

RATES OF BOX AND POCKET CHRONOMETERS

ON TRIAL

FOR PURCHASE BY THE BOARD OF ADMIRALTY,

AT THE

ROYAL OBSERVATORY, GREENWICH,

BOX CHRONOMETERS—FROM 1909 JUNE 19 TO 1910 JANUARY 8.

POCKET CHRONOMETERS—FROM 1909 JULY 31 TO 1909 NOVEMBER 20.

RATES OF BOX CHRONOMETERS ON TRIAL FOR PURCHASE BY THE ADMIRALTY,

NAME or MAKER.	No.	Whether on Days.	(I.) WEEKLY RATES															
			June 19-26	June 26-30	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		
			19-26	26-30	3-10	10-17	17-24	24-31	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		
Kullberg.....	8075	2	+ 1.5	+ 0.1	+ 0.8	+ 0.4	+ 0.9	+ 0.4	+ 0.1	+ 0.5	+ 1.3	+ 1.3	+ 1.8	+ 0.7	+ 0.5	+ 1.5	Kullberg.....	8075
Kullberg.....	8013	2	+ 0.4	+ 1.2	+ 0.8	+ 0.2	+ 0.2	+ 0.5	+ 0.4	+ 0.1	+ 1.1	+ 0.5	+ 3.1	+ 1.7	+ 0.8	+ 0.2	Kullberg.....	8013
Kullberg.....	8107	2	+ 0.7	+ 0.3	+ 0.9	+ 0.6	+ 1.1	+ 1.3	+ 1.7	+ 0.8	+ 0.9	+ 2.8	+ 3.5	+ 3.4	+ 3.6	+ 3.6	Kullberg.....	8107
Kullberg.....	8054	2	+ 0.3	+ 1.3	+ 1.3	+ 0.8	+ 1.8	+ 1.1	+ 3.7	+ 2.6	+ 7.1	+ 3.5	+ 2.1	+ 0.7	+ 3.7	+ 3.7	Kullberg.....	8054
Johannes.....	6451	2	+ 5.1	+ 3.1	+ 5.6	+ 4.6	+ 7.0	+ 6.7	+ 7.3	+ 8.7	+ 5.1	+ 6.6	+ 10.8	+ 13.1	+ 14.2	+ 14.2	Johannes.....	6451
Johannes.....	6455	2	+ 3.7	+ 4.2	+ 6.5	+ 6.1	+ 5.5	+ 7.9	+ 7.8	+ 4.6	+ 4.0	+ 6.8	+ 9.9	+ 7.8	+ 4.4	+ 7.6	Johannes.....	6455
Johannes.....	6429	2	+ 2.6	+ 3.5	+ 1.8	+ 2.7	+ 2.1	+ 1.9	+ 3.5	+ 7.1	+ 8.9	+ 9.0	+ 7.8	+ 7.3	+ 4.3	+ 0.1	Johannes.....	6429
E. Dent & Co.....	55145	2	+ 1.9	+ 1.6	+ 0.2	+ 0.7	+ 1.8	+ 1.5	+ 1.9	+ 3.9	+ 5.5	+ 3.9	+ 4.0	+ 1.5	+ 1.1	+ 0.8	E. Dent & Co.....	55145
Kullberg.....	8074	2	+ 1.6	+ 0.2	+ 1.8	+ 0.2	+ 2.9	+ 2.8	+ 1.8	+ 3.4	+ 2.7	+ 3.2	+ 4.0	+ 2.1	+ 3.0	+ 1.2	Kullberg.....	8074
E. Dent & Co.....	55514	2	+ 3.4	+ 3.4	+ 3.9	+ 2.7	+ 3.9	+ 3.5	+ 1.7	+ 6.0	+ 2.4	+ 6.1	+ 10.4	+ 9.0	+ 3.7	+ 4.7	E. Dent & Co.....	55514
Kullberg.....	8225	2	+ 0.4	+ 0.6	+ 1.8	+ 1.0	+ 2.7	+ 2.1	+ 2.4	+ 3.1	+ 2.6	+ 2.8	+ 5.9	+ 4.6	+ 1.5	+ 1.7	Kullberg.....	8225
Usher & Cole.....	2055	2	+ 5.5	+ 1.6	+ 7.0	+ 3.8	+ 3.5	+ 3.5	+ 3.5	+ 3.5	+ 3.5	+ 3.5	+ 3.5	+ 3.5	+ 3.5	+ 3.5	Usher & Cole.....	2055
Johannes.....	6483	2	+ 3.7	+ 3.1	+ 2.1	+ 1.4	+ 2.5	+ 2.8	+ 2.8	+ 3.5	+ 5.5	+ 7.6	+ 5.2	+ 4.0	+ 0.7	+ 0.7	Johannes.....	6483
Kullberg.....	8077	2	+ 0.3	+ 2.1	+ 3.6	+ 5.4	+ 5.8	+ 6.5	+ 7.6	+ 5.8	+ 7.9	+ 8.4	+ 6.2	+ 5.2	+ 4.6	+ 3.6	Kullberg.....	8077
Johannes.....	6459	2	+ 7.2	+ 7.3	+ 9.7	+ 9.1	+ 8.9	+ 12.1	+ 13.8	+ 15.1	+ 13.8	+ 12.0	+ 17.0	+ 18.3	+ 16.8	+ 16.8	Johannes.....	6459
Kullberg.....	7985	8	- 0.2	- 2.2	- 1.3	- 1.2	- 0.7	- 1.7	- 2.3	- 0.8	- 1.8	- 1.0	- 0.8	- 4.3	- 5.9	- 5.1	Kullberg.....	7985
Kullberg.....	8009	2	- 6.4	- 8.1	- 6.5	- 6.3	- 4.2	- 5.8	- 8.0	- 4.6	- 5.3	- 6.2	- 1.7	- 6.7	- 8.3	- 8.3	Kullberg.....	8009
Usher & Cole.....	2053	2	+ 2.6	+ 5.5	+ 2.9	+ 4.0	+ 1.4	+ 2.6	+ 3.1	+ 1.1	+ 2.6	+ 3.7	+ 8.5	+ 1.6	+ 4.0	+ 4.0	Usher & Cole.....	2053
Johannes.....	6394	2	+ 5.8	+ 2.9	+ 5.6	+ 3.8	+ 4.1	+ 2.9	+ 5.8	- 2.0	- 6.7	+ 1.0	+ 0.5	+ 3.3	+ 2.6	+ 4.2	Johannes.....	6394
Kullberg.....	8122	2	+ 4.7	+ 1.2	+ 1.7	+ 1.0	+ 1.3	+ 1.0	+ 1.0	- 1.3	- 2.5	+ 0.7	+ 4.8	+ 3.6	+ 3.2	+ 4.8	Kullberg.....	8122
Johannes.....	6359	2	+ 14.5	+ 13.0	+ 11.0	+ 10.6	+ 17.1	+ 14.4	+ 12.7	+ 7.6	+ 3.5	+ 41.2	+ 6.4	+ 6.7	+ 9.0	+ 9.0	Johannes.....	6359
Johannes.....	6371	2	+ 10.3	+ 10.2	+ 18.7	+ 17.0	+ 16.0	+ 12.4	+ 18.0	+ 8.5	+ 10.2	+ 10.9	+ 12.3	+ 5.1	+ 1.5	+ 13.3	Johannes.....	6371
Gardner.....	4449	2	+ 1.6	+ 1.4	+ 1.4	+ 1.1	+ 1.1	+ 1.1	+ 1.1	+ 1.1	+ 1.1	+ 1.1	+ 1.1	+ 1.1	+ 1.1	+ 1.1	Gardner.....	4449
