53.31	+6.16

TABLE C. Vibration of Pendulum 12 at Greenwich, May and June 1828.

Exp. 1. May 15th, 1828. Clock making 86406.34 Vibrations in a Mean Solar Day.											
Barom. $\left\{ \begin{matrix} 29.77 \\ 29.76 \end{matrix} \right\}$ 29.765. Observer, Mr. T. G. TAYLOR.											
Therm.	No. of Coincid.	Times of						Arc and Correction.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.
		Disapp.	Re-app.	Coincidence.							
°		m s	m s	h m s	h m s	h m s	h m s				
59.4	1	6 07	6 09	9 6 08.0	} h m s	9 12 38	} 0.96	} + 0.76	} 391.02	} - 0.83	85964.31
59.6	2	12 37	12 39	9 12 38.0							
59.7	3	19 07	19 09	9 19 08.0	} 11 22 58.5	} 0.45	} + 0.76	} 391.02	} - 0.83		
60.4	21	16 21	16 34	11 16 27.5							
60.6	22	22 52	23 05	11 22 58.5	} 11 22 58.5	} 0.45	} + 0.76	} 391.02	} - 0.83		
60.7	23	29 23	29 36	11 29 29.5							

Exp. 2. Fresh impulse given. Barom. $\left\{ \begin{matrix} 29.76 \\ 29.75 \end{matrix} \right\}$ 29.755. Observer, Mr. T. G. TAYLOR.											
Therm.	No. of Coincid.	Times of						Arc and Correction.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.
		Disapp.	Re-app.	Coincidence.							
°		m s	m s	h m s	h m s	h m s	h m s				
61.2	1	49 03	49 05	11 49 04.0	} h m s	11 55 34.33	} 0.94	} + 0.74	} 390.81	} - 0.36	85964.52
61.3	2	55 33	55 36	11 55 34.5							
61.4	3	02 03	02 06	12 02 04.5	} 2 05 50.5	} 0.44	} + 0.74	} 390.81	} - 0.36		
60.8	21	59 14	59 25	1 59 19.5							
61.0	22	05 45	05 57	2 05 51.0	} 2 05 50.5	} 0.44	} + 0.74	} 390.81	} - 0.36		
61.2	23	12 15	12 27	2 12 21.0							

Exp. 3. May 17th. Clock making 86405.93 Vibrations. Barom. $\left\{ \begin{matrix} 29.70 \\ 29.71 \end{matrix} \right\}$ 29.705. Observer, Mr. T. G. TAYLOR.											
Therm.	No. of Coincid.	Times of						Arc and Correction.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.
		Disapp.	Re-app.	Coincidence.							
°		m s	m s	h m s	h m s	h m s	h m s				
59.2	1	29 42	29 43	18 29 42.5	} h m s	18 36 13.67	} 0.94	} + 0.74	} 391.175	} - 0.99	85963.91
59.4	2	36 13	36 15	18 36 14.0							
59.5	3	42 43	42 46	18 42 44.5	} 20 46 37.17	} 0.44	} + 0.74	} 391.175	} - 0.99		
60.0	21	40 00	40 12	20 40 06.0							
60.0	22	46 31	46 43	20 46 37.0	} 20 46 37.17	} 0.44	} + 0.74	} 391.175	} - 0.99		
60.1	23	53 02	53 15	20 53 08.5							

Exp. 4. Fresh impulse given. Barom. $\left\{ \begin{matrix} 29.72 \\ 29.71 \end{matrix} \right\}$ 29.715. Observers: 1—3 Mr. T. G. TAYLOR: 21—23 Captain SABINE.											
Therm.	No. of Coincid.	Times of						Arc and Correction.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.
		Disapp.	Re-app.	Coincidence.							
°		m s	m s	h m s	h m s	h m s	h m s				
60.2	1	8 59	9 00	21 08 59.5	} h m s	21 15 30.17	} 0.95	} + 0.74	} 391.017	} - 0.56	85964.14
60.3	2	15 29	15 31	21 15 30.0							
60.5	3	21 59	22 03	21 22 01.0	} 23 25 50.5	} 0.43	} + 0.74	} 391.017	} - 0.56		
61.0	21	19 14	19 24	23 19 19.0							
61.0	22	25 44	25 57	23 25 50.5	} 23 25 50.5	} 0.43	} + 0.74	} 391.017	} - 0.56		
61.1	23	32 16	32 28	23 32 22.0							

Exp. 5. Fresh impulse given. Clock making 86405.91 Vibrations. Barom. $\left\{ \begin{matrix} 29.70 \\ 29.70 \end{matrix} \right\}$ 29.70.
Observer, Captain SABINE.

