

RATES OF BOX AND POCKET CHRONOMETERS

ON TRIAL

FOR PURCHASE BY THE BOARD OF ADMIRALTY,

AT THE

ROYAL OBSERVATORY, GREENWICH.

BOX CHRONOMETERS—FROM 1912 JUNE 15 TO 1913 JANUARY 4.

POCKET CHRONOMETERS—FROM 1912 AUGUST 3 TO 1912 NOVEMBER 23.

(1.) WEEKLY RATES

Order of Merit.	NAME OF MAKER.	No.	Whether a set day.	IN ORDER OF TIME.													
				June 15-22	June 22-29	June 29 to July 6	July 6-13	July 13-20	July 20-27	July 27 to Aug. 3	Aug. 3-10	Aug. 10-17	Aug. 17-24	Aug. 24-31	Aug. 31 to Sept. 7	Sept. 7-14	Sept. 14-21
1	V. Kullberg.....	8861	2	+2.4	+1.9	+1.2	+0.2	+0.1	+1.5	+1.3	+0.2	-0.8	-1.1	-0.9	+1.1	+0.1	-0.1
2	V. Kullberg.....	8862	2	+1.0	+0.8	-0.5	+0.7	-0.9	+0.9	+0.1	+0.5	-1.3	-1.9	-0.6	+0.4	-0.4	+1.2
3	V. Kullberg.....	8810	2	+1.0	+1.8	+0.8	+0.9	+1.0	+1.5	+1.9	-0.8	-0.4	-0.2	-0.2	-0.1	-1.0	-2.8
4	V. Kullberg.....	8815	2	+1.5	+1.5	+0.9	+0.9	+0.9	+1.4	+1.4	+1.4	+1.4	+2.6	+2.6	+2.6	+2.6	+2.6
5	A. Johansen & Co.	6586	2	+5.7	+6.7	+6.8	+6.8	+6.8	+9.4	+9.3	+9.3	+11.6	+12.7	+12.7	+10.0	+11.4	+11.1
6	A. Johansen & Co.	6570	2	+1.4	+1.8	+0.3	-0.9	+1.2	+1.4	+1.5	+5.8	+8.7	+9.2	+8.3	+5.5	+4.6	+2.5
7	V. Kullberg.....	8118	2	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0
8	V. Kullberg.....	8245	2	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0
9	V. Kullberg.....	8857	2	+2.8	+4.1	+2.5	+3.2	+3.0	+6.8	+6.8	+10.0	+9.1	+8.4	+7.6	+6.4	+6.4	+6.6
10	V. Kullberg.....	8814	2	+0.2	+0.1	-0.8	-0.1	+0.8	-0.6	-0.6	-0.4	-4.4	-6.8	-7.5	-5.8	-5.8	-6.6
11	W. Lindqvist.....	105	2	+2.8	+3.4	+4.1	+3.3	+4.0	+6.5	+7.8	+11.8	+10.1	+9.5	+9.8	+13.4	+9.0	+6.2
12	V. Kullberg.....	8811	2	+1.8	+2.7	+3.3	+3.1	+0.9	+0.4	+2.9	+2.4	+1.8	+1.4	+2.2	+4.6	+4.8	+0.9
13	A. Kullberg.....	8194	2	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0	+1.0
14	A. Johansen & Co.	6586	2	+4.9	+4.9	+4.9	+4.9	+4.9	+6.1	+3.7	+4.7	+3.4	+3.4	+2.2	+9.3	+9.0	+10.7
15	V. Kullberg.....	8282	2	+0.5	+0.7	+1.4	+0.3	+1.1	+2.1	+0.9	+3.0	+3.5	+3.6	+4.5	+3.1	+2.5	+3.1
