

RATES OF DECK WATCHES

ON TRIAL

FOR PURCHASE BY THE BOARD OF ADMIRALTY,

AT THE

ROYAL OBSERVATORY, GREENWICH,

FROM 1897 OCTOBER 23 TO 1898 FEBRUARY 12.

Wt. 24563.

NAME OF MAKER.	No. of Chronometer.	Construction of Escapement and Balance, from the Description furnished by the Maker.	(I) WEEKLY RATES												NAME OF MAKER.	No.
			July 3-10	July 10-17	July 17-24	July 24-31	July 31 to Aug. 7	Aug. 7-14	Aug. 14-21	Aug. 21-28	Aug. 28 to Sept. 4	Sept. 4-11	Sept. 11-18	Sept. 18-25		
Gardner	4571	2 Compensation for extremes; palladium spring	+2.6	+3.8	+3.4	+3.5	+4.5	+3.0	+4.5	+2.8	+0.0	+0.9	+3.8	+2.1	Gardner	4571
Kullberg	6308	Reversed detent. Kullberg's auxiliary balance; palladium spring	+0.5	+1.0	+1.8	+3.6	+1.7	+2.1	+3.8	+2.1	+0.0	+2.8	+3.8	+4.0	Kullberg	6308
Johannes & Co.	4654	Reversed detent. Kullberg's auxiliary balance; palladium spring	+0.2	+2.3	+2.5	+3.6	+3.8	+4.5	+3.8	+3.8	+1.5	+1.1	+1.1	+1.1	Johannes & Co.	4654
Johannes & Co.	4658	2 Auxiliary to balance acting in heat; palladium spring	+0.5	+1.5	+1.5	+1.5	+2.0	+1.4	+2.5	+2.4	+1.1	+2.8	+3.6	+3.0	Johannes & Co.	4658
Johannes & Co.	4652	2 Auxiliary to balance acting in heat; palladium spring	+1.8	+1.4	+1.6	+1.1	+0.8	+0.9	+2.8	+1.1	+1.0	+1.0	+1.0	+0.2	Johannes & Co.	4652
Iversen	1188	2 Auxiliary to balance acting in cold; blue steel spring	-6.2	-7.4	-7.7	-7.0	-6.1	-6.8	-6.8	-6.0	-8.5	-6.6	-2.6	-4.2	Iversen	1188
Usher & Cole	8215	2 Auxiliary to balance acting in heat and cold; steel spring	-0.3	+1.2	+4.3	+3.9	+4.3	+0.3	+1.7	+0.9	+3.1	+8.0	+10.5	+11.1	Usher & Cole	8215
Kullberg	6110	Reversed detent. Kullberg's auxiliary balance; palladium spring	-0.6	+0.5	+0.5	+0.7	+0.7	+1.0	+1.9	+1.7	+1.1	+1.4	+0.9	+1.8	Kullberg	6110
Johannes & Co.	4656	2 Auxiliary to balance acting in heat; palladium spring	+1.5	+1.5	+1.5	+1.5	+1.5	+1.5	+1.5	+1.5	+1.5	+1.5	+1.5	+1.5	Johannes & Co.	4656
Kullberg	6304	Reversed detent. Kullberg's auxiliary balance; palladium spring	+1.7	+2.0	+2.6	+3.4	+2.4	+2.3	+2.1	+2.5	+1.4	+2.5	+2.2	+1.2	Kullberg	6304
Johannes & Co.	4657	2 Auxiliary to balance acting in heat; palladium spring	-2.0	+3.0	+3.7	+4.4	+4.9	+4.5	+6.6	+4.0	-1.9	-0.7	+0.6	+6.2	Johannes & Co.	4657
Johannes & Co.	4658	2 Auxiliary to balance acting in heat; palladium spring	+5.4	+4.8	+4.2	+3.4	+0.0	-0.2	-1.3	+2.7	+3.7	-3.9	-2.4	-1.5	Johannes & Co.	4658
