

1878GOAMM...38I...1A

RATES OF CHRONOMETERS

ON TRIAL

FOR PURCHASE BY THE BOARD OF ADMIRALTY,

AT THE

ROYAL OBSERVATORY, GREENWICH.

1877.

NAME OF MAKER.	No.	Weather & Days.	Construction of Escapement and Balance, from the Description furnished by the Maker.	(I.) WEEKLY SUMS OF DAILY RATES											
				Feb. 10-17	Feb. 17-24	Feb. 24 Mar. 3	March 3-10	March 10-17	March 17-24	March 24-31	Mar. 31 to Apr. 7	April 7-14	April 14-21	April 21-28	
Isaac	1612	2	Original auxiliary to ordinary balance, unimproved ordinary balance. [Unaltered.]	-3.7	-5.0	-5.8	-5.5	-4.7	-5.1	-6.8	-7.8	-7.7	-7.8	-8.0	
Edward and Sons.	2138	2	Ordinary balance with slight addition. "Airy's Compensation."	-2.9	-1.5	-0.3	-0.2	-1.1	-1.9	-4.5	-5.5	-5.4	-5.8	-6.8	
Edwards and Sons.	2138	2	Ordinary balance with slight addition. "Airy's Compensation."	-7.0	-9.1	-11.8	-12.0	-12.7	-14.5	-16.9	-16.9	-16.4	-18.0	-13.5	
McGregor and Co.	399	2	Ordinary auxiliary. [Compensation.]	-5.5	-1.0	-2.3	-1.8	-2.5	-2.5	-2.5	-4.5	-4.0	-3.0	-1.5	
McGregor and Co.	3130	2	"Airy's Compensation."	-1.3	-0.3	-0.3	-0.3	-1.3	-2.9	-7.8	-4.7	-7.8	-9.0	-0.5	
[Compensation.]															
Graham and Parker	3597	2	Brass check piece to ordinary balance, "Airy's Compensation."	-15.0	-15.4	-15.6	-16.3	-16.2	-14.5	-14.0	-12.9	-11.6	-11.5	-17.0	
Edwards and Sons.	458	2	Ordinary balance with slight addition. "Airy's Compensation."	-6.0	-5.3	-7.4	-6.8	-7.0	-9.0	-10.5	-10.5	-11.7	-12.7	-5.8	
J. Poole and Co.	5680	2	Point's auxiliary. "Airy's Compensation." [Denation.]	-0.9	-0.8	-0.5	-0.7	-1.1	-3.3	-3.7	-2.0	-0.4	-1.4	-0.5	
Edwards and Sons.	3597	2	"Airy's Compensation."	-10.0	-8.5	-7.2	-6.0	-8.5	-7.0	-9.3	-2.1	-3.0	-0.5	-3.8	
Edwards and Sons.	3597	2	Ordinary balance with auxiliary in cold. "Airy's Compensation."	-5.0	-6.0	-7.2	-6.4	-6.4	-6.2	-1.5	-2.7	-5.5	-3.5	-0.5	
[Compensation.]															
Hennessy	1832	2	Auxiliary with "Airy's Compensation."	-9.8	-8.3	-9.7	-8.5	-7.1	-7.8	-1.7	-1.3	-1.5	-4.0	-2.5	
Edwards and Sons.	458	2	Edwards's patent balance of independent figure. "Airy's Compensation."	-3.5	-7.0	-9.5	-9.0	-9.3	-10.7	-3.1	-5.0	-6.9	-1.9	-5.6	
Crisp	3381	2	Brass check piece to ordinary balance. "Airy's Compensation."	-0.5	-1.2	-1.5	-1.6	-1.9	-2.5	-2.9	-2.4	-2.7	-2.8	-2.5	
Walker	7632	2	High range auxiliary to balance. [Compensation.]	-17.3	-18.0	-18.1	-18.2	-18.3	-18.4	-18.5	-18.6	-18.7	-18.8	-18.9	
Edwards and Sons.	3597	2	Auxiliary with "Airy's Compensation."	-6.9	-5.0	-6.8	-6.9	-6.8	-7.1	-10.9	-6.1	-4.5	-3.0	-2.0	
[Compensation.]															
McGregor and Co.	5002	2	Kailberg's high range, auxiliary to balance. "Airy's Compensation."	-13.7	-17.1	-16.4	-17.8	-16.5	-16.5	-2.4	-1.9	-1.3	-0.3	-7.2	
Edwards and Sons.	3472	2	Brass check piece to balance. "Airy's Compensation."	-17.3	-14.5	-14.1	-13.7	-14.0	-12.5	-8.0	-8.4	-3.1	-3.7	-3.0	