Johannes.....	6431	2	+ 2.3	+ 3.7	+ 4.7	+ 1.9	+ 1.6	+ 0.8	- 1.7	- 4.3	- 4.8	- 3.1	- 3.0	- 3.2	- 1.5	- 1.5	Johannes.....	6431
Johannes.....	6486	2	- 6.0	- 7.0	- 5.9	- 8.8	- 5.0	- 11.8	- 12.9	- 13.4	- 17.8	- 15.7	- 11.1	- 13.5	- 16.8	- 14.9	Johannes.....	6486
Kullberg.....	7905	2	+ 0.1	- 0.1	- 0.2	+ 10.2	+ 10.1	+ 10.7	+ 10.1	+ 8.8	+ 6.3	+ 8.0	+ 9.9	+ 12.4	+ 10.7	+ 9.9	Kullberg.....	7905
L. Hall.....	1705	2	+ 9.7	- 12.2	- 13.8	- 11.3	- 11.1	- 7.3	- 8.2	- 6.5	- 4.0	+ 2.6	+ 4.1	+ 0.6	+ 1.3	+ 1.0	L. Hall.....	1705
Kullberg.....	8076	2	+ 0.2	- 1.7	- 0.9	- 1.3	- 1.9	- 2.0	- 2.5	- 1.8	- 1.3	- 0.2	- 0.7	- 3.5	- 6.9	- 6.8	Kullberg.....	8076
S. Smith & Sons.....	7938	2	+ 1.5	+ 1.6	+ 2.0	+ 1.1	+ 8.6	+ 4.4	+ 5.2	+ 2.3	+ 3.3	+ 2.1	+ 4.9	+ 9.4	+ 9.8	+ 9.8	S. Smith & Sons.....	7938
Gardner.....	4438	2	+ 14.9	+ 16.2	+ 16.3	+ 16.9	+ 12.8	+ 12.3	+ 13.6	+ 5.4	+ 5.7	+ 4.9	+ 8.8	+ 15.3	+ 20.6	+ 17.2	Gardner.....	4438
Usher & Cole.....	2007	2	+ 13.4	+ 13.6	+ 11.5	+ 9.8	+ 12.7	+ 13.8	+ 13.7	+ 7.3	+ 17.2	+ 19.9	+ 20.8	+ 16.3	+ 13.2	+ 12.6	Usher & Cole.....	2007
Carley & Clemence.....	51783	2	+ 15.0	+ 12.1	+ 11.9	+ 10.8	+ 13.1	+ 13.6	+ 13.7	+ 12.3	+ 12.3	+ 12.3	+ 12.3	+ 12.3	+ 12.3	+ 12.3	Carley & Clemence.....	51783
J. Sewell.....	5586	2	+ 5.2	+ 4.8	+ 5.0	+ 6.2	+ 7.0	+ 6.2	+ 6.8	+ 14.2	+ 18.3	+ 14.3	+ 15.4	+ 8.3	+ 3.1	+ 2.4	J. Sewell.....	5586
C. Frodham & Co.....	10523	2	+ 2.0	+ 0.9	+ 2.0	+ 2.7	+ 1.8	+ 2.0	+ 2.0	+ 2.0	+ 2.0	+ 2.0	+ 2.0	+ 2.0	+ 2.0	+ 2.0	C. Frodham & Co.....	10523
A. Johannes & Co.....	6380	2	+ 3.1	+ 3.1	+ 4.2	+ 8.0	+ 6.0	+ 8.7	+ 7.0	+ 4.1	+ 2.1	+ 0.9	+ 0.1	+ 1.3	+ 2.0	+ 2.6	A. Johannes & Co.....	6380
E. Dent & Co.....	55232	2	+ 0.7	- 0.7	- 0.2	- 1.1	- 1.6	- 0.4	- 1.0	- 0.9	+ 3.4	+ 8.0	+ 10.0	+ 5.9	+ 0.9	+ 0.4	E. Dent & Co.....	55232
A. W. Webb.....	5710	2	+ 12.3	+ 12.3	+ 16.2	+ 15.0	+ 11.0	+ 9.0	+ 6.1	+ 7.9	+ 13.0	+ 12.5	+ 2.5	+ 3.0	+ 0.0	+ 0.0	A. W. Webb.....	5710
A. Johannes & Co.....	6478	2	+ 2.7	+ 1.8	+ 7.9	+ 11.1	+ 7.0	+ 11.0	+ 11.0	+ 8.0	+ 11.0	+ 11.0	+ 11.0	+ 11.0	+ 11.0	+ 11.0	A. Johannes & Co.....	6478
Usher & Cole.....	2060	2	+ 8.5	+ 6.8	+ 5.8	+ 7.0	+ 1.2	+ 8.2	+ 3.9	+ 1.2	+ 2.0	+ 4.5	+ 0.4	+ 7.1	+ 3.6	+ 2.1	Usher & Cole.....	2060
S. Smith & Sons.....	8007	2	+ 4.8	+ 3.2	+ 2.5	+ 4.2	+ 2.9	+ 0.7	+ 0.4	+ 7.3	+ 4.1	+ 6.0	+ 16.9	+ 11.5	+ 9.5	+ 1.9	S. Smith & Sons.....	8007
Gardner.....	4419	8	- 6.8	- 10.4	- 5.8	- 8.8	- 7.1	- 10.1	- 8.9	- 0.5	+ 4.3	+ 1.0	+ 5.2	+ 5.6	+ 9.5	+ 9.4	Gardner.....	4419
E. Dent & Co.....	55146	2	- 3.1	- 3.8	- 3.2	- 3.3	- 4.3	- 2.7	- 4.7	- 6.1	- 8.6	- 4.8	+ 2.4	+ 8.5	+ 0.6	- 1.0	E. Dent & Co.....	55146
Chronometrical Thermometer.....			- 499.9	- 218.6	- 544.6	- 533.4	- 836.8	- 631.2	- 675.1	- 2393.7	- 3382.0	- 3018.9	- 2288.2	- 328.4	- 270.7	- 323.4	Chronometrical Thermometer.....	
Mean Weekly Temperature.....			61.1	62.2	64.9	64.7	68.6	66.5	67.1	87.5	96.1	100.8	85.1	62.3	62.7	62.4	Mean Weekly Temperature.....	
Extremes of Temperature as shown by the Self-Registering Thermometer.....			61.1	60.8	62.8	62.0	67.5	64.7	61.0	72.4	95.2	97.8	81.0	59.0	60.0	60.4	Extremes of Temperature as shown by the Self-Registering Thermometer.....	
			66.2	65.0	68.2	67.2	70.0	68.0	70.0	98.0	105.6	104.8	88.5	64.5	64.4	63.8		

The sign + indicates that the rate is gaining.
+ During these weeks the Chronometers were placed in the chamber of 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.
The Chronometrical Thermometer differs from an ordinary Chronometer in the construction of the balance only, the position of the metals forming the compensating rim being reversed. By this arrangement the effect of temperature is much magnified.