E. Dent & Co.	4923	2 Dent's balance; bright steel spring	+13.7	+16.9	+12.3	+12.2	+12.6	+12.3	+12.1	+10.0	+3.8	+5.4	+11.4	+11.4	E. Dent & Co.	4923
Webb	5672	2 Ordinary balance; palladium spring	+2.2	+1.8	+2.0	+1.4	+2.0	+2.6	+2.4	+2.2	+2.0	+1.9	+1.7	+2.0	Webb	5672
Johannes & Co.	4655	2 Auxiliary to balance acting in heat; palladium spring	-0.8	-1.7	-0.4	-1.3	-2.3	-1.2	-0.6	-0.6	-0.0	+2.0	+2.5	+1.5	Johannes & Co.	4655
Reid & Sons	4772	2 Loom's auxiliary compensation; palladium spring	-4.6	-5.8	-5.7	-4.9	-1.6	-3.2	-4.4	+2.2	+0.6	+2.5	-0.4	-3.6	Reid & Sons	4772
Kullberg	6273	Reversed detent. Kullberg's auxiliary balance; palladium spring	-1.0	-1.0	-0.9	-1.0	-1.2	-0.1	-0.0	-0.8	-2.0	-3.5	-3.2	-5.2	Kullberg	6273
Kullberg	6108	Reversed detent. Kullberg's auxiliary balance; palladium spring	+0.7	+0.9	+2.0	+2.0	+1.5	+1.8	+1.5	+0.7	+3.9	+4.0	+5.4	+1.9	Kullberg	6108
Johannes & Co.	4659	2 Auxiliary to balance acting in heat; palladium spring	+4.7	+5.1	+8.1	+10.9	+13.1	+12.9	+12.0	+12.1	+13.0	+13.0	+13.2	+8.8	Johannes & Co.	4659
E. Dent & Co.	49212	2 Dent's balance; bright steel spring	+11.1	+9.9	+10.9	+10.1	+14.9	+13.4	+16.7	+12.4	+7.4	+7.3	+13.6	+17.4	E. Dent & Co.	49212
Johannes & Co.	4650	2 Auxiliary to balance acting in heat; palladium spring	-3.1	-3.2	-1.2	-0.9	-0.2	+0.4	+0.8	+2.3	+4.6	+5.2	+6.9	+8.1	Johannes & Co.	4650
Johannes & Co.	4658	2 Reversed detent. Kullberg's auxiliary balance; palladium spring	-2.1	-3.1	-2.9	-3.0	-2.2	-2.3	-3.6	+4.5	+5.2	+6.9	+8.1	+1.0	Johannes & Co.	4658
Johannes & Co.	4566	2 Auxiliary to balance acting in heat; palladium spring	-9.7	-1.7	-3.6	-6.9	-8.0	-8.4	+0.7	+1.5	+0.9	+1.9	-2.3	-2.3	Johannes & Co.	4566
Gardner	4562	2 Compensation for extremes; palladium spring	-1.0	-1.0	-1.7	-1.2	-1.0	-18.0	-17.7	-18.5	-21.7	-21.3	-20.7	-20.5	Gardner	4562
Insee	2350	2 Ordinary balance; palladium spring	+5.4	+5.5	+5.4	+5.4	+6.1	+7.9	+8.9	+4.8	+5.9	+4.8	+12.6	+13.9	Insee	2350
Johannes & Co.	4658	2 Auxiliary to balance acting in heat; palladium spring	+4.9	+5.0	+7.9	+9.1	+8.9	+11.1	+11.9	+14.6	+14.7	+15.6	+13.9	+11.5	Johannes & Co.	4658
Kullberg	6300	Reversed detent. Kullberg's auxiliary balance; palladium spring	+0.8	-0.8	-2.1	-0.8	-3.7	-2.0	-2.2	-3.3	+1.7	+4.9	+8.7	+3.3	Kullberg	6300