Walker	4645	2	Auxiliary to balance. [Den.]	-7.5	-9.5	-2.4	-8.9	-7.7	-8.1	-6.6	-4.5	-5.5	-5.5	-6.0	
Edwards and Sons.	4220	2	Auxiliary compensation. "Airy's Compensation."	-1.0	-2.4	-0.9	-0.4	-0.2	-1.8	-10.7	-15.6	-16.7	-16.2	-6.0	
Edwards and Sons.	441	2	Edwards's patent balance of independent figure. "Airy's Compensation."	-2.8	-7.1	-6.8	-6.8	-6.9	-4.0	-3.6	-0.9	-1.0	-8.8	-9.0	
[Compensation.]															
Glover	332	2	"Airy's Compensation."	-9.1	-4.7	-4.3	-3.9	-3.0	-2.7	-5.0	-1.0	-0.2	-3.8	-9.0	
Edwards and Sons.	458	2	Auxiliary with "Airy's Compensation."	+0.2	+4.4	+7.5	+5.5	+3.3	+1.0	+6.0	+8.7	+9.5	+10.5	+12.0	
Edwards and Sons.	5645	2	Auxiliary. "Airy's Compensation."	-0.6	-1.1	-2.3	-3.8	-3.9	-3.3	-3.9	-10.7	-12.3	-14.0	-6.5	
Edwards and Sons.	5677	2	Edwards's patent balance of independent figure. "Airy's Compensation."	+0.5	+0.5	+0.5	+0.5	+0.5	+0.5	+0.5	+0.5	+0.5	+0.5	+0.5	
J. Poole and Co.	5677	2	Edwards's patent balance of independent figure. "Airy's Compensation."	+0.5	+0.5	+0.5	+0.5	+0.5	+0.5	+0.5	+0.5	+0.5	+0.5	+0.5	
[Compensation.]															
Russell and Son	2853	2	Auxiliary in cold. "Airy's Compensation."	-4.3	-4.7	-5.2	-5.1	-5.5	-6.0	-1.5	-0.6	-1.5	-1.5	-0.5	
Edwards and Sons.	4221	2	Auxiliary compensation. "Airy's Compensation."	-4.0	-2.0	-1.0	-0.7	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	
Edwards and Sons.	1179	2	Auxiliary. "Airy's Compensation."	+4.0	+2.0	+1.8	+1.2	+1.3	+2.0	-3.5	+1.0	-0.1	-3.4	-5.7	
Usher and Cole	1507	2	Auxiliary to balance. "Airy's Compensation."	-6.2	-5.0	-4.8	-4.6	-3.3	-0.6	-1.7	-1.5	-2.0	-2.0	-2.1	
Edwards and Sons.	5974	2	Auxiliary with "Airy's Compensation."	-2.2	-2.4	-2.9	-3.0	-3.2	-3.5	-1.1	-1.6	-7.9	-7.9	-7.3	
[Compensation.]															
Usher and Cole	1517	2	Auxiliary to balance. "Airy's Compensation."	-8.1	-12.5	-15.5	-17.8	-16.7	-17.8	-11.0	-6.8	-3.7	-0.5	-6.0	
Edwards and Sons.	2856	2	Ordinary balance with auxiliary in cold. "Airy's Compensation."	+3.6	+7.9	+13.3	+10.6	+10.7	+2.4	+2.4	+6.7	+4.7	+6.0	+3.0	
W. Webb	5550	2	Auxiliary in cold. "Airy's Compensation." [Denation.]	+9.7	+4.1	+1.9	+1.1	+4.0	+5.0	-0.1	-0.8	-3.0	-4.9	-15.2	
W. Webb	352	2	Ordinary balance with auxiliary. "Airy's Compensation."	+3.1	-3.1	-9.2	-16.7	-9.6	-28.0	-33.4	-35.6	-38.5	-30.0	-19.0	
[Compensation.]															
A. W. Webb	501	2	Auxiliary acting in cold. "Airy's Compensation."	+2.4	+8.0	...	...	...	...	...	...	...	...	...	
[Compensation.]															
Chronometrical Thermometer.				+681.4	+1069.9	+1218.8	+1250.7	+1146.9	+1277.1	+3029.9	+1887.6	+1907.1	+1290.0	+1270.0	
Extremes of Temperature as shown by the Self-Regulating Thermometer.				90-56	44-35	40-31	42-50	41-52	40-50	78-100	74-74	74-90	73-88	47-54	