Therm.	No. of Coincid.	Times of						Arc and Correction.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.	
		Disapp.		Re-app.		Coincidence.						
		m	s	m	s	h	m	s				
61.1	1	38	51	38	53	23	38	52.0	0.92 } + 0.68 } 0.42 }	390.79	-0.29	85964.10
61.2	2	45	21	45	24	23	45	22.5				
61.2	3	51	51	51	54	23	51	52.5				
61.4	21	49	01	49	14	01	49	07.5				
61.5	22	55	32	55	44	01	55	38.0				
61.5	23	02	03	02	15	02	02	09.0				

Exp. 6. May 18th. Clock making 86405.91 Vibrations. Barom. $\left\{ \begin{matrix} 29.69 \\ 29.70 \end{matrix} \right\}$ 29.695.
Observer, Mr. T. G. TAYLOR.

Therm.	No. of Coincid.	Times of						Arc and Correction.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.	
		Disapp.		Re-app.		Coincidence.						
		m	s	m	s	h	m	s				
59.0	1	55	28	55	29	18	55	28.5	0.95 } + 0.75 } 0.44 }	391.258	-1.16	85963.91
59.1	2	01	58	02	00	19	01	59.33				
59.3	3	08	30	08	31	19	08	30.5				
59.4	21	05	48	06	00	21	05	54.0				
59.4	22	12	18	12	31	21	12	24.5				
59.5	23	18	49	19	01	21	18	55.0				

Exp. 7. Fresh impulse given. Clock making 86406.05 Vibrations. Barom. $\left\{ \begin{matrix} 29.72 \\ 29.71 \end{matrix} \right\}$ 29.715.
Observer, Mr. T. G. TAYLOR.

Therm.	No. of Coincid.	Times of						Arc and Correction.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.	
		Disapp.		Re-app.		Coincidence.						
		m	s	m	s	h	m	s				
59.9	1	30	07	30	09	0	30	08.0	0.95 } + 0.75 } 0.44 }	390.90	-0.84	85963.85
60.1	2	36	37	36	39	0	36	38.0				
60.2	3	43	08	43	11	0	43	09.5				
59.9	21	40	19	40	31	2	40	25.0				
60.1	22	46	51	47	02	2	46	56.5				
60.1	23	53	22	53	34	2	53	28.0				

Exp. 8. Fresh impulse given. Barom. $\left\{ \begin{matrix} 29.71 \\ 29.70 \end{matrix} \right\}$ 29.705. Observer, Mr. T. G. TAYLOR.

Therm.	No. of Coincid.	Times of						Arc and Correction.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.	
		Disapp.		Re-app.		Coincidence.						
		m	s	m	s	h	m	s				
60.3	1	00	48	00	49	3	00	48.5	0.92 } + 0.68 } 0.42 }	391.033	-0.96	85963.80
60.3	2	07	18	07	20	3	07	19.0				
60.4	3	13	48	13	50	3	13	49.0				
59.2	21	11	02	11	14	5	11	08.0				
59.2	22	17	34	17	45	5	17	39.5				
59.2	23	24	05	24	17	5	24	11.0				

Exp. 9. May 19th. Clock making 86406.12 Vibrations. Barom. $\left\{ \begin{matrix} 29.70 \\ 29.72 \end{matrix} \right\}$ 29.71.
Observer, Mr. T. G. TAYLOR.

Therm.	No. of Coincid.	Times of						Arc and Corrections.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.
		Disapp.		Re-app.		Coincidence.					
57.2	1	m s	m s	h m s	} h m s 19 21 21.17 } 0.94 } +0.74 } 0.44 }			s 391.708	s -1.78	85963.90	
57.3	2	14 49	14 51	19 14 50.0							
57.4	3	21 20	21 22	19 21 21.0							
58.3	21	27 51	27 54	19 27 52.5							
58.4	22	21 25 18	25 30	21 25 24.0							
58.5	23	31 50	32 01	21 31 55.5	} 21 31 55.33						
		38 20	38 33	21 38 26.5	} 21 38 26.5						

Exp. 10. Fresh impulse given. Barom. $\left\{ \begin{matrix} 29.72 \\ 29.70 \end{matrix} \right\}$ 29.71. Observer, Mr. T. G. TAYLOR.