Insee	574	2 Reversed detent. Kullberg's auxiliary balance; palladium spring	-0.7	-1.0	-0.7	-0.6	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	-0.5	Insee	574
Kullberg	6110	2 Reversed detent. Kullberg's auxiliary balance; palladium spring	-2.8	-1.7	-1.9	-2.2	-1.3	-0.9	+0.6	+4.9	+1.6	+3.9	+4.3	+3.7	Kullberg	6110
Reid & Sons	4772	2 Loom's auxiliary compensation; palladium spring	-4.0	-3.4	-3.3	-4.1	-6.1	-6.1	-10.1	-3.0	-5.4	-8.7	-6.8	-12.0	Reid & Sons	4772
Johannes & Co.	4658	2 Auxiliary to balance acting in heat; palladium spring	-7.8	-6.6	-4.8	-5.9	-5.1	-4.8	-5.5	-4.6	-4.4	-2.9	-2.8	-5.8	Johannes & Co.	4658
Johannes & Co.	4658	2 Auxiliary to balance acting in heat; palladium spring	-0.7	-0.1	-0.7	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	Johannes & Co.	4658
Johannes & Co.	4658	2 Auxiliary to balance acting in heat; palladium spring	+2.1	+5.0	+4.9	+4.1	+2.9	+3.6	+1.5	+2.9	+5.0	+1.6	+1.6	+2.4	Johannes & Co.	4658
E. Dent & Co.	47327	2 Dent's balance; bright steel spring	+11.9	+10.6	+11.5	+12.3	+13.8	+15.8	+14.7	+16.4	+17.4	+21.0	+25.9	+19.5	E. Dent & Co.	47327
Kullberg	6308	2 Reversed detent. Kullberg's auxiliary balance; palladium spring	+0.5	+0.5	+1.5	+2.1	+2.1	+2.0	+1.6	+2.0	-0.7	-0.1	+0.5	+0.5	Kullberg	6308
Usher & Cole	8229	2 Right addition to ordinary balance; palladium spring	+4.1	+4.1	+3.4	+1.8	+3.1	+0.6	+0.7	+1.2	+4.9	+4.9	+7.6	+7.2	Usher & Cole	8229
Insee	2350	2 Right addition to ordinary balance; palladium spring	+5.9	+1.0	+3.6	+4.8	+3.6	+3.1	+1.9	+3.6	+3.2	+1.0	+14.5	+9.5	Insee	2350
Pyott	693	2 Auxiliary to ordinary balance; bright steel spring	+1.9	+6.1	+7.2	+6.8	+6.8	+8.1	+5.5	+10.0	+1.9	+1.8	+8.6	+2.8	Pyott	693
Johannes & Co.	4611	2 Auxiliary to balance acting in heat; palladium spring	-14.8	-9.8	-4.4	-5.0	-6.8	-8.1	-1.7	+2.0	+1.2	-0.1	-0.1	-5.0	Johannes & Co.	4611
Chronometrical Ther- mometer			+95.2	-67.9	-197.9	-149.9	-323.3	-280.1	+0.2	-167.8	-264.2	-260.6	-162.6	+688.7	Chronometrical Ther- mometer	
Mean Weekly Tempera- ture			67.8	69.5	71.1	70.4	72.6	70.9	68.3	86.8	90.8	90.8	84.7	90.0	Mean Weekly Tempera- ture	
Extremes of Tempera- ture as shown by the Self-Registering Ther- mometer			55.8-96.0	67.7-72.9	69.8-72.9	68.5-73.8	68.4-75.9	68.5-73.8	68.6-75.9	68.0-90.9	92.0-101.1	88.2-101.1	87.5-97.0	97.3-98.6	Extremes of Tempera- ture as shown by the Self-Registering Ther- mometer	