AT THE ROYAL OBSERVATORY, GREENWICH, FROM 1909 JUNE 19 TO 1910 JANUARY 8.

IN ORDER OF TIME.															NAME OF MAKER.		No.
Sept. 25 to 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 to Dec. 4	Dec. 4-11	Dec. 11-18	Dec. 18-25	Dec. 25 to Jan. 1	Jan. 1-8		No.	
+ 0.2 - 0.6 - 4.8 + 13.4	+ 1.1 + 1.2 + 3.9 + 4.0	+ 0.3 - 0.6 + 3.9 + 13.3	+ 0.2 - 0.2 + 3.3 + 13.0	+ 1.1 - 1.1 + 3.3 + 11.5	+ 1.1 - 2.1 + 4.4 + 10.8	+ 0.8 - 1.7 + 4.5 + 9.7	+ 1.3 - 1.2 + 4.0 + 13.0	+ 0.4 - 0.8 + 6.8 + 13.0	+ 0.6 - 1.6 + 6.0 + 13.1	+ 1.9 - 1.4 - 6.2 + 9.8	- 3.2 - 2.4 - 6.8 + 13.2	- 2.5 - 3.6 - 5.9 + 12.1	- 2.2 - 3.6 - 6.2 + 11.9	- 3.9 - 4.5 - 6.9 + 14.5	Kullberg. Kullberg. Kullberg. Kullberg. Johannes.	8075 8013 8107 8054 6451	
+ 7.4 - 0.5 - 3.2 + 3.7	+ 9.7 - 1.1 - 2.0 + 4.9	+ 6.9 - 2.0 + 1.5 + 4.4	+ 3.7 - 2.4 + 1.4 + 3.6	+ 1.3 - 4.3 + 0.8 + 9.6	+ 3.8 - 8.6 + 1.8 + 10.1	+ 6.9 - 8.6 + 0.7 + 10.8	+ 2.3 - 0.0 + 2.5 + 11.1	+ 4.4 - 5.5 + 3.3 + 8.2	+ 3.1 - 5.1 - 2.9 + 4.2	+ 0.3 - 6.2 + 4.6 + 1.8	+ 2.2 - 6.8 - 2.0 + 2.7	+ 3.4 - 5.8 + 0.5 + 3.9	+ 2.2 - 7.1 - 2.2 + 4.0	+ 3.3 - 6.5 - 0.4 + 4.2	Johannes. Johannes. E. Dent & Co.	6465 6429 55145 8074 55514	
+ 0.4 - 2.4 - 1.6 - 6.8 + 16.9	+ 2.0 + 3.9 + 1.5 + 5.5 + 15.3	+ 2.1 + 3.8 + 1.5 + 4.5 + 15.5	+ 2.7 - 3.0 + 2.5 + 6.3 + 14.2	+ 7.2 - 4.5 + 2.8 + 2.4 + 14.8	+ 9.2 - 2.8 + 3.6 - 8.4 + 16.1	+ 8.7 - 1.6 + 3.6 - 3.7 + 13.1	+ 9.9 - 1.9 + 3.6 - 0.5 + 21.5	+ 4.0 - 5.0 + 1.3 - 1.6 + 21.2	+ 3.7 - 0.6 + 2.0 - 8.4 + 18.9	+ 1.5 - 1.7 + 0.1 - 5.0 + 18.6	+ 0.7 - 3.9 + 0.5 - 1.9 + 21.3	+ 0.4 - 3.9 + 0.7 - 5.2 + 21.2	+ 0.4 - 3.8 - 2.6 - 5.9 + 21.1	+ 0.9 - 3.8 - 3.6 - 6.2 + 21.1	Kullberg. Usher & Cole. Johannes. Kullberg. Johannes.	8225 2055 6483 8077 6459	
- 6.6 - 8.0 + 4.1 - 4.1	- 6.4 - 8.5 + 3.4 - 4.1	- 3.9 - 7.4 + 3.0 - 5.0	- 4.4 - 6.9 + 2.6 - 5.9	- 4.0 - 3.3 + 0.6 - 5.9	- 3.0 - 0.3 + 1.2 - 3.7	- 2.7 - 0.6 + 0.8 + 4.4	- 5.6 - 1.1 + 6.8 + 3.8	- 11.5 - 8.2 + 8.2 + 1.6	- 12.8 - 10.2 - 6.7 - 7.2	- 12.8 - 10.0 - 8.2 - 3.5	- 10.4 - 7.2 - 4.9 + 1.1	- 12.7 - 7.4 - 5.9 + 1.1	- 13.7 - 8.3 - 9.1 + 0.9	- 13.1 - 8.3 - 10.0 + 1.0	Kullberg. Kullberg. Johannes. Johannes.	7985 8009 8053 6394 8123	
+ 15.2 - 12.6 - 2.9 - 14.9	+ 14.7 - 22.3 - 11.3 - 16.5	+ 12.9 - 22.0 - 11.3 - 16.5	+ 12.1 - 22.5 - 11.4 - 19.5	+ 7.6 - 20.2 - 11.4 - 19.5	+ 7.8 - 19.4 - 11.4 - 16.4	+ 7.6 - 19.1 - 11.4 - 14.4	+ 10.8 - 9.8 - 13.0 - 19.1	+ 9.3 - 8.8 - 19.1 - 22.4	+ 12.6 - 14.7 - 18.5 - 22.4	+ 5.4 - 15.0 - 14.9 - 22.6	+ 6.5 - 16.0 - 15.9 - 22.6	+ 6.5 - 16.1 - 15.9 - 22.6	+ 7.9 - 21.2 - 17.3 - 22.2	+ 8.9 - 21.7 - 17.2 - 22.2	Johannes. Johannes. Gardner. Johannes. Johannes.	6359 6371 4449 4449 6486	
+ 3.0 - 2.4 - 0.8 - 5.7 - 16.1	+ 9.3 + 2.8 - 6.7 - 8.4 - 12.5	+ 9.3 + 2.8 - 7.9 - 8.4 - 13.8	+ 9.8 + 2.8 - 7.9 - 8.4 - 17.8	+ 9.2 + 1.5 - 7.7 - 7.6 - 11.4	+ 7.2 + 1.5 - 7.4 - 0.6 - 11.4	+ 7.7 + 1.5 - 7.4 - 0.6 - 7.3	+ 9.1 + 5.5 + 8.3 + 8.2 - 10.0	+ 10.0 + 6.6 + 9.8 + 8.2 - 12.9	+ 9.2 + 1.0 + 2.6 + 1.8 - 16.2	+ 7.6 + 2.6 + 4.8 - 2.0 - 16.2	+ 7.1 + 4.1 + 7.0 - 8.1 - 19.9	+ 8.1 + 9.8 + 8.2 - 3.1 - 19.9	+ 7.9 + 9.8 + 8.2 - 3.1 - 19.9	+ 8.0 - 10.0 - 7.7 + 4.7 - 21.4	Kullberg. L. Hall. Usher & Cole. Smith & Sons. Gardner.	7905 1705 8075 7988 4453	
+ 11.5 + 12.7 + 2.5	+ 12.5 + 14.2 + 5.7	+ 12.1 + 13.4 + 5.6	+ 9.8 + 14.2 + 8.4	+ 9.8 + 14.2 + 0.7	+ 10.1 + 24.5 + 8.1	+ 20.2 + 24.8 + 8.2	+ 22.6 + 27.3 + 2.2	+ 24.0 + 29.2 + 10.8	+ 21.1 + 25.7 - 6.0	+ 19.2 + 10.9 + 0.3	+ 18.2 + 12.2 + 0.7	+ 19.2 + 12.2 + 0.9	+ 17.7 + 9.8 + 1.0	+ 17.1 + 9.9 - 1.8	Usher & Cole. Carter & Clesence. J. Sewell. Frederham & Co. A. Johannes & Co.	2007 51788 5586 10052 6380	
- 0.7 + 1.9 + 2.0	+ 0.7 + 3.0 + 3.5	+ 0.5 + 4.0 + 3.5	+ 0.9 + 4.9 + 3.5	+ 2.9 + 10.1 + 8.5	+ 3.3 + 10.1 + 8.5	+ 5.0 + 10.1 + 8.5	+ 15.7 + 15.7 + 15.2	+ 12.2 + 14.1 + 14.1	+ 1.1 + 1.7 + 1.8	+ 0.1 + 4.5 + 4.8	+ 0.7 + 4.5 + 4.8	+ 0.6 + 0.9 + 10.7	+ 0.6 + 0.7 + 8.6	+ 0.5 + 3.7 + 8.6	E. Dent & Co. A. W. Webb. A. Johannes & Co. Usher & Cole. Smith & Sons.	55232 5710 6478 2060 8007	
- 8.8 - 1.7	- 10.8 - 1.5	- 7.7 - 2.0	- 7.0 - 1.9	- 0.5 + 1.3	- 2.6 + 4.9	- 0.5 + 4.9	+ 6.9 + 12.9	- 4.9 + 17.4	- 12.9 + 12.6	- 13.4 + 2.7	- 11.7 + 1.7	- 11.0 + 1.7	- 10.1 + 1.4	- 14.2 + 1.1	Gardner. E. Dent & Co.	4419 55146	
- 242.6	- 413.6	- 241.5	- 383.0	- 1450.0	- 2716.0	- 2094.3	- 1807.4	+ 650.1	+ 403.8	+ 810.9	+ 775.8	+ 667.7	+ 420.0	+ 888.9	Chromometrical Thermometer.		
61.7	65.5	68.1	69.2	76.3	91.5	92.3	79.6	61.0	51.6	48.4	50.1	51.2	53.9	54.3	Mean Weekly Temperature.		
60.2	61.2	61.7	61.8	60.9	89.7	85.5	76.5	49.7	50.0	45.8	48.4	46.7	51.0	53.0	Extremes of Temperature as shown by the Self-Register- ing Thermometers.		
68.7	65.6	64.8	63.8	87.2	90.2	98.3	84.3	54.6	52.8	51.2	52.8	55.0	55.2	55.1			
The Chronometers are placed in order of merit, their respective positions being determined by the consideration of the irregularities of rate exhibited in Table III.																	
Only those Chronometers have been included in this list for which a δ did not exceed 12 seconds.																	