16	A. Johansen & Co.	6556	2	-2.5	0.0	+2.2	+2.5	-0.5	+0.2	+0.1	-1.3	+2.2	+3.4	+4.4	+10.1	+8.6	+12.4
17	A. W. Webb.....	5621	2	+10.8	+12.3	+12.4	+12.4	+12.4	+12.1	+19.6	+11.0	+10.6	+11.4	+9.0	+11.0	+9.0	+2.4
18	A. Johansen & Co.	6558	2	+0.1	+1.9	+1.2	+1.8	+0.9	+7.8	+9.8	+6.2	+3.8	+2.6	+5.1	+9.9	+7.2	+6.1
19	E. Dent & Co.	5714	2	+0.2	+2.0	+2.2	+2.2	+2.2	+2.2	+2.2	+2.2	+2.2	+2.2	+2.2	+2.2	+2.2	+2.2
20	E. Dent & Co.	5712	2	-1.6	+0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8
21	E. Dent & Co.	5720	2	+5.2	+5.6	+4.2	+5.1	+4.9	+5.5	+6.4	+4.5	+7.7	+11.0	+17.7	+20.4	+15.9	+14.8
22	Usher & Cole.....	2949	2	+10.8	+11.5	+10.8	+11.1	+14.1	+14.4	+17.2	+12.4	+11.4	+8.7	+10.4	+11.1	+8.1	+6.5
23	A. Johansen & Co.	6522	2	+9.9	+7.7	+7.2	+6.3	+7.0	+6.5	+8.7	+10.9	+5.5	+12.4	+6.7	+7.8	+8.1	+8.1
24	Usher & Cole.....	2944	2	-3.0	-0.1	-2.9	-3.8	-2.2	-0.5	+1.5	+2.8	+3.1	-0.5	+3.1	-1.5	+7.1	+5.0
25	A. W. Webb.....	5707	2	-10.2	-14.2	-14.8	-14.8	-14.2	-14.5	-12.6	-22.8	-18.0	-16.7	-18.5	-22.7	-20.5	-21.6
26	A. Johansen & Co.	6589	2	-0.6	+0.1	-0.3	+0.3	+3.0	+1.8	+0.4	+8.1	+9.0	+10.3	+13.4	+11.8	+7.6	+2.0
27	V. Kullberg.....	8141	2	-1.7	-1.9	-2.8	-2.2	-1.1	-0.8	-1.6	+3.5	+5.8	+6.0	+5.1	-1.9	-3.8	-0.0
28	A. Johansen & Co.	6587	2	-1.0	+0.1	-1.7	+0.6	+4.0	+1.7	+10.1	+10.1	+10.1	+10.1	+10.1	+10.1	+10.1	+10.1
29	Usher & Cole.....	2945	2	-1.8	-4.4	-2.5	-3.4	-4.0	-0.6	-7.8	-7.4	-8.6	-11.1	-4.1	-14.1	-15.5	-14.8
30	A. Johansen & Co.	6581	2	+1.7	+2.8	+1.7	-4.0	+2.2	+3.0	+5.7	-6.1	+1.4	+7.0	+7.1	+7.2	+4.8	+6.7
31	A. Johansen & Co.	6477	2	-7.8	-5.5	-9.7	-8.3	-6.8	-4.0	-1.0	+0.8	-5.9	-4.2	-2.5	-3.2	-1.2	-0.5
32	A. Johansen & Co.	6475	2	-12.0	-11.5	-11.6	-6.2	-7.8	-7.8	-2.0	-0.8	-4.7	-4.2	-2.5	-0.8	-6.3	-0.6
33	F. J. Woods.....	130	2	-29.7	-30.7	-28.2	-28.8	-27.7	-25.8	-28.0	-27.3	-29.9	-24.0	-15.2	-6.5	-7.4	-9.6
34	Carley & Clémence	6359	2	+2.5	+2.7	+5.8	+4.0	+7.3	+9.9	+11.1	+13.2	+10.7	+10.5	+19.4	+22.0	+19.0	+10.0
35	C. Crisp.....	1512	2	+39.0	+39.0	+37.9	+38.3	+38.2	+37.0	+36.5	+38.2	+10.1	+11.5	+20.4	+32.1	+37.7	+38.4