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 temperature being regulated by Kullberg's automatic governor which controls the supply 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 ORDER OF TIME.

																	NAME OF		No.
																	MAKER.		
Sept. 25 Oct. 2	Oct. 2-9	Oct. 9-16	Oct. 16-23	Oct. 23-30	Oct. 30 to Nov. 6	Nov. 6-13	Nov. 13-20	Nov. 20-27	Nov. 27 Dec. 4	Dec. 4-11	Dec. 11-18	Dec. 18-25	Dec. 25 to Jan. 1	Jan. 1-8	Jan. 8-15	Jan. 15-22			
+1.8	+0.5	+2.8	+1.9	+2.0	+1.4	+2.6	+3.9	+6.0	+3.8	+8.4	+3.1	+9.0	+3.8	+3.0	+3.7	+4.1	Gardner	4563	
+1.6	+0.4	+2.0	+0.8	+1.1	+1.1	+4.4	+4.5	+6.0	+7.2	+6.3	+4.3	+5.8	+4.3	+3.5	+3.7	+4.1	Kullberg	6304	
+2.6	+4.4	+3.7	+4.5	+3.8	+2.4	+3.7	+4.4	+6.5	+7.8	+6.3	+5.2	+7.1	+8.3	+9.0	+9.0	+9.0	Kullberg	6284	
+0.8	+0.2	+1.8	+0.4	+0.6	+1.0	+1.4	+3.3	+2.1	+3.8	+2.8	+3.9	+3.5	+1.5	+3.7	+3.4	+3.7	Johannes & Co.	4652	
-6.6	-6.9	-4.5	-9.1	-7.8	-8.7	-6.0	-4.2	-1.9	-3.8	-4.6	-1.5	-6.5	-4.9	-8.2	-6.6	-8.2	Iversen	1188	
+9.8	+9.8	+10.1	+10.0	+9.7	+10.0	+10.9	+10.0	+9.8	+9.1	+10.0	+12.3	+11.1	+11.4	+11.5	+11.9	+11.9	Usher & Cole	8215	
+0.2	+1.1	+0.4	+0.3	+0.2	-0.1	+2.3	+0.6	+0.9	+1.1	+3.1	+4.2	+3.7	+3.6	+5.4	+6.6	+6.8	Kullberg	6110	
+0.2	+1.1	-1.4	-3.1	-2.9	-1.6	-1.9	-0.5	+1.0	+2.4	+2.6	+0.8	+0.2	+0.6	-1.0	-1.2	-2.0	Johannes & Co.	4649	
+0.9	-2.3	2.1	-1.0	-1.6	-1.9	+3.4	+1.2	+1.9	+1.6	-1.9	-2.4	-2.9	-8.6	-2.6	-4.2	-3.2	Kullberg	5804	
+5.5	+3.6	+4.1	+2.6	+2.0	+2.5	-0.5	-1.2	-0.7	+1.7	+0.7	+0.5	+0.1	-0.4	-1.7	-3.1	-2.6	Johannes & Co.	4665	
+11.3	+10.6	+12.0	+11.0	+10.4	+11.9	+10.3	+7.4	+7.1	+11.2	+12.6	+12.5	+8.8	+12.4	+11.6	+10.3	+11.8	Johannes & Co.	4679	
+10.6	+10.9	+12.1	+12.1	+12.1	+12.1	+12.1	+12.1	+12.1	+12.1	+12.1	+12.1	+12.1	+12.1	+12.1	+12.1	+12.1	Webb	5672	
-2.0	-0.2	+1.1	-0.9	+1.6	+2.8	+0.9	+1.5	+0.8	-2.1	+3.8	+4.2	+5.2	+4.0	+4.1	+4.7	+4.7	Johannes & Co.	4650	
-4.3	-7.9	-6.3	-5.7	-6.9	-6.4	-1.9	+0.3	+0.6	+8.7	-7.8	-2.2	-6.6	-2.4	-5.9	-6.2	-7.2	Reid & Sons	4772	
-6.1	-8.7	-9.4	-8.6	-9.0	-8.6	-9.1	-8.9	-6.9	-11.1	-11.0	-10.5	-13.8	-13.6	-15.2	-15.2	-15.2	Johannes & Co.	4659	
+4.0	+2.9	+2.5	+1.3	+1.4	+1.8	+2.8	+4.8	+5.6	+5.7	+1.1	-1.3	-3.2	-3.8	-4.2	-4.8	-4.8	Kullberg	6108	
+10.9	+7.8	+7.1	+8.0	+1.5	+8.7	+10.7	+14.6	+18.6	+18.0	+0.0	+0.0	+0.0	+11.1	+10.7	+10.7	+10.7	Johannes & Co.	4658	
+17.9	+18.1	+19.9	+19.0	+19.1	+20.3	+16.1	+14.2	+14.7	+19.6	+15.1	+19.0	+19.4	+19.3	+18.6	+18.6	+18.6	E. Dent & Co.	49212	
+1.3	-0.9	-0.7	+0.2	+0.5	+2.5	+4.2	+5.6	+7.0	+9.5	+7.5	+2.8	+1.2	-1.1	-0.7	-2.1	-0.4	Johannes & Co.	4650	