Therm.	No. of Coincid.	Times of						Arc and Corrections.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.
		Disapp.		Re-app.		Coincidence.					
58.5	1	m s	m s	h m s	} h m s 22 04 32.83 } 0.96 } +0.76 } 0.44 }			s 391.35	s -1.42	85963.90	
58.6	2	58 01	58 03	21 58 02.0							
58.8	3	04 32	04 34	22 04 33.0							
58.7	21	11 02	11 05	22 11 03.5							
58.8	22	8 22	8 34	0 8 28.0							
58.8	22	14 55	15 06	0 15 00.5	} 0 14 59.83						
58.8	23	21 25	21 37	0 21 31.0	} 0 21 31.0						

Exp. 11. Fresh impulse given. Barom. $\left\{ \begin{matrix} 29.70 \\ 29.70 \end{matrix} \right\}$ 29.70.
Observer, Captain SABINE.

Therm.	No. of Coincid.	Times of						Arc and Corrections.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.
		Disapp.		Re-app.		Coincidence.					
59.0	1	m s	m s	h m s	} h m s 1 00 10.83 } 0.97 } +0.77 } 0.44 }			s 391.35	s -1.29	85964.04	
	2	53 40	53 41	0 53 40.5							
	3	00 10	00 12	1 00 11.0							
59.0	21	06 40	06 42	1 06 41.0							
	22	04 01	04 11	3 04 06.0							
	22	10 31	10 44	3 10 37.5	} 3 10 37.83						
	23	17 03	17 17	3 17 10.0	} 3 17 10.0						

Exp. 12. June 5th. Clock making 86406.16 Vibrations. Barom. $\left\{ \begin{matrix} 29.32 \\ 29.35 \end{matrix} \right\}$ 29.335.
Observer, Mr. T. G. TAYLOR.

Therm.	No. of Coincid.	Times of						Arc and Correction.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.
		Disapp.		Re-app.		Coincidence.					
54.2	1	m s	m s	h m s	} h m s 21 15 28.67 } 0.95 } +0.75 } 0.44 }			s 393.5	s -3.04	85964.71	
54.3	2	08 54	08 56	21 08 55.0							
54.5	3	15 28	15 30	21 15 29.0							
55.5	21	22 01	22 03	21 22 02.0							
55.5	22	19 58	20 12	23 20 05.0							
55.5	22	26 32	26 46	23 26 39.0	} 23 26 38.67						
55.5	23	33 05	33 19	23 33 12.0	} 23 33 12.0						

Exp. 13. Fresh impulse given. Barom. $\left\{ \begin{smallmatrix} 29.35 \\ 29.37 \end{smallmatrix} \right\}$ 29.36. Observer, Mr. T. G. TAYLOR.														
Therm.	No. of Coincid.	Times of						Arc and Correction.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.			
		Disapp.		Re-app.		Coincidence.								
		m	s	m	s	h	m	s						
55.5	1	39	25	39	26	23	39	25.5	0.95	s	393.17	s	-2.69	85964.64
55.5	2	45	58	46	00	23	45	59.0							} +0.74	s	393.17	s	-2.69
55.5	3	52	30	52	32	23	52	31.0	} 0.43	s	393.17	s	-2.69	
55.9	21	50	23	50	34	1	50	28.5							} 1 57 02.0	s	393.17	s	-2.69
55.9	22	56	56	57	08	1	57	02.0	} 0.43	s	393.17	s	-2.69	
56.2	23	03	30	03	41	2	03	35.5						

Exp. 14. Fresh impulse given. Barom. $\left\{ \begin{smallmatrix} 29.38 \\ 29.39 \end{smallmatrix} \right\}$ 29.385. Observer, Mr. T. G. TAYLOR.														
Therm.	No. of Coincid.	Times of						Arc and Correction.	Mean Interval.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day.			
		Disapp.		Re-app.		Coincidence.								
		m	s	m	s	h	m	s						
56.7	1	10	12	10	13	2	10	12.5	0.94	s	392.87	s	-2.30	85964.70
56.9	2	16	43	16	45	2	16	44.0							} +0.72	s	392.87	s	-2.30
56.8	3	23	16	23	18	2	23	17.0	} 0.43	s	392.87	s	-2.30	
56.4	21	21	03	21	14	4	21	08.5							} 4 27 41.83	s	392.87	s	-2.30
56.5	22	27	36	27	47	4	27	41.5	} 0.43	s	392.87	s	-2.30	
56.6	23	34	10	34	21	4	34	15.5						

TABLE D.—London, July 1828. Experiments with Pendulum 12.