Chromometer Thermometer.....	-502.5	-681.4	-355.3	-752.8	-1292.0	-755.3	-563.8	-2387.2	-3254.0	-3245.4	-2380.6	-256.8	+17.5	+42.8
Mean Weekly Temperature.....	65.0	66.7	63.6	68.7	72.4	68.4	66.0	87.3	95.9	96.8	85.8	62.2	59.9	59.8
Extremes of Temperature as shown by the Self-Registering Thermometer.....	61.3	64.0	62.1	64.1	64.3	65.5	62.2	82.2	89.3	94.2	81.6	60.8	57.5	57.5
	71.8	72.7	65.8	78.6	77.6	72.0	70.8	89.9	101.5	102.1	89.2	64.0	62.2	61.8

The Chronometers are placed in order of merit, their respective positions being determined by consideration of the irregularities of rate exhibited in Table II.
 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 irregular products of combustion can enter.

IN ORDER OF TIME.

															NAME OF MAKER.		No.
Sept. 21-28	Sept. 28 to Oct. 5	Oct. 5-12	Oct. 12-19	Oct. 19-26	Oct. 26 to Nov. 2	Nov. 2-9	Nov. 9-16	Nov. 16-23	Nov. 23-30	Nov. 30 to Dec. 7	Dec. 7-14	Dec. 14-21	Dec. 21-28	Dec. 28 to Jan. 4			
+ 0.4	- 1.2	- 1.6	- 1.6	+ 0.8	+ 0.8	+ 1.2	+ 1.3	+ 2.0	+ 2.8	+ 3.1	+ 3.6	+ 3.3	+ 2.8	+ 1.3	V. Kullberg.....	8361	
- 1.4	- 1.8	- 2.8	- 3.5	- 1.7	- 2.8	- 2.2	- 0.7	- 2.1	- 2.5	- 2.8	- 2.7	- 3.0	- 3.2	- 5.6	V. Kullberg.....	8385	
- 2.0	- 2.2	- 3.9	- 3.4	- 3.6	- 2.7	- 2.9	- 3.7	- 3.0	- 3.6	- 3.6	- 3.6	- 3.7	- 4.0	- 6.7	V. Kullberg.....	8310	
+ 0.2	+ 3.2	+ 2.7	+ 2.9	+ 7.7	+ 6.3	+ 8.9	+ 7.6	+ 10.1	+ 9.3	+ 10.1	+ 9.8	+ 8.0	+ 4.2	+ 4.3	V. Kullberg.....	8315	
+ 11.4	+ 11.6	+ 11.2	+ 13.1	+ 15.9	+ 17.1	+ 16.6	+ 16.6	+ 16.6	+ 16.6	+ 14.0	+ 14.2	+ 12.5	+ 9.8	+ 11.8	A. Johansen & Co.	6586	
+ 4.8	+ 3.1	+ 3.4	+ 0.2	+ 2.0	+ 6.9	+ 7.9	+ 5.1	+ 4.8	+ 3.1	+ 4.1	+ 0.1	+ 0.2	- 0.6	- 0.4	A. Johansen & Co.	6570	
+ 1.8	+ 0.6	+ 0.1	+ 0.9	+ 4.6	+ 1.8	+ 4.2	+ 5.3	+ 4.6	+ 4.2	+ 4.8	+ 3.7	+ 3.0	+ 2.6	+ 2.5	V. Kullberg.....	8118	
+ 2.3	+ 2.1	+ 0.8	+ 1.0	+ 5.1	+ 5.9	+ 7.9	+ 10.0	+ 7.2	+ 5.1	+ 6.8	+ 4.4	+ 3.9	+ 2.9	+ 2.0	V. Kullberg.....	8245	