-7.0	-7.5	-6.7	-7.8	-6.6	-5.9	-0.1	-2.1	-2.1	-0.6	-6.7	-6.5	-7.6	-9.9	-10.7	-9.4	-9.4	Johannes & Co.	4659	
-1.3	-4.1	-3.8	-3.8	-3.8	-3.8	-1.5	+4.0	+4.2	+4.2	-1.5	-0.0	-5.1	-3.9	-4.4	-4.4	-4.4	Johannes & Co.	4654	
-25.9	-24.0	-22.9	-25.6	-25.0	-22.0	-22.0	-19.1	-17.9	-21.0	-22.0	-20.6	-24.6	-23.8	-22.6	-22.6	-22.6	Gardner	4562	
+9.4	+10.6	+8.8	+5.4	+8.1	+8.5	+7.2	+8.6	+10.6	+16.1	+11.0	+4.7	+6.8	+6.2	+2.7	+1.4	+2.9	Insee	2050	
+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	Johannes & Co.	4658	
+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	+3.6	Johannes & Co.	4658	
+0.5	+7.2	+9.8	+7.1	+7.1	+11.5	+10.8	+6.1	+6.2	+7.0	+4.9	+6.0	+10.3	+10.9	+7.0	+5.6	+8.0	Keys	974	
+0.5	+4.4	+2.3	+3.8	+2.0	+4.5	+10.5	+11.9	+13.1	+11.4	+7.1	+9.9	+4.1	+1.5	+1.9	+2.0	+2.5	Kullberg	6110	
-16.7	-12.9	-9.9	-16.3	-15.4	-12.2	-9.5	-10.7	-15.5	-16.2	-11.3	-9.4	-8.9	-7.4	-7.2	-8.7	-8.7	Reid & Sons	4772	
-8.1	-9.9	-10.0	-8.0	-10.9	-11.4	-8.7	-9.8	-14.9	-15.6	-10.7	-8.6	-10.7	-12.3	-12.3	-13.3	-13.3	Johannes & Co.	4674	
+2.9	+0.0	+1.9	+1.7	-1.0	-1.7	+6.0	+9.0	+11.2	+4.6	+3.1	+3.4	+2.8	+3.1	+4.0	+4.0	+1.4	Johannes & Co.	4694	
+1.9	-1.5	-1.4	-3.8	-4.4	-1.6	+7.0	+2.9	+9.6	+7.7	+7.0	+7.0	+6.0	+7.3	+7.0	+10.7	+11.1	Johannes & Co.	4776	
+17.1	+18.8	+19.4	+16.9	+17.0	+19.8	+20.2	+22.2	+24.6	+20.3	+20.1	+26.0	+26.0	+26.0	+26.0	+26.0	+26.0	E. Dent & Co.	4757	
-0.7	-3.3	-3.8	-2.9	-4.1	-4.7	-0.3	-1.1	-0.9	-0.1	-8.4	-6.0	-7.7	-9.3	-7.4	-10.2	-8.4	Kullberg	6306	
+4.5	+4.1	+3.8	+5.8	+8.0	+9.9	+6.1	+9.9	+12.8	+14.5	+14.2	+15.6	+12.7	+16.3	+13.9	+16.4	+16.4	Johannes & Co.	4666	
+1.9	+4.9	+5.1	+5.8	+7.2	+9.9	+12.8	+15.2	+16.1	+14.7	+7.1	+10.3	+8.0	+8.0	+8.0	+8.0	+8.0	Insee	2066	
+6.9	+4.9	+4.9	+5.8	+7.2	+9.9	+12.8	+15.2	+16.1	+14.7	+7.1	+10.3	+8.0	+8.0	+8.0	+8.0	+8.0	Johannes & Co.	4666	
-7.5	-10.6	-9.0	-11.2	-11.2	-3.9	-1.1	+1.0	+0.7	-0.4	-5.8	-3.9	-11.4	-10.4	-11.5	-12.7	-11.8	Johannes & Co.	4611	
+476.7	+928.7	+1120.0	+894.6	+905.7	+1153.4	-1181.2	-2118.4	-2017.4	+1123.0	+1371.0	+1270.0	+1441.0	+1554.0	+1424.0	+1457.9	+1394.1	Chromometrical Thermometer.		
62.6	57.1	55.7	61.6	57.6	55.2	80.0	91.5	88.2	78.5	52.2	54.5	53.3	50.4	53.6	53.2	53.4	Mean Weekly Temperature.		
57.88-62.67	61.70-59.27	59.67-58.34	61.55-59.61	61.56-74.14	58.71-56.77	74.14-80.94	80.39-94.07	78.35-67.51	61.34-48.83	46.68-56.49	56.49-40.72	52.62-57.65	48.83-37.04	38.33-27.04	Extremes of temperatures as shown by thermometer.				