The sign + indicates that the rate is gaining.

† During these weeks the Chronometers were placed in the chamber of a stove heated by jets of gas. The gas flames are exterior to the chamber, into which none of the injurious products of combustion can enter.

The Chronometrical Thermometer differs from an ordinary Chronometer only in the construction of the balance, the positions of the metals forming the compensating rim being reversed. By this arrangement the effect of temperature is much magnified.

IN THE ORDER OF TIME.

Apr. 28 to May 5	May 5-12	May 12-19	May 19-26	May 26 to June 2	June 2-9	June 9-16	June 16-23	June 23-30	June 30 to July 7	July 7-14	July 14-21	July 21-28	July 28 to Aug. 4	Aug. 4-11	Aug. 11-18	Aug. 18-25	Aug. 25 to Sept. 1	N A M E O R M A K E R.	No.
- 4.9	- 1.0	+ 1.0	+ 0.5	+ 1.6	- 0.5	- 2.5	- 2.8	- 2.7	- 2.5	- 4.9	- 4.8	- 3.0	- 2.9	- 2.9	- 1.9	- 2.0	- 0.1	Isaac	1612
+ 5.5	+ 5.5	+ 2.5	+ 0.3	+ 3.5	+ 5.4	+ 7.5	+ 7.9	+ 6.1	+ 6.0	+ 7.0	+ 9.3	+ 7.9	+ 7.4	+ 7.3	+ 9.5	+ 6.8	Edward and Sons.	2138	
+ 10.0	+ 10.0	+ 2.9	+ 3.4	+ 1.9	+ 3.5	+ 12.9	+ 14.5	+ 23.6	+ 14.9	+ 15.7	+ 13.4	+ 18.4	+ 17.5	+ 15.0	+ 17.0	+ 17.5	+ 14.0	Edwards and Sons.	399
- 1.3	- 0.0	- 1.3	- 1.3	- 0.9	- 0.0	- 2.4	+ 4.1	- 0.1	- 2.1	- 1.9	- 1.0	- 0.0	- 3.0	- 3.0	- 3.0	- 1.0	- 1.0	Edwards and Sons.	3130
+ 2.0	+ 3.7	+ 3.5	- 1.3	+ 3.0	+ 4.8	+ 5.7	+ 3.4	+ 3.1	+ 2.5	+ 3.0	+ 2.9	+ 4.0	+ 4.0	+ 3.1	+ 4.9	+ 4.0	+ 4.2	Isaac	3130
- 17.5	- 15.0	- 12.4	- 10.6	- 10.5	- 11.1	- 9.9	- 8.9	- 17.0	- 19.1	- 19.0	- 21.0	- 15.1	- 13.4	- 11.4	- 11.1	- 11.5	- 13.5	Graham and Parker	3597
- 1.9	- 7.9	- 9.0	- 8.6	- 8.1	- 8.2	- 14.7	- 15.5	- 14.7	- 15.5	- 14.7	- 15.5	- 14.7	- 15.5	- 14.7	- 15.5	- 14.7	- 15.5	Edwards and Sons.	458
+ 0.1	+ 1.4	+ 2.1	+ 2.4	+ 2.3	+ 2.0	+ 2.9	+ 2.7	+ 0.3	+ 0.0	+ 1.1	+ 1.1	+ 1.1	+ 1.1	+ 1.1	+ 1.1	+ 1.1	+ 1.1	J. Poole and Co.	5680
- 0.4	- 2.4	- 2.3	- 2.4	- 2.3	- 1.1	- 1.1	- 1.1	- 1.1	- 1.1	- 1.1	- 1.1	- 1.1	- 1.1	- 1.1	- 1.1	- 1.1	- 1.1	Edwards and Sons.	3597
+ 0.5	+ 2.5	+ 4.9	+ 3.8	+ 5.8	+ 5.5	+ 9.0	+ 9.8	+ 6.0	+ 6.8	+ 7.2	+ 8.2	+ 13.4	+ 14.8	+ 14.2	+ 14.5	+ 15.0	+ 15.0	Edwards and Sons.	3597
- 3.0	+ 1.5	+ 4.3	+ 3.2	+ 4.7	+ 6.3	+ 6.9	+ 7.1	+ 3.0	+ 0.1	+ 1.4	- 4.4	+ 9.9	+ 8.5	+ 8.5	+ 9.1	+ 9.9	+ 8.5	Hennessy	1832
- 6.9	- 6.7	- 7.4	- 10.9	- 8.5	- 9.8	- 11.7	- 13.5	- 12.4	- 21.1	- 21.1	- 21.1	- 21.1	- 21.1	- 21.1	- 21.1	- 21.1	- 21.1	Edwards and Sons.	458
- 20.0	- 20.0	- 22.1	- 23.9	- 25.5	- 22.2	- 22.0	- 27.5	- 27.6	- 27.3	- 26.7	- 26.4	- 25.9	- 26.4	- 25.9	- 26.4	- 25.9	- 26.4	Crisp	3381
- 0.5	- 0.5	- 10.2	- 10.5	- 10.8	- 10.5	- 10.0	- 8.9	- 1.5	- 3.1	- 3.1	- 4.8	- 6.1	- 4.3	- 3.6	- 3.6	- 3.6	- 3.6	Walker	7632
- 1.5	- 5.5	- 3.5	- 5.1	- 2.2	- 2.7	- 1.0	- 1.0	- 1.0	- 1.0	- 1.0	- 1.0	- 1.0	- 1.0	- 1.0	- 1.0	- 1.0	- 1.0	Walker	7632
- 0.5	- 7.0	- 7.3	- 10.5	- 7.8	- 7.7	- 6.7	- 6.0	- 5.5	- 6.5	- 5.8	- 8.9	- 5.5	- 7.1	- 8.0	- 7.5	- 8.0	- 7.5	McGregor and Co.	5002
- 21.8	- 24.6	- 27.8	- 28.1	- 29.2	- 30.8	- 30.5	- 31.2	- 30.8	- 28.8	- 27.2	- 37.0	- 37.0	- 37.0	- 37.0	- 37.0	- 37.0	- 37.0	Edwards and Sons.	3472
+ 12.5	+ 12.0	+ 10.6	+ 12.9	+ 10.4	+ 5.5	+ 0.1	- 3.9	- 4.6	- 1.9	- 0.1	+ 2.4	+ 2.2	+ 9.4	+ 0.3	+ 3.0	+ 3.0	+ 3.0	Walker	4645