+ 6.8	+ 6.0	+ 4.1	+ 2.9	+ 9.3	+ 7.0	+ 8.9	+ 9.3	+ 4.3	+ 5.1	+ 6.7	+ 5.9	+ 3.8	+ 2.9	+ 1.2	V. Kullberg.....	8857	
- 1.6	- 6.9	- 7.3	- 7.8	- 9.0	- 11.9	- 12.0	- 10.9	- 9.3	- 8.9	- 8.9	- 11.2	- 11.6	- 11.6	- 11.0	V. Kullberg.....	8314	
+ 8.6	+ 7.8	+ 8.8	+ 7.2	+ 11.8	+ 12.3	+ 14.8	+ 14.6	+ 13.6	+ 13.4	+ 10.8	+ 8.1	+ 6.1	+ 6.8	+ 5.5	W. Lindqvist.....	105	
+ 1.2	+ 3.9	+ 0.8	+ 1.7	+ 1.8	+ 1.7	+ 4.4	+ 6.9	+ 8.8	+ 7.5	+ 6.6	+ 6.0	+ 6.1	+ 5.5	+ 4.1	V. Kullberg.....	8311	
- 0.7	- 0.1	- 0.5	- 0.4	+ 5.8	+ 3.9	+ 4.4	+ 7.0	+ 6.8	+ 5.0	+ 4.6	+ 3.7	+ 2.7	+ 2.0	+ 1.2	V. Kullberg.....	8194	
+ 3.9	+ 3.6	+ 11.1	+ 5.9	+ 10.8	+ 8.7	+ 10.2	+ 7.9	+ 6.8	+ 5.6	+ 5.7	+ 7.7	+ 9.1	+ 2.0	+ 2.0	V. Kullberg.....	8282	
+ 8.9	+ 7.7	+ 8.3	+ 9.4	+ 10.8	+ 9.0	+ 11.5	+ 13.7	+ 10.6	+ 6.2	+ 11.9	+ 12.0	+ 11.8	+ 11.7	+ 11.7	V. Kullberg.....	8382	
+ 3.5	+ 0.7	+ 1.0	- 0.8	+ 4.2	+ 1.7	+ 4.3	+ 4.9	+ 5.3	+ 4.4	+ 4.6	+ 2.7	+ 2.8	- 1.8	- 3.1	A. Johansen & Co.	6556	
+ 12.2	+ 13.1	+ 9.9	+ 11.1	+ 7.8	+ 7.2	+ 3.8	+ 4.3	+ 4.2	+ 11.4	+ 13.0	+ 13.0	+ 14.9	+ 14.4	+ 15.3	A. W. Webb.....	5621	
+ 6.1	+ 2.0	+ 1.4	+ 1.6	+ 3.1	+ 1.6	+ 3.1	+ 1.2	- 0.8	+ 3.4	+ 1.9	+ 3.4	+ 1.9	+ 6.3	+ 6.3	A. Johansen & Co.	6558	
+ 10.1	+ 6.9	+ 5.8	+ 1.1	+ 11.5	+ 11.9	+ 13.6	+ 10.6	+ 15.1	+ 13.4	+ 13.0	+ 10.1	+ 9.5	+ 6.8	+ 7.9	E. Dent & Co.	5714	
- 6.4	- 7.3	- 11.2	- 10.0	- 8.2	- 8.7	- 10.1	- 11.9	- 7.0	- 2.6	- 5.8	- 6.4	- 8.8	- 9.0	- 9.2	E. Dent & Co.	5712	
+ 15.8	+ 13.8	+ 12.7	+ 13.0	+ 15.7	+ 14.8	+ 16.6	+ 20.7	+ 19.1	+ 19.1	+ 17.4	+ 15.7	+ 17.1	+ 14.4	+ 14.8	E. Dent & Co.	5720	
+ 13.5	+ 13.8	+ 14.6	+ 14.6	+ 14.0	+ 14.0	+ 17.3	+ 19.2	+ 17.5	+ 19.8	+ 21.4	+ 22.2	+ 23.2	+ 22.1	+ 22.1	Usher & Cole.....	2949	
+ 14.3	+ 17.6	+ 15.5	+ 14.3	+ 19.1	+ 19.3	+ 20.6	+ 22.5	+ 19.4	+ 19.1	+ 19.7	+ 19.1	+ 18.4	+ 17.1	+ 17.5	A. Johansen & Co.	6522	