NAME OF MAKER.				No.	Watches on days.	(L) WEEKLY RATES												IN ORDER OF TIME												NAME OF MAKER.		No.					
						Construction of Escapement and Balance, from the Description furnished by the Maker.																															
				No.	Watches on days.	July 3-10	July 10-17	July 17-24	July 24-31	July 31-Aug. 7	Aug. 7-14	Aug. 14-21	Aug. 21-28	Aug. 28-Sept. 4	Sept. 4-11	Sept. 11-18	Sept. 18-25	Sept. 25-Oct. 2	Oct. 2-9	Oct. 9-16	Oct. 16-23	Oct. 23-30	Oct. 30-Nov. 6	Nov. 6-13	Nov. 13-20	Nov. 20-27	Nov. 27-Dec. 4	Dec. 4-11	Dec. 11-18	Dec. 18-25	Dec. 25-Jan. 1	Jan. 1-8	Jan. 8-15	Jan. 15-22			
Kullberg	6302	2	Reversed dent, Kullberg's auxiliary balance; spring	6302	2	-3.5	-3.0	-1.5	+2.4	+2.3	+2.3	+1.6	+2.9	+1.5	+1.6	+4.9	+2.3	-0.7	-3.7	-3.8	-3.4	-4.6	-3.6	+3.9	+5.0	+6.2	+6.5	-2.0	-3.4	-4.7	-6.3	-5.1	-6.5	-5.0	Kullberg	6302	
Usher & Cole	8189	2	Auxiliary to balance acting in heat and cold; steel spring	8189	2	-0.1	+0.8	+0.5	+2.5	+2.6	+2.6	+1.1	+0.8	+1.0	+0.8	+1.2	-2.8	-4.7	-4.7	-4.7	-4.7	-4.7	+3.9	+5.0	+6.3	+6.3	-2.0	-3.4	-4.7	-6.3	-5.1	-6.5	-5.0	Usher & Cole	8189		
Kullberg	6317	2	Reversed dent, Kullberg's auxiliary balance; spring	6317	2	-2.3	-2.9	-3.0	-2.0	+1.8	+1.3	+0.8	+0.8	+1.0	-0.9	-0.4	-6.4	-9.6	-12.5	-14.6	-13.9	-13.9	-13.9	+5.0	+7.0	+8.1	+7.4	-14.5	-16.9	-17.4	-19.0	-17.6	-18.4	-18.4	Kullberg	6317	
Gardner	6317	2	Compensation for extremes; palladium spring	6317	2	+1.0	+2.6	+2.1	+3.0	+2.6	+4.4	+4.4	+0.5	+3.6	+3.8	+5.2	-1.3	-6.8	-5.2	-4.6	-5.8	-3.6	+5.2	+6.8	+8.6	+5.4	-2.0	-7.1	-2.1	-7.0	-5.7	-6.5	-5.0	Gardner	6317		
Kullberg	6271	2	Reversed dent, Kullberg's auxiliary balance; spring	6271	2	-4.9	-6.0	-6.7	-7.5	-7.7	-7.9	-8.2	-7.9	-10.8	-11.5	-12.6	-13.6	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	Kullberg	6271	
E. Dent & Co.	4215	2	Dent's balance; bright steel spring	4215	2	-2.0	-1.4	-1.5	+2.6	+5.5	+3.8	+3.1	+2.9	+1.6	+1.6	+1.6	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	+1.6	+1.6	+1.6	+1.6	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	-1.6	E. Dent & Co.	4215	
Pyatt	8607	2	Auxiliary to balance; bright steel spring	8607	2	+3.4	+3.9	-1.6	-2.4	-2.8	-0.9	-3.8	+5.0	+7.6	+10.4	+12.8	+7.5	-13.1	-13.1	-13.1	-13.1	-13.1	-13.1	+2.6	+2.6	+2.6	+2.6	-13.1	-13.1	-13.1	-13.1	-13.1	-13.1	-13.1	-13.1	Pyatt	8607
Kullberg	6297	2	Reversed dent, Kullberg's auxiliary balance; spring	6297	2	-4.2	-4.5	-6.0	-6.6	-6.6	-7.6	-8.3	-1.5	-3.3	-5.6	-10.3	-13.3	-13.3	-13.3	-13.3	-13.3	-13.3	-13.3	+2.6	+2.6	+2.6	+2.6	-13.3	-13.3	-13.3	-13.3	-13.3	-13.3	-13.3	-13.3	Kullberg	6297
Gardner	6307	2	Reversed dent, Kullberg's auxiliary balance; spring	6307	2	+1.2	+0.9	+1.3	+0.7	+0.6	+1.0	+0.8	+1.9	+0.3	+0.6	+0.1	-1.3	-4.1	-6.9	-5.7	-5.8	-6.4	-6.6	-4.0	-3.8	-6.1	-5.1	-12.4	-14.3	-16.2	-14.8	-14.8	-16.4	-16.3	Gardner	6307	
Johannsen & Co.	4578	2	Auxiliary to balance acting in heat; palladium spring	4578	2	+3.6	+3.8	+2.6	+2.1	+1.0	+0.6	+2.3	+3.4	+1.6	+3.2	+3.5	-5.7	-7.8	-7.7	-5.9	-6.1	-7.3	+0.3	+0.2	+2.5	+5.9	-1.6	-7.0	-8.0	-8.3	-9.7	-10.4	-10.6	-10.6	Johannsen & Co.	4578	