RATES OF BOX CHRONOMETERS ON TRIAL FOR PURCHASE BY THE ADMIRALTY.

NAME OF MAKER		No.	Days of Watch	(II.) WEEKLY RATES IN ORDER OF TEMPERATURE													
				Dec. 4-11	Dec. 11-18	Dec. 18-25	Nov. 20-27	Nov.27 to Dec. 4	Dec. 25 to Jan. 1	Jan. 1-8	June 26 to July 3	Sept. 25 to Oct. 2	Sept. 11-18	Sept. 4-11	Sept. 18-25	Oct. 9-16	Oct. 16-23
Kullberg	8075	2	#	- 1.9	- 3.2	- 2.5	+ 0.4	+ 0.6	- 3.2	- 2.9	+ 0.1	+ 0.2	+ 0.5	+ 0.7	+ 1.5	+ 0.3	+ 0.2
Kullberg	8013	2	#	- 1.4	- 2.4	- 2.6	+ 0.8	+ 1.6	- 3.5	- 4.5	- 1.2	- 0.6	+ 0.8	+ 1.7	- 0.2	- 0.6	- 0.2
Kullberg	8013	2	#	- 0.2	- 6.8	- 6.8	- 6.8	- 5.0	- 6.2	- 5.9	- 4.9	- 3.4	- 3.5	- 3.5	- 3.9	- 4.0	- 4.0
Kullberg	8054	2	#	- 4.1	- 3.9	- 4.0	- 2.0	- 1.9	- 4.3	- 4.5	- 1.3	- 3.9	- 3.7	- 3.1	- 3.7	- 1.5	- 2.5
Johannes	6451	2	#	+ 1.8	+ 13.2	+ 13.1	+ 13.0	+ 13.1	+ 13.5	+ 14.5	+ 1.1	+ 1.4	+ 1.8	+ 1.7	+ 1.8	+ 1.8	+ 1.8
Johannes	6455	2	#	+ 3.1	+ 0.3	+ 2.2	+ 2.3	+ 4.4	+ 3.4	+ 3.3	+ 4.2	+ 7.4	+ 4.4	+ 7.9	+ 7.6	+ 9.4	+ 8.3
Johannes	6429	2	#	+ 1.1	+ 6.2	- 0.8	+ 0.5	+ 1.5	+ 7.1	- 1.5	+ 3.5	- 0.0	- 4.3	- 7.3	- 1.0	- 2.4	- 2.4
E. Dent & Co.	55145	2	#	+ 1.9	- 4.6	- 3.2	+ 3.3	- 0.7	- 1.4	- 0.4	+ 1.6	- 0.5	+ 1.1	+ 1.5	+ 0.9	+ 1.3	+ 1.4
Kullberg	8078	2	#	- 2.0	- 5.0	- 1.9	- 1.5	- 0.8	- 5.1	- 0.7	- 0.2	- 3.2	- 2.9	- 2.1	- 1.2	- 1.7	- 0.5
E. Dent & Co.	55014	2	#	+ 1.8	+ 2.7	+ 3.9	+ 3.2	+ 4.2	+ 4.0	+ 4.2	+ 3.4	+ 3.7	+ 3.7	+ 3.7	+ 4.7	+ 4.4	+ 3.6
Kullberg	8225	2	#	+ 1.5	- 1.0	+ 0.7	+ 4.0	+ 3.7	+ 0.4	+ 0.9	- 0.6	+ 0.4	+ 1.5	+ 4.6	+ 1.7	+ 2.1	+ 2.7
Usher & Cole	3255	2	#	- 1.7	- 3.9	- 3.9	- 5.0	+ 0.8	- 4.4	- 3.8	- 6.5	- 4.0	- 2.1	+ 0.5	- 4.3	- 3.8	- 3.0
Johannes	6432	2	#	+ 0.1	- 4.9	+ 0.5	+ 1.3	+ 2.0	- 3.2	- 3.6	+ 3.1	- 1.6	+ 0.5	+ 2.0	+ 0.7	- 1.5	- 2.3
Kullberg	8077	2	#	- 5.0	- 5.6	- 5.2	- 1.6	- 3.4	- 5.9	- 5.9	- 2.1	- 5.8	- 8.4	- 7.9	- 6.2	- 4.5	- 6.3
Johannes	6459	2	#	+ 18.9	+ 18.6	+ 18.2	+ 18.5	+ 18.2	+ 18.1	+ 7.2	+ 16.9	+ 16.3	+ 17.0	+ 16.8	+ 15.5	+ 14.2	+ 14.2
Kullberg	7985	8	#	- 12.8	- 12.8	- 10.4	- 11.5	- 10.2	- 12.7	- 13.1	- 2.2	- 6.6	- 5.9	- 4.3	- 5.1	- 5.9	- 4.4
Kullberg	8069	2	#	- 8.2	- 10.0	- 7.2	- 0.6	- 6.7	- 8.7	- 8.3	- 8.1	- 8.0	- 6.7	- 1.7	- 8.8	- 7.4	- 6.9
Kullberg	8069	2	#	- 1.3	- 5.6	- 1.2	- 0.5	- 1.8	- 2.0	- 3.2	- 3.6	+ 3.1	- 1.6	+ 0.5	+ 2.0	+ 0.7	- 1.5
Johannes	6384	2	#	- 3.5	+ 1.0	+ 1.1	- 7.7	- 2.7	+ 0.9	+ 1.0	- 2.9	+ 4.1	+ 2.5	- 0.3	- 4.2	- 4.4	- 2.0
Kullberg	8122	2	#	- 9.8	- 11.1	- 8.1	+ 1.6	- 4.5	- 9.1	- 10.6	+ 1.2	- 5.2	- 3.2	- 6.6	- 4.8	- 5.0	- 5.9
Johannes	6359	2	#	+ 5.4	+ 6.5	+ 6.5	+ 9.3	+ 12.5	+ 7.9	+ 8.9	+ 19.0	+ 15.2	+ 6.7	+ 6.4	+ 3.0	+ 12.9	+ 12.1
Johannes	6371	2	#	- 14.7	- 16.0	- 15.0	- 8.8	- 12.5	- 21.2	- 21.7	- 10.2	- 15.6	- 9.1	- 6.6	- 15.3	- 23.4	- 22.5