- 9.3	- 10.2	- 12.4	- 12.6	- 8.8	- 6.9	- 5.3	- 0.2	- 9.1	- 9.8	- 11.3	- 12.6	- 13.7	- 14.3	- 14.3	Usher & Cole.....	2944	
- 22.9	- 21.8	- 22.0	- 22.0	- 35.0	- 10.8	- 16.2	- 23.7	- 26.8	- 24.4	- 23.7	- 20.7	- 19.0	- 19.2	- 19.2	A. W. Webb.....	5707	
+ 4.0	+ 3.9	+ 2.4	+ 1.7	+ 11.8	+ 13.6	+ 12.2	+ 13.8	+ 8.5	+ 7.9	+ 9.9	+ 6.2	+ 6.0	+ 3.7	+ 2.7	A. Johansen & Co.	6589	
+ 19.9	+ 16.0	+ 17.0	+ 18.0	+ 21.8	+ 22.2	+ 19.0	+ 18.0	+ 19.2	+ 23.5	+ 19.6	+ 22.7	+ 23.0	+ 20.9	+ 19.1	A. Johansen & Co.	6587	
+ 12.8	+ 12.1	+ 11.3	+ 9.5	+ 6.1	+ 6.1	+ 6.1	+ 6.1	+ 6.1	+ 6.1	+ 6.1	+ 6.1	+ 6.1	+ 6.1	+ 6.1	F. J. Woods.....	130	
+ 8.4	+ 5.8	+ 2.9	+ 2.4	+ 6.7	+ 1.0	+ 3.4	+ 4.2	+ 7.7	+ 9.9	+ 8.2	+ 6.0	+ 4.8	+ 4.3	+ 4.3	A. Johansen & Co.	6581	
- 1.5	- 2.7	- 4.1	- 4.2	+ 5.9	+ 5.7	+ 6.5	+ 9.8	+ 3.5	+ 4.8	+ 4.5	+ 2.7	+ 2.7	- 0.9	- 4.7	A. Johansen & Co.	6477	
+ 5.8	- 0.4	- 4.7	- 1.9	+ 2.9	- 1.7	- 0.1	+ 2.9	+ 8.9	+ 12.1	+ 13.0	+ 6.2	+ 4.9	+ 4.6	+ 3.8	A. Johansen & Co.	6475	
+ 6.2	- 16.2	- 16.7	- 16.2	- 18.5	- 25.9	- 18.7	- 30.2	- 7.6	- 7.8	- 11.1	- 11.2	- 10.9	- 9.3	- 9.3	F. J. Woods.....	130	
+ 20.0	+ 19.3	+ 16.4	+ 25.4	+ 24.3	+ 28.3	+ 32.0	+ 27.7	+ 26.4	+ 21.7	+ 20.1	+ 18.9	+ 18.5	+ 18.5	+ 18.5	Carley & Clémence	6359	
+ 38.8	+ 38.1	+ 37.4	+ 37.9	+ 42.5	+ 43.8	+ 35.8	+ 22.1	+ 29.7	+ 39.8	+ 44.2	+ 44.2	+ 42.1	+ 44.8	+ 44.8	C. Crisp.....	1512	
+ 156.5	+ 209.5	+ 384.6	+ 776.0	+ 1443.9	+ 2548.5	+ 2517.8	+ 1477.1	+ 225.2	+ 520.0	+ 565.6	+ 178.6	+ 238.2	+ 524.6	+ 357.6	Chromothermal Thermometer.		
59.2	60.6	57.8	59.9	79.0	93.0	92.9	78.8	57.8	56.8	54.6	59.1	58.5	56.5	56.7	Mean Weekly Temperature.		
52.8	57.9	58.2	56.8	78.1	90.0	90.2	78.1	58.0	53.1	48.8	56.2	56.0	50.1	53.4	Extremes of Temperature as shown by the Self-Registering Thermometer.		
62.9	63.0	65.5	63.0	80.2	96.0	95.2	80.2	60.1	61.1	58.0	61.8	63.1	59.8	62.0			