- 4.5	- 0.9	- 1.6	- 0.5	- 0.0	- 3.2	- 3.9	- 6.6	- 13.0	- 14.5	- 14.7	- 16.0	- 6.3	- 9.2	- 6.0	- 11.0	- 6.9	- 6.9	Edwards and Sons.	4220
+ 6.2	+ 3.1	+ 1.1	+ 2.1	- 0.2	- 0.5	- 4.4	- 5.4	- 9.2	- 8.4	- 6.6	- 10.5	+ 4.8	- 0.3	- 1.5	- 1.5	- 1.5	- 1.5	Edwards and Sons.	441
+ 5.0	+ 8.0	+ 8.0	+ 9.0	+ 6.0	+ 7.4	+ 8.1	+ 3.5	- 4.8	+ 2.3	+ 7.0	+ 3.9	+ 17.6	+ 15.5	+ 15.7	+ 16.3	+ 20.5	+ 19.0	Glover	332
+ 15.0	+ 12.7	+ 13.8	+ 11.3	+ 13.8	+ 10.0	+ 17.0	+ 17.3	+ 6.0	+ 6.5	+ 8.7	+ 8.0	+ 21.4	+ 19.9	+ 22.4	+ 21.1	+ 26.7	+ 27.0	Edwards and Sons.	458
- 7.1	- 11.4	- 12.9	- 11.3	- 16.0	- 17.5	- 12.1	- 13.8	- 15.9	- 14.5	- 13.9	- 13.6	- 20.4	- 24.5	- 26.8	- 27.7	- 26.8	- 27.7	Edwards and Sons.	5645
+ 17.0	+ 14.4	+ 15.1	+ 10.5	+ 10.5	+ 10.5	+ 12.6	+ 9.1	+ 8.8	+ 10.5	+ 9.5	+ 9.4	+ 21.1	+ 23.0	+ 23.0	+ 23.0	+ 26.5	+ 26.5	Edwards and Sons.	2856
+ 16.2	+ 13.9	+ 11.1	+ 11.2	+ 24.9	+ 25.6	+ 25.2	+ 25.0	+ 21.5	+ 20.5	+ 30.8	+ 28.5	+ 31.0	+ 30.0	+ 32.2	+ 34.8	+ 34.5	+ 35.5	J. Poole and Co.	5677
+ 0.5	+ 3.7	+ 3.5	+ 1.9	+ 2.9	+ 7.8	+ 12.2	+ 14.0	+ 22.0	+ 20.0	+ 20.6	+ 19.9	+ 14.5	+ 18.5	+ 20.0	+ 22.5	+ 22.0	+ 22.5	Russell and Son	2853
+ 12.0	+ 15.0	+ 14.2	+ 13.1	+ 22.5	+ 22.3	+ 19.5	+ 18.3	- 2.5	+ 1.5	+ 4.5	+ 3.5	+ 20.0	+ 20.0	+ 20.0	+ 20.5	+ 19.0	+ 21.7	Edwards and Sons.	4221
+ 4.2	+ 5.6	+ 8.0	+ 8.6	+ 12.4	+ 12.1	+ 12.9	+ 10.0	- 1.0	- 3.5	- 3.5	- 4.9	+ 16.9	+ 17.0	+ 18.5	+ 19.0	+ 18.7	+ 21.0	Williams	1179
- 1.5	- 2.9	- 2.3	- 2.3	- 2.6	- 2.8	- 2.5	- 2.6	- 2.5	- 2.5	- 2.8	- 2.9	+ 4.3	+ 3.8	+ 4.0	+ 4.0	+ 3.7	+ 4.2	Usher and Cole	1507
- 12.4	- 12.0	- 11.1	- 14.0	- 9.2	- 9.3	- 8.0	- 6.9	- 18.8	- 21.3	- 18.1	- 22.6	- 3.0	- 4.0	- 3.0	- 1.8	- 3.7	- 2.3	Edwards and Sons.	5674
- 8.0	- 3.0	- 0.5	- 5.5	- 3.0	- 0.5	+ 5.0	+ 6.1	+ 1.0	+ 3.7	+ 5.8	+ 7.1	+ 17.4	+ 17.5	+ 27.0	+ 23.8	+ 28.5	+ 29.2	Usher and Cole	1517
+ 41.1	+ 42.9	+ 43.0	+ 47.0	+ 42.5	+ 44.0	+ 46.5	+ 47.5	+ 64.1	+ 70.5	+ 72.5	+ 78.4	+ 64.7	+ 70.1	+ 70.9	+ 74.3	+ 78.0	+ 74.3	Edwards and Sons.	4221
+ 10.7	+ 16.3	+ 5.4	+ 11.2	+ 7.4	- 0.8	- 2.8	- 6.3	- 36.4	- 43.0	- 38.5	- 45.9	+ 16.1	+ 20.9	+ 22.9	+ 22.9	+ 22.9	+ 17.2	W. Webb	5350
- 12.5	- 21.5	- 24.5	- 20.9	- 35.0	- 30.9	- 22.6	- 24.9	- 39.5	- 39.1	- 41.3	- 42.1	- 38.4	- 40.9	- 41.5	- 40.0	- 43.6	- 42.0	Edwards and Sons.	282
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	W. A. Webb	501
+1084.4	+641.1	+335.5	+565.5	+159.0	-253.5	-639.0	-800.0	-3385.0	-2529.5	-2402.9	-2727.5	-575.5	-406.2	-660.7	-712.4	-789.0	-428.0	Chromometer Thermometers	...
43-57	46-60	54-60	51-59	54-64	57-71	65-75	66-78	87-97	88-98	88-98	88-107	65-71	67-77	67-73	73-67	74-66	63-71	(Extreme of Temperature as shown by the Self-Registering Thermometers.)	...
The Chromometers are placed in order of merit, their respective positions being determined by consideration of the irregularities of rate exhibited in Table III.																			
The Chronometer A. W. Webb 501 was removed by the maker in the third week of the trial, the main spring having been found broken. Having only been compared for two weeks it has been placed by itself, after the other Chronometers, in the Table above.																			