July 8th. Clock making 86400 Vibrations in a Mean Solar Day. Barom. $\left\{ \begin{smallmatrix} 29.68 \\ 29.66 \end{smallmatrix} \right\}$ 29.67																
No. of Coincid.	Temp.	Times of						Arc of Vibration.	Mean Interval.	Correction for Arc.	Reduct. to 72°.	Corrected Vibrations in a Mean Solar Day at 72°.				
		Disapp.		Re-app.		Coincidence.										
		m	s	m	s	h	m	s								
1	71.7	43	29	43	33	9	43	31.0	1.115	s	387.45	s	+1.44	s	-0.13	85955.31
6	71.7	15	44	15	49	10	15	47.5	0.915								} 388.25	+0.68	-0.11	85955.49
11	71.7	48	02	48	09	10	48	05.5	0.775	} 388.40	+0.33	-0.04	85955.39			
16	71.7	20	23	20	30	11	20	26.5	0.625					} 388.45	+0.18		+0.04	85955.38
21	71.8	52	43	52	53	11	52	48.0	0.520	} 388.55	+0.08	+0.13	85955.49			
26	71.9	25	04	25	16	12	25	10.0	0.450					} 388.50	+0.04		+0.17	85955.43
31	72.0	57	26	57	38	12	57	32.0	0.380	} 388.55	+0.02	+0.17	85955.47			
36	72.1	29	46	30	03	1	29	54.5	0.310					} 0.090		
41	72.2	02	07	02	26	2	02	16.5	0.260	} 388.55	+0.02	+0.17	85955.47			
46	72.3	34	29	34	50	2	34	39.5	0.210					} 388.55	+0.02	+0.17	85955.47
51	72.4	06	50	07	14	3	07	02.0	0.190	} 388.55	+0.02	+0.17	85955.47			
56	72.4	39	10	39	40	3	39	25.0	0.160					} 388.55	+0.02	+0.17	85955.47
61	72.4	11	30	12	04	4	12	47.0	0.120	} 388.55	+0.02	+0.17	85955.47			
66	72.4	43	50	44	30	4	44	10.0	0.100					} 388.55	+0.02	+0.17	85955.47
71	72.4	16	09	16	56	5	16	32.5	0.090							
	72.07													85955.42		

July 9th. Clock making 86400 Vibrations. Barom. $\left\{ \begin{matrix} 29.50 \\ 29.48 \end{matrix} \right\}$ 29.49										
No. of Coincid.	Therm.	Times of			Arc of Vibration.	Mean Interval.	Correction for Arc.	Reduct. to 72°.	Corrected Vibrations in a Mean Solar Day at 72°.	
		Disapp.	Re-app.	Coincidence.						
		m s	m s	h m s	°	s	s	s		
1	71.5	33 45	33 48	9 33 46.5	1.40					
11	71.7	38 13	38 18	10 38 15.5	0.95	386.90	+2.23	-0.17	85955.44	
21	71.7	42 50	42 58	11 42 54.0	0.63	387.85	+1.00	-0.13	85955.33	
31	71.6	47 32	47 44	12 47 38.0	0.45	388.40	+0.47	-0.15	85955.42	
41	71.6	52 16	52 31	1 52 23.5	0.31	388.55	+0.23	-0.17	85955.34	
51	71.7	56 58	57 22	2 57 10.0	0.21	388.65	+0.11	-0.15	85955.34	
61	71.6	01 43	02 13	4 01 58.0	0.16	388.80	+0.05	-0.15	85955.46	
71	71.7	06 25	07 08	5 06 46.5	0.11	388.85	+0.03	-0.15	85955.50	
	71.73									85955.40 at 72°

TABLE E.

Determination of the rate of the clock by GRAHAM, with which the pendulum was compared in the experiments at Greenwich between the 21st and 26th of July inclusive: by Mr. TAYLOR.