Gardner	4449	2	#	- 13.2	- 14.2	- 14.9	- 12.9	- 10.9	- 17.7	- 11.9	- 12.4	- 10.4	- 7.7	- 11.1	- 11.1	- 11.1	- 11.1
Johannes	6431	2	#	- 3.3	- 6.2	- 4.7	- 0.4	- 1.2	- 6.4	- 3.0	+ 3.7	- 3.2	- 3.2	- 3.5	- 1.5	- 1.0	- 3.5
Johannes	6486	2	#	- 22.4	- 23.6	- 21.6	- 19.1	- 21.5	- 20.0	- 22.2	- 7.0	- 14.9	- 10.8	- 13.0	- 14.9	- 16.5	- 19.5
Kullberg	7905	2	#	+ 7.8	+ 7.1	+ 8.1	+ 10.0	+ 9.1	+ 10.2	+ 7.4	+ 8.0	+ 0.1	+ 10.7	+ 12.4	+ 4.9	+ 8.9	+ 9.4
L. Hall	1705	2	#	- 2.6	- 4.8	- 4.9	+ 5.5	- 1.0	- 9.3	- 10.2	- 12.2	- 2.4	- 1.3	+ 0.5	- 1.0	- 2.8	- 7.3
Kullberg	8076	2	#	+ 4.8	- 7.0	- 5.9	- 3.3	- 3.2	- 6.2	- 7.7	- 1.7	- 1.2	- 5.9	- 5.5	- 8.9	- 7.9	- 11.3
S. Smith & Sons	5998	2	#	- 2.0	- 2.1	- 3.1	+ 9.5	+ 4.0	- 4.7	+ 1.6	- 0.7	+ 0.3	- 9.4	- 8.5	- 4.4	- 7.8	- 7.8
Gardner	4433	2	#	- 18.2	- 18.9	- 18.9	- 19.0	- 18.2	- 21.4	- 18.2	- 18.1	- 20.6	- 15.3	- 17.2	- 18.8	- 17.8	- 17.8
Usher & Cole	3207	2	#	+ 20.5	+ 19.2	+ 19.2	+ 24.0	+ 21.1	+ 17.0	+ 13.6	+ 11.5	+ 13.2	+ 16.3	+ 12.6	+ 14.4	+ 9.8	+ 9.8
Carley & Clemens	57393	2	#	+ 10.9	+ 12.2	+ 10.6	+ 22.5	+ 12.7	+ 10.7	+ 9.7	+ 9.9	+ 12.1	+ 12.7	+ 14.6	+ 12.4	+ 14.2	+ 14.2
C. Sewell	5036	2	#	+ 0.5	+ 0.8	+ 3.7	- 0.9	+ 1.7	+ 4.4	- 1.8	- 4.3	- 2.1	- 3.8	- 2.4	- 2.3	- 2.0	- 2.0
C. Frodham & Co.	10052	2	#	+ 2.1	- 2.1	+ 1.9	+ 2.5	+ 2.5	+ 1.9	+ 2.5	+ 2.5	+ 1.9	+ 2.5	+ 2.5	+ 2.5	+ 2.5	+ 2.5
A. Johannes & Co.	6360	2	#	+ 0.3	+ 0.7	+ 0.9	- 10.8	- 8.0	- 1.5	- 1.8	+ 3.1	+ 2.5	+ 2.5	+ 1.2	+ 2.6	+ 5.6	+ 8.4
E. Dent & Co.	55232	2	#	+ 1.7	+ 0.1	+ 0.7	+ 12.2	+ 4.1	- 0.6	- 0.5	- 0.7	+ 0.7	+ 0.9	+ 5.9	+ 0.4	+ 0.5	+ 0.9
A. W. Webb	5710	2	#	+ 4.8	+ 4.5	- 0.9	- 2.0	- 0.7	- 3.7	- 1.9	- 3.9	- 3.9	- 2.5	- 0.2	- 4.7	- 6.8	- 6.8
A. Johannes & Co.	6478	2	#	+ 18.8	+ 19.4	+ 20.2	+ 13.9	+ 16.8	+ 20.0	+ 20.0	- 1.3	- 13.7	- 8.0	- 12.7	- 12.0	- 10.5	- 10.5
Usher & Cole	3260	2	#	+ 0.8	+ 8.2	+ 10.7	+ 15.2	+ 10.8	+ 8.3	+ 8.6	- 3.8	+ 2.0	+ 3.6	+ 7.1	+ 2.1	+ 3.3	+ 4.5
S. Smith & Sons	6007	2	#	- 4.7	- 5.7	- 6.2	- 5.9	- 3.2	- 2.9	- 2.2	- 3.2	- 1.9	- 3.9	- 11.5	+ 1.9	- 0.9	- 0.1
Gardner	4419	8	#	- 12.6	- 13.4	- 11.7	- 4.9	- 12.3	- 16.0	- 14.2	- 10.4	- 8.8	- 9.5	- 6.5	- 9.4	- 7.7	- 7.0
E. Dent & Co.	55146	2	#	+ 2.7	+ 0.4	+ 1.7	+ 17.4	+ 6.0	+ 0.1	- 1.0	- 8.8	- 1.7	+ 0.6	+ 5.5	- 1.0	- 2.0	- 1.9
Chronometrical Thermometer			#	+810.9	+775.8	+667.7	+650.1	+503.5	+430.9	+383.9	-218.6	-242.6	-270.7	-329.4	-329.4	-341.5	-363.0
Mean Weekly Temperature			#	48.4	50.1	51.2	51.0	51.5	53.9	54.3	62.2	61.7	62.7	62.3	62.4	63.1	63.2
Extremes of Temperature as shown by the Self-Registering Thermometer			#	45.8	48.4	46.7	49.7	50.0	51.0	53.0	60.8	60.2	60.0	59.0	60.4	61.7	61.8
			#	51.2	52.8	55.0	54.6	52.8	55.2	55.1	65.0	63.7	64.4	64.5	63.8	64.8	63.8

The sign + indicates that the rate is gaining.