NAME or MAKER.	No.	Construction of Escapement and Balance, from the Description furnished by the Maker.	(11.) WEEKLY SUMS OF DAILY RATES											
			July 14-21 †	June 30 to July 7 †	July 7-14 †	June 23-30 †	March 24-31 †	April 7-14 †	Mar. 31 to April 7 †	April 14-21 †	July 28 to Aug. 4 †	June 16-23 †	Aug. 18-25 †	
Isaac	1612	2 Original auxiliary to ordinary balance, unpub- lished.	-48	-53	-49	-57	-68	-67	-75	-68	-30	-38	-50	
Edward and Sons	2198	Improved ordinary balance. "Airy's Com- pensation."	-63	-60	-70	-61	-43	-84	-39	-83	-79	-75	-92	
Redd and Sons	399	2 Ordinary balance with slight addition. "Airy's Compensation."	-134	-149	-157	-136	-162	-184	-169	-180	-175	-143	-175	
McGregor and Co.	5000	Ordinary auxiliary. "Airy's Compensation."	-40	-31	-16	-30	-49	-40	-35	-40	-43	-35	-43	
Seiff	4420	"Airy's Compensation."	-16	-20	-20	-31	-78	-78	-47	-90	-40	-34	-40	
Graham and Parkes	3227	2 Brass check-piece to ordinary balance. "Airy's Compensation."	-215	-191	-190	-170	-140	-116	-129	-115	-134	-89	-115	
Pyatt	458	2 Ordinary balance with slight addition. "Airy's Com- pensation."	-200	-147	-185	-138	-105	-117	-105	-127	-189	-118	-303	
J. Poole and Co.	5677	2 Poole's auxiliary. "Airy's Compensation."	-50	-40	-37	-44	-39	-34	-34	-61	-37	-100	-35	
Redd and Sons	2556	2 "Airy's Compensation."	-80	-40	-50	-22	-52	-30	-31	-93	-48	-27	-93	
Sutton	2642	2 Ordinary balance with auxiliary in cold. "Airy's Compensation."	-82	-68	-73	-60	-13	-68	-27	-95	-134	-59	-145	
Hennessey	1822	2 Auxiliary with "Airy's Compensation."	-44	-41	-14	-30	-17	-15	-13	-40	-85	-71	-89	
Ediff	343	2 Ediff's patent balance of independent figure.	-244	-211	-221	-214	-31	-69	-50	-19	-182	-193	-194	
Crip	2381	2 Brass check-piece to ordinary balance. "Airy's Compensation."	-267	-276	-273	-270	-269	-273	-248	-274	-330	-260	-327	
Walker	5638	2 High range auxiliary to balance. "Compensation."	-48	-31	-31	-15	-29	-13	-37	-75	-89	-18	-18	
Aitchison	387	2 Auxiliary with "Airy's Compensation."	-154	-173	-116	-115	-109	-43	-61	-30	-23	-10	-90	
McGregor and Co.	5000	2 Kullberg's high range auxiliary to balance.	-89	-65	-68	-55	-34	-13	-19	-93	-71	-60	-80	
Seiff	4420	2 Brass check-piece to balance. "Airy's Com- pensation."	-272	-260	-284	-268	-240	-311	-284	-337	-345	-312	-370	
Ediff	343	2 Auxiliary to balance. "Compensation."	-24	-19	-91	-49	-66	-55	-43	-93	-29	-39	-35	
Seiff	4420	2 Auxiliary compensation. "Airy's Compensation."	-100	-143	-147	-150	-167	-107	-156	-164	-92	-65	-110	
Ediff	343	2 Ediff's patent balance of independent figure.	-100	-84	-56	-92	-56	-19	-90	-68	-83	-94	-90	
Glover	322	2 "Airy's Compensation."	-39	-33	-70	-48	-50	-92	-10	-38	-155	-35	-305	
Aitchison	387	2 Auxiliary with "Airy's Compensation."	-150	-65	-87	-60	-60	-93	-87	-105	-109	-175	-267	
Davidson	2645	2 Auxiliary with "Airy's Compensation."	-150	-145	-159	-139	-89	-123	-107	-140	-245	-129	-268	
Nelson	3229	2 Ordinary balance with Poole's check-piece. "Airy's Com- pensation."	-59	-88	-103	-91	-63	-111	-117	-154	-215	-129	-230	
J. Poole and Co.	5677	2 Poole's auxiliary. "Airy's Compensation."	-285	-305	-309	-315	-240	-229	-226	-247	-300	-290	-342	
Russell and Son	2853	2 Auxiliary in cold. "Airy's Compensation."	-219	-200	-206	-220	-112	-115	-96	-135	-165	-140	-230	
Serill	4221	2 Auxiliary compensation. "Airy's Compensation."	-68	-14	-43	-35	-77	-100	-94	-106	-209	-103	-209	
Williams	1179	2 Auxiliary. "Airy's Compensation."	-49	-35	-38	-19	-35	-91	-10	-34	-170	-130	-187	
Usher and Cole	1517	2 Auxiliary to balance. "Airy's Compensation."	-293	-295	-285	-220	-101	-205	-195	-260	-268	-265	-297	
Davidson	2671	2 Auxiliary with "Airy's Compensation."	-226	-212	-183	-189	-116	-79	-75	-40	-69	-37	-37	
Usher and Cole	1517	2 Auxiliary to balance. "Airy's Compensation."	-71	-37	-53	-10	-110	-37	-68	-69	-175	-61	-285	
Solomon	2850	2 Ordinary balance with auxiliary in cold. "Airy's Com- pensation."	-784	-794	-725	-641	-429	-477	-497	-490	-703	-673	-789	
W. Webb	5850	2 Auxiliary in cold. "Airy's Compensation."	-402	-443	-448	-364	-31	-80	-69	-49	-209	-63	-229	
Keys	399	2 Ordinary balance with auxiliary. "Airy's Com- pensation."	-401	-391	-413	-396	-334	-388	-390	-300	-400	-349	-433	
A. W. Webb	501	2 Auxiliary setting in cold. "Airy's Compensation."	†	†	†	†	†	†	†	†	†	†	†	
Chronometrical Thermometer			-2727	-2595	-3490	-2580	-2002	-1801	-1887	-1732	-809	-8000	-7890	
Extremes of Temperature as shown by the Self-Registering Thermometers			68	108	88	85	90	87	97	75	100	74	90	