“The rate of the clock was obtained from comparisons with the transit clock at the time that the observations were making for the determination of the rate of the latter; thus resting the accuracy of the results on the correct determination of the rate of the transit clock, for which purpose the following observations have been selected from the Greenwich observations:

1828.	Observed Place.	Apparent Place.	Error of Clock.	Mean.	Rate in 24h.
	h m s	h m s	s		
July 21 A.M.	Capella . . . 5 4 55.92	5 4 1.69	+54.23	} at 5 ^h 23 ^m + 54 ^{''} .20	
	β Tauri. . . . 5 16 21.40	5 15 27.22	54.18		
	α Orionis . . . 5 46 47.24	5 45 53.04	54.20		
— 22 A.M.	β Tauri 5 16 20.98	5 15 27.25	53.73	} at 5 ^h 16 ^m + 53 ^{''} .73	-0 ^{''} .47
— 23 A.M.	Aldebaran 4 26 58.62	4 26 5.41	53.21		
	Capella . . . 5 4 54.96	5 4 1.75	53.21	} at 5 ^h 42 ^m + 53 ^{''} .17	-0 ^{''} .55
	Pollux . . . 7 35 41.04	7 34 47.96	53.08		
— 25 A.M.	Aldebaran 4 26 57.56	4 26 5.46	52.10	} at 4 ^h 59 ^m + 52 ^{''} .07	-0 ^{''} .56
	Capella . . . 5 4 53.90	5 4 1.82	52.08		
	Rigel 5 7 9.80	5 6 17.74	52.06		
	β Tauri 5 16 19.38	5 15 27.33	52.05		
— 26 P.M.	α Cor. Bor. 15 28 18.10	15 27 26.79	51.31	} at 15 ^h 32 ^m + 51 ^{''} .29	-0 ^{''} .55
	α Serpentis 15 36 42.10	15 35 50.83	+51.27		

In addition to the preceding, two observations only of the Sun are available, which occurring at a time when only one star could be taken, are better employed in conjunction with that star; thereby more nearly equalizing the share of credit to be attributed to the several results.

	h m s	h m s	} — 0".43
July 21 ☉ Centre	8 3 50.05	8 2 55.50	
22 ☉ Centre	8 7 48.82	8 6 54.70	54.12

Giving this result the same weight as that of β Tauri on the 22nd, where it is probable the greatest error exists, we have for the daily rate of the transit clock as follows.

July 21 to 22.	—0.45	or	^{m s} +3 55.46	on mean time.
23.	—0.57		+3 55.34	_____
24.	—0.56		+3 55.35	_____
25.	—0.56		+3 55.35	_____
26.	—0.55		+3 55.36	_____

Making use of these rates with the following comparisons, the daily rates of the coincidence clock can be obtained up to the 26th; and since no observations offer to determine the rate on the 27th, the rate as determined up to within twelve hours of the comparison on the 27th (—0".55) may with safety be used.

1828.	Time by Clock.	Time by Transit Clock.	Interval by Transit Clock.	Interval of Mean Time.	Interval by Clock.	Rate of Clock in 24 Hours.
	h m s	h m s	h m s	h m s	h m	"
July 21.	7 46 0	3 41 0.39	24 42 0.41 =	24 37 58.08	24 38	+ 1.87
22.	8 24 0	4 23 0.80	23 37 50.10 =	23 33 58.38	23 34	+ 1.65
23.	7 58 0	4 0 50.90	24 46 1.08 =	24 41 58.21	24 42	+ 1.74
24.	8 40 0	4 46 51.98	23 45 51.52 =	23 41 58.48	23 42	+ 1.54
25.	8 22 0	4 32 43.50	24 2 54.45 =	23 58 58.61	23 59	+ 1.39
26.	8 21 0	4 35 37.95	24 41 0.43 =	24 36 58.37	24 37	+ 1.58
27.	8 58 0	5 16 38.38				

THOMAS GLANVILLE TAYLOR.

TABLE F.—Vibration of Pendulum 12 at Greenwich, July 1828.

EXP. 1. July 21st. Clock making 86401.87 Vibrations. Barom. $\left\{ \begin{matrix} 29.38 \\ 29.37 \end{matrix} \right\}$ 29.375										
No. of Coincid.	Temp.	Times of			Arc.	Observer.	Mean Interval.	Correct. for Arc.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day at 62°.
		Disapp.	Re-app.	Coincidence.						
1	.....	m s	m s	h m s	0.90	Mr. TAYLOR.	} ^s 391.27	} ^s +0.66	} ^s -0.69	85960.18
2	59.6	14 42	14 44								8 21 13.33
3	.....	27 43	27 47	10 31 39.33	0.423	Mr. TAYLOR.	} ^s 391.38	} ^s +0.16	} ^s -0.25	85960.26
21	25 05	25 11								12 42 07
22	61.2	31 36	31 43	2 52 31	0.110	Capt. SABINE.	} ^s 391.2	} ^s +0.04	} ^s -0.04	85960.15
42	61.6	42 02	42 12	Fresh impulse given.						
62	62.2	52 23	52 39	3 05 20.5	0.720	Capt. SABINE.	} ^s 390.675	} ^s +0.43	} ^s +0.08	85960.06
2	.....	05 18	05 23	5 15 34	0.340	Capt. SABINE.	} ^s 391.175	} ^s +0.10	} ^s -0.10	85960.13
3	.....	11 49	11 53	7 25 57.5	0.170	Mr. TAYLOR.				
22	62.1	15 30	15 38							
42	61.4	25 43	26 12							
	61.49									85960.16 at 62°.