† During these weeks the Chronometers were placed in the chamber of 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.

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

AT THE ROYAL OBSERVATORY, GREENWICH, FROM 1909 JUNE 19 TO 1910 JANUARY 8.

AS DETERMINED GENERALLY BY THE CHRONOMETRICAL THERMOMETER.

																NAME OF MAKER.		No.
Oct. 2-9	June 19-26	July 10-17	July 3-10	July 24-31	July 31 to Aug. 7	Aug. 17-24	Oct. 23-30	Nov. 13-20	Aug. 28 to Sept. 4	Aug. T=14	Oct. 30 to Nov. 6	Nov. 6-13	Aug. 14-21	Aug. 21-28				
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*				
+1.1	+1.5	+0.4	+0.8	+0.4	+0.1	+0.9	+1.1	+1.3	+1.8	+0.5	+1.1	+0.8	+1.3	+1.8	Kullberg	8075		
+1.2	+0.4	+0.2	+0.4	+0.4	+0.4	+0.2	+1.2	+1.3	+3.1	+0.1	+2.1	+1.7	+1.1	+0.5	Kullberg	8013		
+2.8	+0.7	+0.6	+0.1	-0.8	-1.3	-0.1	-3.3	-4.0	-2.3	-1.7	-3.4	-4.5	-4.0	-4.9	Kullberg	8107		
+3.0	-0.3	-0.3	-1.3	-3.1	-3.7	-1.8	-2.4	-2.1	-3.5	-2.6	-4.0	-6.9	-8.9	-8.0	Kullberg	8054		
+14.0	+5.1	+4.6	+5.6	+6.7	+7.3	+7.0	+11.5	+12.0	+8.5	+8.7	+10.8	+9.7	+5.1	+6.6	Johannes	6451		
+9.7	+3.7	+5.1	+6.5	+7.9	+7.8	+5.5	+2.7	+6.9	+9.9	+4.6	+1.3	+3.9	+4.0	+8.6	Johannes	6455		
+1.1	-2.6	-2.7	-1.8	-3.5	-2.1	-4.3	-3.9	-7.3	-7.1	-6.3	-8.6	-8.9	-8.0	-8.9	Johannes	6429		
+2.0	+1.9	+0.7	+0.2	-1.5	-1.9	-1.8	+0.8	+2.5	+2.0	-3.9	+1.3	-0.6	-5.5	-5.5	E. Dent & Co.	55145		
+1.7	+1.6	+2.2	+1.8	+2.8	+1.8	+2.9	+3.5	+4.2	+4.0	+3.4	+1.6	+0.7	+2.7	+3.2	Kullberg	8078		
+4.9	+3.4	+2.7	+3.9	+6.7	+7.3	+9.6	+11.1	+10.4	+6.0	+10.1	+10.8	+2.4	+6.1	+2.4	E. Dent & Co.	55014		
+2.0	+0.4	+1.0	+1.8	+2.1	+2.4	+2.7	+7.2	+9.9	+5.9	+3.1	+3.2	+3.7	+2.6	+2.8	Kullberg	8225		
+4.2	-5.5	-3.8	-7.0	-9.3	-5.5	-5.5	+4.5	+1.9	+2.0	-3.0	-2.9	-1.6	-3.8	-3.8	Usher & Cole	3255		
+1.8	+3.7	+1.4	+2.1	+2.8	+2.8	+2.5	+2.9	+5.2	+5.0	+3.8	+3.6	+5.5	+7.6	+6.5	Johannes	6432		
-5.5	-0.3	-5.4	-3.6	-6.5	-7.6	-5.6	-4.4	+0.5	-5.8	-5.3	-2.7	-3.7	-7.3	-7.3	Kullberg	8077		
+15.3	+7.2	+9.1	+9.7	+9.8	+12.1	+8.3	+14.8	+21.3	+21.0	+13.8	+16.1	+15.1	+15.1	+20.0	Johannes	6459		
-4.4	-0.2	-1.2	-1.3	-1.7	-2.3	-0.7	-4.0	-5.6	-0.8	-0.3	-3.0	-2.7	-1.8	-1.0	Kullberg	7985		
-6.5	-0.4	-3.8	-6.0	-6.4	-5.8	-4.2	-3.3	-1.1	-2.7	-0.5	-0.8	-5.8	-5.8	-5.8	Usher & Cole	3253		
-2.5	-2.6	-4.0	-2.9	-1.1	-1.1	-2.4	-3.0	+1.6	+2.2	+2.6	+1.2	+0.8	-3.7	-6.7	Johannes	6384		
-4.1	+4.7	-1.0	-1.7	-0.1	-1.0	-1.9	+0.7	+3.0	+4.8	-1.3	+3.4	+3.8	+2.5	+0.7	Kullberg	8122		
+14.7	+14.5	+17.1	+18.0	+14.4	+12.7	+16.0	+7.6	+40.8	+11.2	+7.8	+7.8	+7.6	+3.5	+10.3	Johannes	6359		
-22.3	-10.3	-12.9	-11.7	-12.4	-13.0	-11.0	-20.2	-15.5	-12.3	-8.5	-19.4	-16.1	-15.2	-10.9	Johannes	6371		
-11.4	-6.6	-11.1	-11.4	-7.7	-11.1	-10.8	-4.7	-1.0	-4.5	-6.8	-5.4	-6.1	-5.1	-5.1	Gardner	4449		
-0.6	-2.8	+1.9	+4.7	-0.3	-1.7	-1.7	-0.3	-1.0	-4.5	-6.8	-5.4	-6.1	-5.1	-5.1	Johannes	6431		
-16.5	-0.0	-8.9	-9.9	-11.8	-12.9	-9.0	-15.3	-13.0	-1.1	-13.4	-16.4	-14.4	-17.8	-15.7	Johannes	6486		
+9.9	+0.1	+10.2	-0.2	+10.7	+10.3	+1.0	+9.2	+1.1	+9.9	+8.8	+7.2	+7.7	+6.3	+8.0	Kullberg	7905		
+1.0	+0.2	+10.3	-0.2	+10.7	+10.3	+1.0	+9.2	+1.1	+9.9	+8.8	+7.2	+7.7	+6.3	+8.0	J. Swellish	1705		
-6.7	-0.2	-1.3	-0.9	-2.0	-2.5	-1.9	-1.7	-3.7	-0.7	-1.8	+3.4	+2.3	-1.3	-0.2	Kullberg	8076		
-6.3	+2.6	-1.1	-2.6	-4.4	-3.8	-2.9	-2.0	-8.2	+4.9	-3.2	-0.6	+4.8	-3.1	-2.1	S. Smith & Sons	7398		
-12.5	-14.0	-16.9	-16.6	-12.3	-13.6	-11.4	-10.0	-6.9	-4.4	-7.6	-4.3	-7.3	-6.7	-4.9	Gardner	4437		
+12.5	+13.4	+9.8	+11.5	+13.8	+13.7	+12.7	+19.1	+23.6	+20.8	+7.2	+20.2	+20.3	+17.2	+19.9	Usher & Cole	3253		
+14.2	+10.5	+10.8	+11.9	+12.7	+12.5	+13.1	+21.0	+27.9	+22.2	+10.2	+24.3	+24.8	+22.5	+21.5	Carley & Clemens	31798		
+1.0	-2.7	-6.2	-3.0	-6.2	-6.8	-7.0	-5.2	-9.0	-14.3	-14.2	-6.9	-7.2	-18.3	-14.3	A. Johnson & Co.	5095		
+0.9	-2.0	-2.7	-0.6	+2.6	+2.6	+1.0	+2.0	+4.3	+0.2	+0.8	+1.5	+0.5	-7.4	-0.8	C. Frohman & Co.	10022		
+5.7	+3.1	+0.8	+4.2	+3.7	+7.0	+6.0	+0.7	-2.2	-0.1	-0.1	1.3	2.0	+3.1	+4.1	A. Johnson & Co.	6360		
+0.7	+0.7	-1.1	-0.2	-0.4	-1.0	-1.6	+2.9	+15.7	+10.0	+0.9	+3.2	+5.0	+3.4	+8.0	E. Dent & Co.	55232		
+3.3	+14.6	+14.1	+16.6	+10.5	+9.0	+11.0	+10.1	-1.0	+12.5	+6.1	+9.1	+9.8	+7.2	+13.0	W. A. Webb	5710		
+11.3	+11.7	+11.7	+9.7	+9.9	+10.0	+10.0	+10.0	+10.0	+10.0	+10.0	+10.0	+10.0	+10.0	+10.0	A. Johnson & Co.	5478		
+3.0	-8.5	-7.0	-5.8	-3.2	-3.9	-5.2	+9.5	+11.8	+11.8	+1.2	+9.0	+7.9	+2.0	+4.5	Usher & Cole	2060		
+0.2	+4.8	+4.2	+2.5	+0.7	+4.4	+3.2	+8.7	+7.1	+16.9	+7.9	+6.5	+4.7	+4.1	+6.0	S. Smith & Sons	8007		
-10.9	-6.8	-8.8	-5.8	-10.1	-8.9	-7.1	-0.5	+6.9	+0.2	-0.5	+2.6	+0.5	+0.3	+1.0	Gardner	4419		
-1.0	-3.1	-3.3	-3.2	-3.7	-4.7	-4.3	+1.3	+12.0	+12.2	-6.1	+2.6	+4.9	-3.8	-4.3	E. Dent & Co.	55145		
-413.6	-499.9	-553.4	-544.6	-631.2	-675.1	-836.8	-1450.0	-1607.6	-2282.2	-2393.7	-2716.0	-2904.3	-3882.0	-3618.9	Chronometrical Thermometer.			
63.5	64.1	64.7	64.9	66.5	67.1	68.6	70.3	73.6	85.1	87.5	91.5	92.3	98.1	100.8	Mean Weekly Temperature.			
61.2	61.1	62.0	62.8	64.7	61.0	67.5	60.9	76.5	81.0	72.4	89.7	85.5	95.2	97.3	(Extremes of Temperature as shown by the Self-Registering Thermometers.)			
65.6	66.2	67.2	66.2	68.0	70.0	70.0	80.2	84.3	88.5	93.0	93.2	98.3	105.6	104.8				