The Chronometer Thermometer differs from an ordinary Chronometer only in the construction of the balance, the position of the metals forming the compensating rim being varied by this arrangement the effect of temperature is much magnified.
 Only those Chronometers have been included in this list for which δ did not exceed 15 seconds.

Order of Merit.	NAME OF MAKER.	No.	Whether for 3 days.	ADDRESS OF MAKER.	Construction of Escapement, Balance, and Spring, from a Description furnished by the Maker.	(II.) ABSTRACT OF		
						Least Weekly Sum.	Extremes of Temperature.	
1	V. Kullberg.....	8861	2	105 Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	- 1-6	{ 58-2 - 65-5 56-8 - 63-0	
2	V. Kullberg.....	8868	2	105 Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	- 5-6	{ 53-4 - 62-0 52-8 - 62-0	
3	V. Kullberg.....	8810	2	105 Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	- 7-9	{ 53-4 - 62-0 52-8 - 62-0	
4	V. Kullberg.....	8815	2	105 Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	+ 2-7	{ 53-2 - 65-5 52-8 - 62-0	
5	A. Johansen & Co.....	6566	2	149 Minories, London, E.	Auxiliary acting in heat; palladium spring.	+ 5-7	{ 61-3 - 71-3 61-3 - 71-3	
6	A. Johansen & Co.....	6570	2	149 Minories, London, E.	Auxiliary acting in heat; palladium spring.	- 0-9	{ 64-1 - 78-6 64-1 - 78-6	
7	V. Kullberg.....	8198	2	105 Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	- 5-1	{ 62-1 - 65-8 62-1 - 65-8	
8	V. Kullberg.....	8248	2	105 Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	- 1-1	{ 62-1 - 65-8 62-1 - 65-8	
9	V. Kullberg.....	8367	2	105 Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	+ 1-2	{ 62-1 - 65-8 62-1 - 65-8	
10	V. Kullberg.....	8314	2	105 Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	+ 12-0	{ 50-2 - 55-2 50-2 - 55-2	
11	W. Lindqvist.....	105	2	13 Alderney St., Finsley, W.	Kullberg's auxiliary balance; palladium spring.	+ 2-8	{ 61-3 - 71-3 61-3 - 71-3	
12	V. Kullberg.....	8811	2	105 Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	- 1-3	{ 52-8 - 62-9 52-8 - 62-9	
13	V. Kullberg.....	8194	2	105 Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	- 2-6	{ 54-2 - 102-1 54-2 - 102-1	
14	A. Johansen & Co.....	6525	2	149 Minories, London, E.	Kullberg's auxiliary balance; palladium spring.	+ 2-0	{ 53-4 - 62-0 53-4 - 62-0	
15	V. Kullberg.....	8262	2	105 Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	- 0-4	{ 61-3 - 65-8 61-3 - 65-8	
16	A. Johansen & Co.....	6566	2	149 Minories, London, E.	Auxiliary acting in heat; palladium spring.	- 3-1	{ 53-4 - 62-0 53-4 - 62-0	
17	A. W. Webb.....	5691	2	69 Charlton Road, Blackheath, S.E.	Auxiliary compensation balance; bright steel spring.	+ 3-8	{ 50-2 - 65-5 50-2 - 65-5	
18	A. Johansen & Co.....	6558	2	149 Minories, London, E.	Auxiliary acting in heat; palladium spring.	- 0-5	{ 53-4 - 62-0 53-4 - 62-0	
19	E. Dent & Co.....	57214	2	61 Strand, London, W.C.	Plain Earnshaw balance; palladium spring.	+ 2-2	{ 61-1 - 78-6 61-1 - 78-6	
20	E. Dent & Co.....	57219	2	61 Strand, London, W.C.	Plain Earnshaw balance; palladium spring.	- 11-9	{ 78-1 - 82-0 78-1 - 82-0	
21	E. Dent & Co.....	57220	2	61 Strand, London, W.C.	Plain Earnshaw balance; palladium spring.	+ 4-2	{ 82-1 - 65-8 82-1 - 65-8	
22	Usher & Co.....	2049	2	339 St. John Street, Clerkenwell, E.C.	Auxiliary acting in cold.	+ 4-7	{ 53-4 - 62-0 53-4 - 62-0	
23	A. Johansen & Co.....	6622	2	149 Minories, London, E.	Auxiliary acting in heat; palladium spring.	+ 3-6	{ 57-5 - 62-2 57-5 - 62-2	
24	Usher & Co.....	2054	2	339 St. John Street, Clerkenwell, E.C.	Auxiliary acting in cold.	- 14-2	{ 53-4 - 62-0 53-4 - 62-0	
25	A. W. Webb.....	5707	2	69 Charlton Road, Blackheath, S.E.	Auxiliary compensation balance; bright steel spring.	- 28-3	{ 53-4 - 62-0 53-4 - 62-0	
26	A. Johansen & Co.....	6539	2	149 Minories, London, E.	Auxiliary acting in heat; palladium spring.	- 0-6	{ 61-3 - 71-3 61-3 - 71-3	
27	V. Kullberg.....	8141	2	105 Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	- 5-0	{ 53-2 - 65-5 53-2 - 65-5	
28	A. Johansen & Co.....	6587	2	149 Minories, London, E.	Plain compensation balance; palladium spring.	- 1-0	{ 61-3 - 71-3 61-3 - 71-3	
29	Woods.....	2045	2	339 St. John Street, Clerkenwell, E.C.	Auxiliary acting in cold.	- 10-3	{ 50-1 - 55-2 50-1 - 55-2	
30	A. Johansen & Co.....	6581	2	149 Minories, London, E.	Auxiliary acting in heat; palladium spring.	- 0-1	{ 82-2 - 89-9 82-2 - 89-9	
31	A. Johansen & Co.....	6477	2	149 Minories, London, E.	Auxiliary acting in heat; palladium spring.	- 9-7	{ 62-1 - 65-8 62-1 - 65-8	
32	A. Johansen & Co.....	6478	2	149 Minories, London, E.	Auxiliary acting in heat; palladium spring.	- 12-0	{ 61-3 - 71-3 61-3 - 71-3	
33	Woods.....	130	2	7 Harley Street, Cavendish Sq., W.	Auxiliary acting in cold.	- 30-7	{ 64-0 - 72-7 64-0 - 72-7	
34	Carley & Clémence.....	51839	2	30 Ivy Place, London, E.C.	Auxiliary compensation; palladium spring.	+ 3-5	{ 61-3 - 71-3 61-3 - 71-3	
35	Crisp.....	1512	2	38 Leicester Road, East Finchley, N.	Auxiliary acting in heat.	+ 11-5	{ 94-2 - 102-1 94-2 - 102-1	