The sign + indicates that the rate is gaining.
† During these weeks the Chronometers were placed in the chamber of a stove heated by jets of gas. The gas flames are exterior to the chamber, into which none of the injurious products of combustion can enter.
The Chronometrical Thermometer differs from an ordinary Chronometer only in the construction of the balance, the positions of the metals forming the compensating rim being reversed. By this arrangement the effect of temperature is made negligible.

The sign + indicates that the rate is gaining.

† During these weeks the Chronometers were placed in the chamber of a stove heated by jets of gas. The gas flames are exterior to the chamber, into which none of the injurious products of combustion can enter.

The Chronometrical Thermometer differs from an ordinary Chronometer only in the construction of the balance, the positions of the metals forming the compensating rim being reversed. By this arrangement the effect of temperature is much magnified.

IN THE ORDER OF TEMPERATURE, AS DETERMINED GENERALLY BY THE CHRONOMETRICAL THERMOMETER.

Aug. 11-18	Aug. 18-25	June 11-18	July 11-18	Aug. 25 to Sept. 1	June 25 to June 30	May 12-19	May 19-26	May 26-31	Feb. 10-17	April 21-28	Feb. 17-24	April 28 to May 5	March 10-17	Feb. 24 to Mar. 3	March 3-10	March 17-24	NAME or MAKER.	No.
-15	-20	-25	-30	-03	-05	15	+10	+05	-10	-37	-30	-90	-45	-47	-58	-53	Isaac	1612
-73	-64	-73	-79	-83	-74	-33	+33	+03	-14	-39	-43	-15	-25	-11	-03	-08	Edward and Sons	2198
-170	-159	-129	-184	-140	-86	-66	-128	-94	-152	-70	-153	+1	+160	-127	-116	-129	Keys	399
-105	-99	-92	-100	-110	-00	-18	-15	-18	-03	-39	-43	-10	-15	-23	-3	-15	McGregor and Co.	5000
+49	+31	+57	+40	+42	+48	+30	+35	+12	-37	-13	+03	+03	+20	+12	+23	+23	Seiff	4420
-111	-114	-99	-151	-135	-111	-105	-124	-156	-150	-150	-170	-154	-175	-162	-156	-163	Graham and Parkes	3227
+212	+205	+120	+161	+175	91	86	+60	+65	+70	+60	+55	+33	+69	+70	+74	+88	Pyatt	458
+300	+79	+39	+93	+111	+36	+33	+11	+04	+14	-00	+00	+86	+91	-70	-61	-86	J. Poole and Co.	5677
+88	+64	+11	+80	+130	+11	+19	+32	+34	+24	+100	+33	-83	-84	-85	-72	-90	Redd and Sons	2556
-142	-143	-90	-124	-150	-85	-58	+43	+28	-35	-30	+03	-60	+05	-64	-72	-84	Sutton	2642
-91	-85	-69	-59	-85	-62	-47	-43	-22	+15	-58	-25	-82	-30	-71	-87	-85	Hennessey	1822
-186	-173	-117	-173	-172	-98	-85	-74	-105	-87	-33	-56	-70	-69	-93	-95	-107	Ediff	343
+339	+335	+292	+294	+288	+275	-250	+251	+259	+250	-65	+35	+13	+20	+105	+156	+169	Crip	2381
+36	+44	+100	-63	+102	-08	-102	-103	-03	-173	-03	+00	+00	+01	-70	-61	-86	Walker and Co.	5638
+05	-07	-10	-10	-15	-27	-22	-35	-81	-25	-69	-30	-10	-15	-83	-68	-69	Aitchison	387
-75	-80	-67	-53	-90	-77	-78	-75	-105	-70	-137	-73	-171	-95	-165	-164	-178	McGregor and Co.	5000
+870	+770	+803	+350	+277	+808	+292	+278	+268	+246	-173	-340	+143	+218	+140	+161	+187	Seiff	4420
+80	+74	+81	+83	+80	+85	+104	+106	+125	+120	+13	+125	93	+75	+24	+89	+81	Ediff	343
-90	-90	-39	-63	-89	-22	-00	-16	-02	-09	-10	-60	-24	-45	-62	-68	-64	Seiff	4420
-15	-13	-14	-68	-05	-02	-02	-11	-21	-31	-28	-60	-71	-62	-29	-68	-68	Ediff	343
+103	+157	+81	+176	+190	+74	+60	+50	+00	+80	-31	+80	-47	+50	-30	-42	-39	Glover	322
+281	+224	+170	+214	+270	+160	+133	+133	+112	+107	+10	+120	+44	+150	+93	+75	+85	Aitchison	387
+277	+265	+191	+209	+275	+175	+160	+153	+113	+114	+06	+68	-11	+71	-33	-28	-39	Davidson	2645
+230	+230	+135	+143	+265	+165	+165	+161	+150	+144	+03	+190	+15	+170	+23	+38	+51	Nelson	3229
+348	+332	+282	+310	+365	+266	+249	+211	+212	+193	+53	+178	+40	+162	+113	+68	+83	J. Poole and Co.	5677
+295	+200	+122	+145	+225	+78	+39	+35	+19	+37	-43	00	-47	+05	-95	-52	-51	Russell and Son	2853
+303	+200	+193	+200	+217	+283	+293	+142	+123	+180	-20	+118	-14	+120	-23	-07	-08	Solomon	4221
+190	+185	+129	+169	+210	+131	+131	+140	+80	+86	+96	+40	+87	+30	+43	+15	+18	Williams	1179
+405	+400	+269	+269	+423	+269	+268	+280	+284	+295	-52	+210	+50	+195	-22	-43	-50	Usher and Cole	1517
-18	-00	-30	-30	-30	-32	-92	-92	-111	-140	-120	-293	-110	-243	-134	-229	-230	Davidson	2671
+335	+270	+50	+174	+292	-03	-30	-65	-55	-90	-81	-60	-128	-80	-167	-155	-178	Usher and Cole	1517
+283	+209	+665	+647	+740	+400	+428	+43	+470	+429	-20	-209	-73	+411	+12	+133	+258	Seiff	4420
+323	+225	+261	+173	-08	-74	-84	+112	+163	-37	+155	+41	+167	-40	-19	-17	-55	W. Webb	5850
+430	+415	+236	+384	+420	+309	+256	+346	+209	+215	+31	+190	-31	+155	-56	-92	-167	Keys	399
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	A. W. Webb	501
...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	Chronometrical Thermometer	
-712	-667	-630	-575	-429	-359	-158	-335	-555	-641	-631	-770	-1059	-1084	-1146	-1318	-1357	Extremes of Temperature as shown by the Self-Registering Thermometers	
67	-74	-73	-75	-75	-71	-64	-64	-60	-51	-56	-60	-56	-47	-54	-43	-57	...	