Webb	5673	2	Ordinary balance; palladium spring	5673	2	+10.6	+14.9	+12.0	+11.9	+10.7	+12.6	+14.4	+12.7	+16.6	+16.7	+27.8	+18.5	+22.2	+21.5	+19.5	+17.6	+18.4	+19.4	+17.3	+20.6	+20.2	+22.1	+22.0	+22.6	+20.0	+22.0	+22.0	+22.0	+22.0	Webb	5673	
Johannsen & Co.	4562	2	Auxiliary to balance acting in heat; palladium spring	4562	2	+0.1	+1.3	+3.7	+5.5	+5.1	+6.3	+7.1	+4.4	+5.5	+4.0	+5.7	+7.4	+12.4	+2.4	+2.4	+2.4	+2.4	+2.4	+2.4	+2.4	+2.4	+2.4	+2.4	+2.4	+2.4	+2.4	+2.4	+2.4	+2.4	Johannsen & Co.	4562	
E. Dent & Co.	4215	2	Dent's balance; bright steel spring	4215	2	+6.2	+1.0	+8.6	+8.6	+9.3	+13.1	+14.0	+16.5	+16.5	+16.5	+16.5	+16.5	-18.1	-18.1	-18.1	-18.1	-18.1	-18.1	+16.5	+16.5	+16.5	+16.5	-18.1	-18.1	-18.1	-18.1	-18.1	-18.1	-18.1	E. Dent & Co.	4215	
Johannsen & Co.	4572	2	Auxiliary to balance acting in heat; palladium spring	4572	2	+2.6	+7.9	+13.9	+15.1	+16.7	+17.2	+18.0	+17.1	+17.4	+17.4	+17.4	-18.7	-18.7	-18.7	-18.7	-18.7	-18.7	-18.7	+17.4	+17.4	+17.4	+17.4	-18.7	-18.7	-18.7	-18.7	-18.7	-18.7	-18.7	Johannsen & Co.	4572	
Johannsen & Co.	4723	2	Auxiliary to balance acting in heat; palladium spring	4723	2	-5.9	-6.1	-6.1	-6.9	-6.5	-5.2	-4.2	-4.5	-1.0	-0.2	-1.0	-2.2	-5.1	-7.8	-7.7	-5.9	-6.1	-7.3	+0.3	+0.2	+2.5	+5.9	-1.6	-7.0	-8.0	-8.3	-9.7	-10.4	-10.6	-10.6	Johannsen & Co.	4723
Kullberg	6149	2	Reversed dent, Kullberg's auxiliary balance; palladium spring	6149	2	-4.9	-4.2	-3.1	-3.8	-2.0	-1.7	-1.4	-1.0	-1.0	-0.7	-0.4	-1.3	-2.2	-4.5	-6.6	-5.6	-6.4	-6.6	-7.6	-1.2	+0.3	-0.7	-1.3	-10.8	-12.8	-13.1	-12.9	-12.7	-12.7	-12.7	Kullberg	6149
Gardner	6317	2	Compensation for extremes; palladium spring	6317	2	-4.9	-6.0	-6.7	-7.5	-7.7	-7.9	-8.2	-7.9	-10.8	-11.5	-12.6	-13.6	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8	Gardner	6317	
E. Dent & Co.	4215	2	Dent's balance; bright steel spring	4215	2	+9.6	+7.6	+6.1	+8.9	+8.4	+7.4	+5.4	+3.2	+5.4	+7.1	+7.5	+8.6	+9.0	+12.4	+12.4	+12.4	+12.4	+12.4	+12.4	+12.4	+12.4	+12.4	+12.4	+12.4	+12.4	+12.4	+12.4	+12.4	E. Dent & Co.	4215		
Kullberg	6298	2	Reversed dent, Kullberg's auxiliary balance; spring	6298	2	-0.6	+0.8	+1.0	+1.6	+1.6	+1.6	+2.2	+3.2	+5.4	+7.1	+7.5	+8.6	+9.0	+12.4	+12.4	+12.4	+12.4	+12.4	+12.4	+12.4	+12.4	+12.4	+12.4	+12.4	+12.4	+12.4	+12.4	+12.4	Kullberg	6298		
Johannsen & Co.	4723	2	Auxiliary to balance acting in heat; palladium spring	4723	2	-9.0	-8.2	-4.7	-1.2	+5.1	+5.8	+5.9	+9.1	+6.1	+6.8	+10.4	+9.5	+3.6	+1.4	+4.2	+0.1	+2.8	+5.1	+9.9	+10.2	+11.7	+10.6	+5.8	+5.4	+5.4	+5.4	+5.4	+5.4	+5.4	Johannsen & Co.	4723	
Johannsen & Co.	4561	2	Auxiliary to balance acting in heat; palladium spring	4561	2	-2.5	-2.3	-1.1	-0.4	-0.9	-0.1	+0.3	+2.9	+3.3	+4.4	+0.7	-4.8	-2.6	-2.6	-2.6	-2.6	-2.6	-2.6	+2.9	+2.8	+7.3	+2.9	-6.0	-5.2	-8.5	-15.0	-3.9	-6.3	-6.3	Johannsen & Co.	4561	
Kullberg	6315	2	Reversed dent, Kullberg's auxiliary balance; spring	6315	2	-2.1	-3.0	-2.4	-2.2	-2.6	-2.5	-2.9	-2.5	-2.5	-2.5	-2.5	-4.1	-2.4	-5.4	-4.2	-5.8	-0.6	+2.1	+2.3	+6.1	-14.8	-18.0	-13.9	-8.9	-15.0	-3.9	-6.3	-6.3	Kullberg	6315		
Johannsen & Co.	4561	2	Auxiliary to balance acting in heat; palladium spring	4561	2	-4.9	-5.5	-5.0	-5.6	-5.0	-2.1	-3.0	-0.6	+3.6	+4.7	+4.9	+0.3	-4.1	-2.4	-5.4	-4.2	-5.8	-0.6	+2.1	+2.3	+6.1	-14.8	-18.0	-13.9	-8.9	-15.0	-3.9	-6.3	-6.3	Johannsen & Co.	4561	