RATES OF BOX CHRONOMETERS ON TRIAL FOR PURCHASE BY THE ADMIRALTY.

NAME OF MAKER.	No.	Whether 2 or 8 days.	ADDRESS OF MAKER.	Construction of Escapement, Balance, and Spring, from a Description furnished by the Maker.	(III.) ABSTRACT OF	
					Least Weekly Sum.	Extremes of Temperature.
Kullberg.....	8075	2	105, Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	- 3.2	48.4 - 52.8
Kullberg.....	8018	2	105, Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	- 4.5	53.0 - 55.1
Kullberg.....	8107	2	105, Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	- 6.9	53.0 - 55.1
Kullberg.....	8054	2	105, Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	- 7.1	53.0 - 55.1
Johannes.....	6451	2	149, Minories, London, E.	Plain compensation balance; palladium spring.	+ 8.1	50.8 - 55.0
Johannes.....	6465	2	149, Minories, London, E.	Plain compensation balance; palladium spring.	+ 8.3	48.4 - 52.8
Johannes.....	6459	2	149, Minories, London, E.	Auxiliary to balance acting in heat; palladium spring.	- 10.5	49.7 - 54.6
E. Dent & Co.....	55145	2	61, Strand, London, W.C.	Plain Earnshaw balance; palladium spring.	- 5.5	50.2 - 105.6
Kullberg.....	8074	2	105, Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	- 6.7	53.0 - 55.1
E. Dent & Co.....	55144	2	61, Strand, London, W.C.	Plain Earnshaw balance; palladium spring.	+ 1.7	51.0 - 70.0
Kullberg.....	8225	2	105, Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	- 1.0	48.4 - 52.8
Usher & Cole.....	2055	2	339, St. John Street, London, E.C.	Auxiliary to balance acting in cold; palladium spring.	- 7.0	52.8 - 55.1
Johannes.....	6483	2	149, Minories, London, E.	Auxiliary to balance acting in heat; palladium spring.	- 4.9	48.4 - 52.8
Kullberg.....	8077	2	105, Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	- 8.4	50.0 - 54.4
Johannes.....	6459	2	149, Minories, London, E.	Plain compensation balance; palladium spring.	+ 7.2	51.1 - 55.2
Kullberg.....	7985	8	105, Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	- 13.1	52.0 - 55.1
Kullberg.....	8009	2	105, Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	- 10.0	48.4 - 52.8
Usher & Cole.....	2058	2	339, St. John Street, London, E.C.	Auxiliary to balance acting in cold; palladium spring.	- 4.0	52.0 - 57.2
Johannes.....	6384	2	149, Minories, London, E.	Auxiliary to balance acting in heat; palladium spring.	- 7.7	49.7 - 54.6
Kullberg.....	8122	2	105, Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	- 11.1	48.4 - 52.8
Johannes.....	6359	2	149, Minories, London, E.	Auxiliary to balance acting in heat; palladium spring.	+ 3.5	55.2 - 105.6
Johannes.....	6371	2	149, Minories, London, E.	Auxiliary to balance acting in heat; palladium spring.	- 23.4	61.7 - 64.8
Gardner.....	4449	2	20, Lloyd's Square, London, W.C.	Auxiliary compensation; palladium spring.	- 17.2	53.0 - 55.1
Johannes.....	6381	2	149, Minories, London, E.	Auxiliary to balance acting in heat; palladium spring.	- 9.0	53.0 - 55.1
Johannes.....	6466	2	149, Minories, London, E.	Auxiliary to balance acting in heat; palladium spring.	- 23.6	48.4 - 52.8
Kullberg.....	7905	2	105, Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	- 0.2	52.8 - 55.2
L. Hall.....	1705	3	17, Mercer Row, Leith, Lincolnshire.	"Invar" balance; palladium spring.	- 13.6	62.8 - 66.2
Kullberg.....	8076	2	105, Liverpool Road, London, N.	Kullberg's auxiliary balance; palladium spring.	- 11.3	51.8 - 55.8
S. Smith & Son.....	7998	2	9, Strand, London, W.C.	Auxiliary to balance acting in cold; palladium spring.	- 7.6	61.8 - 63.8
Gardner.....	4433	2	20, Lloyd's Square, London, W.C.	Auxiliary compensation; palladium spring.	- 22.5	51.0 - 55.2
Usher & Cole.....	2007	2	339, St. John Street, London, E.C.	Auxiliary to balance acting in cold; palladium spring.	+ 7.2	72.4 - 90.0
Carley & Clemence.....	51788	2	30, Rye Place, Holborn Circus, E.C.	Auxiliary compensation; palladium spring.	+ 9.6	51.0 - 55.2
J. Sewell.....	5505	2	61, South Ockley Street, Liverpool.	"Invar" balance; blue steel spring.	- 18.3	55.2 - 105.6
C. Frodham & Co.....	10552	2	115, New Bond Street, London, W.	Auxiliary to balance acting in cold; palladium spring.	- 7.4	50.2 - 105.6
A. Johannes & Co.....	6380	2	149, Minories, London, E.	Auxiliary to balance acting in heat; palladium spring.	- 10.6	49.7 - 54.6
E. Dent & Co.....	55232	2	61, Strand, London, W.C.	Plain Earnshaw balance; palladium spring.	- 1.6	67.5 - 70.0
A. W. Webb.....	5710	2	69, Charlton Road, Blackheath, S.E.	Auxiliary compensation; bright steel spring.	- 4.5	48.4 - 52.8
A. Johannes & Co.....	6473	2	149, Minories, London, E.	Auxiliary to balance acting in heat; palladium spring.	- 3.8	55.2 - 105.6
Usher & Cole.....	2060	2	339, St. John Street, London, E.C.	Auxiliary to balance acting in cold; steel spring.	- 8.1	52.8 - 55.2
S. Smith & Son.....	8007	2	9, Strand, London, W.C.	Auxiliary to balance acting in cold; palladium spring.	- 6.2	46.7 - 55.0
Gardner.....	4419	8	20, Lloyd's Square, London, W.C.	Auxiliary compensation; palladium spring.	- 16.0	51.0 - 55.2
E. Dent & Co.....	55146	2	61, Strand, London, W.C.	Plain Earnshaw balance; palladium spring.	- 8.6	55.2 - 105.6