The Chronometers are placed in order of merit, their respective positions being determined by consideration of the irregularities of rate exhibited in Table III. The Chronometer A. W. Webb 501 was removed by the maker in the third week of the trial, the main spring having been found broken. Having only been compared for two weeks, it has been placed by itself, after the other Chronometers, in the Table above.

RATES OF CHRONOMETERS ON TRIAL FOR PURCHASE BY THE ADMIRALTY,

NAME OF MAKER.	No.	Whether 2 or 3 Days.	ADDRESS OF MAKER.	Construction of Escapement and Balance, from the Description furnished by the Maker.	(III.)—ABSTRACT OF THE			
					First Day of Rating.	Last Day of Rating.	Number of Weeks.	Least Weekly Sum.
Isaac	1612	2	10, Spencer Street, Clerkenwell, E.C.	Original auxiliary to ordinary balance, unpublished.	February 10	Sept. 1	29	— 7.5
Edward and Sons...	2138	2	92, Buchanan Street, Glasgow.	Improved ordinary balance.	February 10	Sept. 1	29	— 2.9
Keys	399	2	15, Craven Street, Strand, W.C.	Ordinary balance, with slight addition. "Airy's [Compensation.]"	February 10	Sept. 1	29	+ 6.6
McGregor and Co.	3130	2	45, Clyde Place, Glasgow.	Ordinary auxiliary.	February 10	Sept. 1	29	— 3.1
Isaac	3130	2	10, Spencer Street, Clerkenwell, E.C.	"Airy's Compensation."	February 10	Sept. 1	29	— 1.3
Graham and Parkes	3527	2	43, Canning Place, Liverpool.	[Compensation.] Brass check-piece to ordinary balance. "Airy's	February 10	Sept. 1	29	— 21.5
Pyott	458	2	7, Jamaica Terrace, West India Dock Road.	Ordinary balance with slight addition. "Airy's Comp[ensation.]"	February 10	Sept. 1	29	+ 5.3
J. Poole and Co. ...	5680	2	33, Spencer Street, Clerkenwell, E.C.	Poole's auxiliary. "Airy's Compensation."	February 10	Sept. 1	29	— 9.2
Reid and Sons	2556	2	41, Grey Street, Newcastle-on-Tyne.	"Airy's Compensation."	February 10	Sept. 1	29	— 10.0
Sutton	2842	2	32, Lowther Street, Whitehaven.	Ordinary balance, with auxiliary in cold. "Airy's [Compensation.]"	February 10	Sept. 1	29	— 7.2
Hennessy	1822	2	5, Wind Street, Swansea.	Auxiliary, with "Airy's Compensation."	February 10	Sept. 1	29	— 8.7
Eiffe	542	2	The Laurels, Yiewsley, Uxbridge.	Eiffe's patent balance of independent figure.	February 10	Sept. 1	29	— 24.4
Crisp	3381	2	174, St. John's Street Road, E.C.	Brass check-piece to ordinary balance. "Airy's	February 10	Sept. 1	29	+ 9.5
Walker	7632	2	8, Cecil Place, Paisley Road, Glasgow.	High range auxiliary to balance. [Compensation.]	February 10	Sept. 1	29	— 17.3
Aitchison	3130	2	15, Bank Street, Edinburgh.	Auxiliary, with "Airy's Compensation."	February 10	Sept. 1	29	— 15.4
McGregor and Co. .	5002	2	45, Clyde Place, Glasgow.	Kullberg's high range, auxiliary to balance.	February 10	Sept. 1	29	— 17.8
Mann	3472	2	The Cross, Gloucester.	Brass check-piece to balance. "Airy's Compensa- [tion.]"	February 10	Sept. 1	29	+ 12.5
Walker	4645	2	8, Cecil Place, Paisley Road, Glasgow.	Auxiliary to balance.	February 10	Sept. 1	29	— 6.6
Sewill	4220	2	61, South Castle Street, Liverpool.	Auxiliary compensation. "Airy's Compensation."	February 10	Sept. 1	29	— 16.7
Eiffe	541	2	The Laurels, Yiewsley, Uxbridge.	Eiffe's patent balance of independent figure.	February 10	Sept. 1	29	— 10.5
Glover	332	2	8, Wrotham Road, Camden New Town,	"Airy's Compensation."	February 10	Sept. 1	29	— 5.0
Aitchison	3130	2	15, Bank Street, Edinburgh. [N.W.]	Auxiliary, with "Airy's Compensation."	February 10	Sept. 1	29	+ 0.2
Davison	5645	2	6, Side, Newcastle-on-Tyne.	Auxiliary, with "Airy's Compensation."	February 10	Sept. 1	29	— 3.8
Nelson	2829	2	31, Halton Road, Canonbury, N.	Ordinary balance, with Poole's check action. "Airy's Com-	February 10	Sept. 1	29	+ 0.5
J. Poole and Co. ...	5677	2	33, Spencer Street, Clerkenwell.	Poole's auxiliary. "Airy's Compensation." [pensation.]	February 10	Sept. 1	29	+ 4.0
Russell and Son	2853	2	Church Street, Liverpool.	Auxiliary in cold. "Airy's Compensation."	February 10	Sept. 1	29	— 5.5
Sewill	4221	2	61, South Castle Street, Liverpool.	Auxiliary compensation. "Airy's Compensation."	February 10	Sept. 1	29	— 2.5
Williams	1179	2	2, Bute Dock, Cardiff.	Auxiliary. "Airy's Compensation."	February 10	Sept. 1	29	— 4.9
Usher and Cole	1507	2	105, St. John's Street Road, Clerkenwell,	Auxiliary to balance. "Airy's Compensation."	February 10	Sept. 1	29	— 6.2
Davison	5974	2	6, Side, Newcastle-on-Tyne. [E.C.]	Auxiliary with "Airy's Compensation."	February 10	Sept. 1	29	— 33.0
Usher and Cole	1517	2	105, St. John's Street Road, Clerkenwell,	Auxiliary to balance. "Airy's Compensation."	February 10	Sept. 1	29	— 17.8
Nelson	2836	2	31, Halton Road, Canonbury, N. [E.C.]	Ordinary balance, with auxiliary in cold. "Airy's Com-	February 10	Sept. 1	29	+ 3.6
W. Webb	5550	2	4, Pullen's Row, Islington.	Auxiliary in cold. "Airy's Compensation." [pensation.]	February 10	Sept. 1	29	— 5.5
Keys	252	2	15, Craven Street, Strand, W.C.	Ordinary balance, with auxiliary. "Airy's Com- [pensation.]"	February 10	Sept. 1	29	— 23.0

The sign + indicates that the rate is gaining.