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

The sign + indicates a gaining rate.

THE PRINCIPAL CHANGES OF RATE DURING THE 29 WEEKS.

Mean Temperature.	Greatest Weekly Sum.	Extremes of Temperature.	Mean Temperature.	Difference between Greatest and Least.	Greatest Difference between one Week and the next.	Mean Temperature for these two Weeks.	Trial No. at 29.	NAME OF MAKER.	No.
57-8	+ 3-6	56-2 - 61-8	59-1	5-2	2-4	59-9 - 79-0	10-0	V. Kullberg.....	8861
56-7	+ 0-6	64-0 - 72-7	66-7	6-2	2-4	58-5 - 56-7	11-0	V. Kullberg.....	8868
56-7	+ 1-5	65-5 - 72-0	65-4	6-7	2-3	57-3 - 56-8	13-3	V. Kullberg.....	8810
57-8	+ 10-3	61-0 - 89-2	85-8	7-6	4-8	59-9 - 79-0	17-2	V. Kullberg.....	8815
65-0	+ 17-1	50-0 - 96-0	73-0	11-4	3-5	85-8 - 62-2	18-4	A. Johansen & Co.....	6566
68-7	+ 9-2	94-2 - 102-1	96-8	10-1	4-3	79-0 - 98-0	18-7	A. Johansen & Co.....	6570
63-6	+ 6-3	78-1 - 82-0	78-8	11-4	3-7	59-9 - 79-0	18-8	V. Kullberg.....	8198
63-6	+ 10-0	78-1 - 82-0	78-8	11-1	4-1	59-9 - 79-0	19-3	V. Kullberg.....	8248
56-7	+ 10-0	82-2 - 89-9	87-8	8-8	5-0	59-9 - 79-0	19-4	V. Kullberg.....	8367
52-9	+ 0-2	61-3 - 71-3	65-0	12-2	4-0	66-0 - 87-3	20-2	V. Kullberg.....	8314
65-0	+ 14-8	90-2 - 95-2	92-9	12-0	4-4	62-2 - 59-9	20-8	W. Lindqvist.....	105
59-2	+ 10-3	59-0 - 59-5	57-8	10-8	5-1	59-2 - 60-6	21-0	V. Kullberg.....	8811
96-8	+ 7-0	78-1 - 82-0	78-8	9-6	6-2	59-9 - 79-0	22-0	V. Kullberg.....	8194
56-7	+ 11-1	53-2 - 65-5	57-3	9-1	7-1	56-5 - 56-7	23-8	A. Johansen & Co.....	6525
63-6	+ 13-7	78-1 - 82-0	78-8	14-1	5-4	59-9 - 79-0	24-9	V. Kullberg.....	8262
56-7	+ 10-1	69-8 - 64-0	62-2	12-3	5-9	59-9 - 59-8	25-0	A. Johansen & Co.....	6556
92-9	+ 15-3	53-4 - 62-0	56-7	11-5	7-2	57-3 - 56-8	25-9	A. W. Webb.....	5691
56-7	+ 9-9	69-8 - 84-0	62-2	10-4	4-8	85-8 - 62-2	26-0	A. Johansen & Co.....	6558
66-7	+ 10-4	78-1 - 82-0	78-8	14-2	6-4	86-8 - 85-8	27-0	E. Dent & Co.....	57214
78-8	+ 0-6	81-6 - 89-2	85-8	12-5	7-5	86-8 - 62-2	27-5	E. Dent & Co.....	57219
63-6	+ 20-7	78-1 - 82-0	78-8	16-5	6-7	96-8 - 85-8	29-9	E. Dent & Co.....	57220
56-7	+ 22-2	81-6 - 89-2	85-8	14-5	7-8	78-8 - 57-3	30-1	Usher & Co.....	2049
59-9	+ 22-5	78-1 - 82-0	78-8	18-9	6-2	59-9 - 59-2	31-3	A. Johansen & Co.....	6622
56-7	+ 3-1	81-6 - 89-2	85-8	17-8	7-0	78-8 - 57-3	31-3	Usher & Co.....	2054
57-8	+ 12-6	62-2 - 70-2	66-0	13-7	9-7	66-0 - 87-3	33-1	A. W. Webb.....	5707
65-0	+ 18-8	78-1 - 82-0	78-8	14-4	9-6	59-9 - 79-0	33-6	A. Johansen & Co.....	6539
57-8	+ 10-8	90-2 - 95-2	92-9	15-8	11-0	59-9 - 79-0	37-8	V. Kullberg.....	8141
65-0	+ 23-0	65-0 - 63-1	58-5	24-0	7-8	56-5 - 56-7	39-6	A. Johansen & Co.....	6587
59-9	+ 4-1	50-1 - 55-2	56-5	19-6	9-7	59-9 - 62-2	39-8	Woods.....	2045
87-8	+ 9-9	48-8 - 58-0	54-6	16-0	11-8	66-0 - 87-3	39-6	A. Johansen & Co.....	6581
63-6	+ 9-8	78-1 - 82-0	78-8	19-5	10-1	59-9 - 79-0	39-7	A. Johansen & Co.....	6477
65-0	+ 13-0	48-8 - 58-0	56-0	25-0	8-3	85-8 - 62-2	41-6	A. Johansen & Co.....	6478
66-7	+ 12-7	53-0 - 59-5	57-3	25-5	9-7	59-9 - 62-2	44-9	Woods.....	130
65-0	+ 8-3	78-1 - 82-0	78-8	23-8	9-5	85-8 - 62-2	48-8	Carley & Clémence.....	51839
96-8	+ 44-3	53-4 - 62-0	56-7	32-8	11-7	85-8 - 62-2	56-2	Crisp.....	1512