E. Dent & Co.	48830	2	Dent's balance; bright steel spring	48830	2	-1.7	-4.4	-4.8	-3.8	-3.5	-4.6	-4.9	+1.3	+2.1	+3.2	+3.4	-2.8	-3.2	-6.0	-4.0	-3.0	-3.9	-5.5	+1.9	+3.4	+4.7	+4.9	-6.4	-7.4	-11.4	-11.3	-10.9	-10.4	-9.9	-9.9	E. Dent & Co.	48830
Johannsen & Co.	4568	2	Auxiliary to balance acting in heat; palladium spring	4568	2	+2.3	+10.8	+14.8	+14.3	+13.9	+10.2	+8.0	+5.7	-2.6	-2.8	-2.8	-2.4	-7.0	-6.1	-6.6	-7.4	-7.7	-5.3	-1.0	-3.1	-1.6	+1.8	+0.1	-4.2	-1.8	-4.2	-6.1	-5.6	-4.9	-4.9	Johannsen & Co.	4568
Johannsen & Co.	4566	2	Auxiliary to balance acting in heat; palladium spring	4566	2	+4.0	+1.9	+10.4	+11.5	+10.9	+10.2	+18.5	+20.5	+20.5	+20.5	+20.5	+20.5	+20.5	+20.5	+20.5	+20.5	+20.5	+20.5	+20.5	+20.5	+20.5	+20.5	+20.5	+20.5	+20.5	+20.5	+20.5	+20.5	+20.5	Johannsen & Co.	4566	
C. Frohman & Co.	4037	2	Auxiliary compensation; bright steel spring	4037	2	-16.1	-15.6	-16.2	-15.8	-17.6	-16.1	-14.0	-19.6	-16.7	-14.9	-14.3	-6.1	-3.2	-6.0	-4.0	-3.0	-3.9	-5.5	+1.9	+3.4	+4.7	+4.9	-6.4	-7.4	-11.4	-11.3	-10.9	-10.4	-9.9	-9.9	C. Frohman & Co.	4037
Usher & Cole	8221	2	Auxiliary to balance acting in heat and cold; palladium spring	8221	2	-16.1	-15.6	-16.2	-15.8	-17.6	-16.1	-14.0	-19.6	-16.7	-14.9	-14.3	-6.1	-3.2	-6.0	-4.0	-3.0	-3.9	-5.5	+1.9	+3.4	+4.7	+4.9	-6.4	-7.4	-11.4	-11.3	-10.9	-10.4	-9.9	-9.9	Usher & Cole	8221
Johannsen & Co.	4708	2	Auxiliary to balance acting in heat; palladium spring	4708	2	-11.7	-9.9	-8.0	-6.9	-4.5	-2.0	-0.2	-1.7	-1.5	+1.7	+2.4	+3.3	-6.5	-8.0	-7.3	-9.5	-9.9	-10.8	-9.5	+1.6	+0.1	-3.3	-8.1	-9.5	-12.3	-15.1	-15.9	-15.7	-15.7	Johannsen & Co.	4708	
Usher & Cole	8214	2	Auxiliary to balance acting in heat and cold; palladium spring	8214	2	-6.4	-6.3	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	-6.0	Usher & Cole	8214	
Usher & Cole	8207	2	Reversed dent, Kullberg's auxiliary balance; spring	8207	2	+10.0	+9.3	+10.0	+11.3	+10.6	+13.4	+14.7	+9.9	+9.3	+14.5	+19.3	+3.8	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	Usher & Cole	8207	
E. Dent & Co.	48838	2	Dent's balance; bright steel spring	48838	2	+10.0	+9.3	+10.0	+11.3	+10.6	+13.4	+14.7	+9.9	+9.3	+14.5	+19.3	+3.8	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	-2.4	E. Dent & Co.	48838	
Gardner	6317	2	Compensation for extremes; palladium spring	6317	2	-4.1	-2.8	-2.7	-4.2	-3.6	-3.3	-4.3	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1	-5.1	Gardner	6317	
Keys	968	2	Improved ordinary balance; bright steel spring	968	2	+4.0	+7.9	+9.0	+6.8	+14.0	+9.2	+9.1	+28																								

AT THE ROYAL OBSERVATORY, GREENWICH, FROM 1897 JULY 3 TO 1898 JANUARY 22

[illegible]

‡ During these weeks the Chronometers were placed in the chamber of a stove heated by jets of gas, the temperature being regulated by Kullberg's automatic governor which controls the supply of gas. The gas flames are exterior to the chamber, into which none of the injurious products of combustion can enter.

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

1. If the time interval between two consecutive calls is less than 12 seconds, the call is not counted.