† During these weeks the Chronometers were placed in the chamber of a stove heated by jets of gas. The gas flames are exterior to the chamber, into which none of the injurious products of combustion can enter. In the column "Before and after what Day" the positions of the symbol (†), before or after the date, indicate respectively exposure to heat in the week immediately preceding, or in the week immediately following.

PRINCIPAL CHANGES OF RATE.

In what Week.	Greatest Weekly Sum.	In what Week.	Difference between the Greatest and Least.	Greatest Difference between one Week and the next.	Before and after what Day.	NAME OF MAKER.	No.
March 31 to April 7†	+ 1.5	May 26 to June 2	9.0	3.5	May 5	Isaac	1612
February 10 to 17	+ 9.5	August 18 to 25	12.4	4.5	† April 21	Edward and Sons	2138
May 26 to June 2	+ 18.4	April 7 to 14†	11.8	5.0	† July 21	Keys	399
June 30 to July 7†	+ 11.0	July 21 to 28	14.1	5.0	July 28	McGregor and Co.....	^M 3773
February 10 to 17	+ 9.0	August 25 to Sept. 1	10.3	8.5	† April 21	Isaac.....	3130
July 14 to 21†	- 8.9	June 16 to 23	12.6	8.1	June 23†	Graham and Parkes.....	3527
February 17 to 24	+ 21.2	August 11 to 18	15.9	7.2	† April 21	Pyott.....	458
February 24 to Mar. 3	+ 11.1	August 25 to Sept. 1	20.3	6.2	† July 21	J. Poole and Co.	5680
March 3 to 10	+ 13.0	August 25 to Sept. 1	23.0	5.7	April 28	Reid and Sons	2556
February 10 to 17	+ 15.0	August 25 to Sept. 1	22.2	7.7	March 24†	Sutton	2842
February 24 to Mar. 3	+ 9.1	August 11 to 18	17.8	10.3	† July 21	Hennessy	1822
July 14 to 21†	- 1.9	April 14 to 21†	22.5	8.1	† July 21	Eiffe	542
February 10 to 17	+ 35.9	July 28 to Aug. 4	26.4	6.5	July 28	Crisp	3381
February 10 to 17	+ 7.0	April 14 to 21†	24.3	9.7	May 12	Walker	7632
July 14 to 21†	+ 1.5	August 25 to Sept. 1	16.9	14.4	† July 21	Aitchison	⁹ 497
March 3 to 10	+ 0.3	April 14 to 21†	18.1	14.1	March 24†	McGregor and Co.....	5002
March 17 to 24	+ 37.7	August 25 to Sept. 1	25.2	11.5	March 24†	Mann	3472
March 24 to 31†	+ 12.5	April 21 to 28	19.1	14.7	March 24†	Walker	4645
March 24 to 31†	+ 2.4	May 19 to 26	19.1	14.9	March 24†	Sewill	4220
April 7 to 14†	+ 9.6	February 17 to 24	20.1	15.3	† July 21	Eiffe.....	541
July 14 to 21†		April 21 to 28					
March 24 to 31†	+ 20.5	August 18 to 25	25.5	13.7	† July 21	Glover.....	332
February 10 to 17	+ 27.0	August 25 to Sept. 1	26.8	13.4	† July 21	Aitchison	² 487
March 3 to 10	+ 27.7	August 11 to 18	31.5	11.3	March 24†	Davison.....	5645
February 10 to 17	+ 26.5	August 25 to Sept. 1	26.0	15.0	† July 21	Nelson	2829
February 17 to 24	+ 36.5	August 25 to Sept. 1	32.5	12.4	March 24†	J. Poole and Co.	5677
March 10 to 17	+ 23.0	August 18 to 25	28.5	15.2	March 24†	Russell and Son	2853
June 23 to 30†	+ 22.5	May 26 to June 2	25.0	20.8	June 23†	Sewill	4221
July 14 to 21†	+ 21.0	August 25 to Sept. 1	25.9	21.8	† July 21	Williams	1179
February 10 to 17	+ 42.5	August 25 to Sept. 1	48.7	11.0	† July 21	Usher and Cole	1507
March 3 to 10	- 1.8	August 11 to 18	31.2	20.0	March 24†	Davison.....	5974
March 3 to 10	+ 33.5	August 11 to 18	51.3	10.3	† July 21	Usher and Cole	1517
February 10 to 17	+ 78.4	July 14 to 21†	74.8	20.5	March 24†	Nelson.....	2836
March 17 to 24	+ 53.2	July 14 to 21†	58.7	37.1	† July 21	W. Webb.....	5550
March 17 to 24	+ 43.5	August 18 to 25	66.5	56.4	March 24†	Keys	252

The Chronometers are placed in order of merit, their respective positions being determined by consideration of irregularities of rate exhibited in the Table above.

The Chronometer, A. W. Webb 501, was removed by the maker in the the third week of the trial, the main spring having been found broken. Its rates not being comparable with the others, it is omitted in the Table above.