The Trial No. a + 2 b is taken as a measure of the irregularities of rate.

Only those Chronometers have been included in this list for which b did not exceed 12 seconds.

Order of Merit	NAME OF MAKER.	No.	ADDRESS OF MAKER.	(1) WEEKLY RATES IN											
				Aug. 3-10	Aug. 10-17	Aug. 17-24	Aug. 24-31	Aug. 31 to Sept. 7	Sept. 7-14	Sept. 14-21	Sept. 21-28	Sept. 28 to Oct. 1	Oct. 1-5		
				Pocket Chronometer Horizontal. Dial up.										Chrono. Vertical. Pendulum up.	Chrono. Vertical. Pendulum up.
1	V. Kullberg.....	7428	105 Liverpool Road, London, N.	+ 1.9	+ 2.0	- 1.0	- 2.1	- 2.1	- 1.2	- 10.4	- 12.4	- 9.3	- 12.6	- 11.6	
2	Carley & Clémence..	51620	30 Ely Place, London, E.C.	- 2.7	+ 1.0	- 3.9	- 10.9	- 11.3	- 6.7	- 2.8	- 11.0	- 6.5	- 7.0	- 3.3	
3	Carley & Clémence..	51619	30 Ely Place, London, E.C.	+ 8.5	+ 6.8	+ 3.0	+ 4.8	+ 2.3	+ 3.1	+ 9.9	- 19.1	- 18.7	- 20.3	- 13.0	
Mean Weekly Temperature.				63.7	62.0	63.3	62.6	62.2	59.9	88.3	86.9		89.2		
Extremes of Temperature as shown by the Self-Registering Thermometer.				62.6 55.0	60.5 64.0	62.1 64.8	61.0 64.6	60.8 64.0	57.5 62.2	86.2 89.5	87.8 89.9		86.9 90.2		

* The weekly rates have been computed from the rates for three days.

† The weekly rates have been computed from the rates for four days.

During the period from Sept. 14 to Oct. 12, the Pocket Chronometers were placed in an oven 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.

ORDER OF TIME.

ORDER OF TIME.							(2) ABSTRACT OF THE PRINCIPAL CHANGES OF RATE.									
Oct. 5-12	Oct. 12-19	Oct. 19-26	Oct. 26 to Nov. 2	Nov. 2-9	Nov. 9-16	Nov. 16-23	Difference between greatest and least weekly rate. Dial up.					Difference of Weekly Rates.				
Pocket Chronometer Horizontal. Dial up.							a.	b.	c.	d.	e.	Trial Number.		NAME OF MAKER.		No.
							Greatest difference between one week and the next. Dial up.					$a + 2b + \frac{1}{2}(c + \frac{d+e}{2})$				
- 3.4	+ 0.9	+ 3.5	+ 5.3	+ 5.8	+ 5.0	+ 4.8	16.2	9.2	- 5.1	- 2.4	- 5.7	34.6	38.6	V. Kullberg.....	7428	1
+ 3.6	- 8.6	- 5.0	- 7.7	- 6.1	- 1.3	+ 0.2	14.9	12.2	- 7.8	- 6.9	- 7.4	39.3	45.5	Carley & Clémence....	51620	2
+ 2.0	+ 2.0	+ 9.9	+ 3.2	+ 1.5	+ 0.4	- 2.1	12.0	7.9	- 22.1	- 24.7	- 26.8	27.8	47.4	Carley & Clémence....	51619	3
88.7	59.9	60.0	61.0	54.9	57.6	57.8	Mean Weekly Temperature.									
85.5 90.1	56.8 63.0	55.0 63.5	58.0 63.8	51.5 59.9	54.2 63.2	53.0 59.5	Extremes of Temperature as shown by the Self-Registering Thermometer.									

The quantities a, b, c, d, e , in the formula $a + 2b + \frac{1}{2}(c + \frac{d+e}{2})$ are taken numerically without regard to sign.

The sign + indicates a gaining rate.