EXP. 2. July 22nd. Clock making 86401.65 Vibrations. Barom. $\left\{ \begin{matrix} 29.43 \\ 29.50 \end{matrix} \right\}$ 29.465										
No. of Coincid.	Temp.	Times of			Arc.	Observer.	Mean Interval.	Correct. for Arc.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day at 62°.
		Disapp.	Re-app.	Coincidence.						
1	.....	m s	m s	h m s	0.933	Mr. TAYLOR.	} ^s 391.32	} ^s +0.71	} ^s -1.20	85959.58
2	58.5	26 56.0	26 58								8 33 27.1
3	.....	33 26.0	33 28	10 43 53.5	0.440	Capt. SABINE.	} ^s 391.525	} ^s +0.17	} ^s -0.67	85959.79
22	59.9	39 56.5	39 58								12 54 24
42	61.0	43 50.0	43 57	1 53 05.5	0.215	Capt. SABINE.	} ^s 391.278	} ^s +0.06	} ^s -0.36	85959.73
51	61.3	54 20.0	54 28							
	60.17	53 00.0	53 11							85959.70 at 62°.

TABLE F. (Continued.)

The Pendulum taken down, the planes wiped and their adjustment examined; and the Pendulum replaced.

Exp. 3. July 23rd. Clock making 86401.74 Vibrations. Barom. $\left\{ \begin{matrix} 29.60 \\ 29.58 \end{matrix} \right\}$ 29.59											
No. of Coincid.	Temp.	Times of			Arc.	Observer.	Mean Interval.	Correct. for Arc.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day at 62°.	
		Disapp.	Re-app.	Coincidence.							
1	.....	m s	m s	} h m s	0.960	Mr. TAYLOR.	}	s	s	s	85959.71
2	59.4	01 13	01 15									8 07 44.33
21	.....	14 13	14 16	} 10 18 04.33	0.447	Mr. TAYLOR.	}	s	s	s	85959.98
22	60.8	11 30	11 36								
23	.....	18 01	18 07	} 12 28 30.5	0.215	Capt. SABINE.	}	s	s	s	85959.92
42	61.6	24 33	24 39								
62	62.3	28 26	28 35	} 2 38 52.5	0.110	Capt. SABINE.	}	s	s	s	85959.95
		38 48	38 57								
Fresh impulse given.											
1	62.3	46 22	46 25	2 46 23.5	0.990	Capt. SABINE.	}	s	s	s	85959.95
21	62.3	56 26	56 32	4 56 29	0.480	Capt. SABINE.					
	61.45									85959.89 at 62°.	

Exp. 4. July 24th. Clock making 86401.54 Vibrations. Barom. $\left\{ \begin{matrix} 29.55 \\ 29.50 \end{matrix} \right\}$ 29.525											
No. of Coincid.	Temp.	Times of			Arc.	Observer.	Mean Interval.	Correct. for Arc.	Reduct. to 62°.	Corrected Vibrations in a Mean Solar Day at 62°.	
		Disapp.	Re-app.	Coincidence.							
1	.....	m s	m s	} h m s	0.950	Mr. TAYLOR.	}	s	s	s	85959.68
2	61.1	40 50	40 52									8 47 21.5
3	.....	47 20	47 22	} 10 57 36.0	0.470	Capt. SABINE.	}	s	s	s	85959.73
22	61.3	53 52	53 53								
42	61.8	57 34	57 38	} 1 07 58.5	0.215	Capt. SABINE.	}	s	s	s	85959.71
62	62.2	07 55	08 02								
		18 15	18 25	} 3 18 20.0	0.110	Capt. SABINE.	}	s	s	s	85959.91
		25 18	25 22								
Fresh impulse given.											
1	62.3	35 32	35 37	5 35 34.5	0.345	Mr. TAYLOR.	}	s	s	s	85959.91
21	62.5	45 50	46 06	7 45 58.0	0.165	Mr. TAYLOR.					
41	62.3									85960.07	
	61.93									85959.82 at 62°.	