The sign + indicates a gaining rate.

AT THE ROYAL OBSERVATORY, GREENWICH, FROM 1909 JANUARY 19 TO 1910 JANUARY 8.

THE PRINCIPAL CHANGES OF RATE DURING THE 29 WEEKS.

Mean Temperature.	Greatest Weekly Sum.	Extremes of Temperature.	Mean Temperature.	Difference between the Greatest and Least. (a)	Greatest Difference between one Week and the next. (b)	Mean Temperature for these two Weeks.	Trial No. a + 2b.	NAME OF MAKER.	No.
50.0	+ 1.6	81.0 - 88.5	85.1	5.0	2.6	85.1 - 105.6	10.2	Kullberg.....	8075
54.3	+ 3.1	81.0 - 88.5	85.1	7.6	2.6	100.8 - 85.1	12.8	Kullberg.....	8018
54.3	+ 0.7	61.1 - 66.2	64.1	7.6	3.2	87.5 - 59.1	14.0	Kullberg.....	8107
100.8	1.3	59.8 - 85.2	64.9	8.4	4.3	87.5 - 59.1	17.0	Kullberg.....	8054
62.2	+ 14.5	53.0 - 55.1	54.3	11.4	3.6	87.5 - 59.1	18.6	Johannes.....	6451
50.1	+ 9.9	81.0 - 88.5	85.1	9.6	4.6	78.6 - 51.0	19.8	Johannes.....	6465
59.1	+ 3.8	49.7 - 54.6	51.0	10.5	5.0	51.0 - 51.5	20.5	Johannes.....	6459
56.3	4.2	75.5 - 84.3	78.6	8.8	5.0	100.8 - 85.1	20.6	E. Dent & Co.....	55145
67.1	+ 11.1	75.5 - 84.3	78.6	9.4	6.0	62.8 - 75.8	21.4	Kullberg.....	8074
50.1	+ 9.9	78.5 - 84.3	78.6	10.9	5.9	78.6 - 51.0	22.7	Kullberg.....	8225
54.9	+ 5.0	49.7 - 54.6	51.0	12.0	5.6	100.8 - 85.1	23.2	Usher & Cole.....	2055
50.1	+ 7.6	57.3 - 104.8	100.8	12.5	5.4	50.1 - 51.2	23.3	Johannes.....	6483
69.7	+ 2.7	89.7 - 89.2	91.5	11.1	6.4	91.5 - 85.3	23.9	Kullberg.....	8077
64.1	+ 21.5	49.7 - 54.6	51.0	14.3	4.9	98.1 - 100.8	24.1	Johannes.....	6459
54.3	- 0.2	61.1 - 66.2	64.1	12.9	5.9	78.6 - 51.0	24.7	Kullberg.....	7985
50.1	+ 0.6	49.7 - 54.6	51.0	10.6	7.8	51.0 - 51.5	25.2	Kullberg.....	8009
64.7	+ 8.5	59.0 - 64.5	62.3	12.5	7.1	51.5 - 49.4	26.7	Usher & Cole.....	2058
51.0	+ 5.8	61.1 - 66.2	64.1	13.5	7.8	67.1 - 87.5	29.1	Johannes.....	6384
50.1	+ 4.8	61.0 - 70.0	67.1	15.9	6.8	62.3 - 62.7	29.5	Kullberg.....	8122
98.1	+ 19.0	60.8 - 65.0	62.2	15.5	7.1	51.5 - 48.4	29.7	Johannes.....	6359
63.1	- 5.6	59.0 - 64.5	62.3	17.8	6.7	85.1 - 62.3	31.2	Johannes.....	6371
54.3	- 2.1	81.0 - 88.5	85.1	15.1	8.4	63.2 - 78.7	31.9	Gardner.....	4449
54.3	+ 7.2	89.7 - 89.2	91.5	16.2	7.9	62.8 - 75.8	32.0	Johannes.....	6381
50.1	- 5.0	67.5 - 70.0	68.6	16.6	7.9	68.6 - 66.6	32.2	Johannes.....	6466
64.9	+ 12.4	59.0 - 64.5	62.3	13.6	10.4	64.9 - 64.7	33.4	Kullberg.....	7905
64.9	+ 5.5	49.7 - 54.6	51.0	17.3	7.2	78.6 - 51.0	33.7	L. Hall.....	1705
63.2	+ 3.7	75.5 - 84.3	78.6	15.0	9.6	62.3 - 75.8	34.2	Kullberg.....	8076
63.2	+ 9.5	49.7 - 54.6	51.0	17.0	9.0	62.3 - 62.7	34.3	S. Smith & Son.....	7998
53.9	- 4.9	97.3 - 104.8	100.8	17.6	9.0	85.1 - 62.3	35.6	Gardner.....	4433
87.5	+ 24.0	49.7 - 54.6	51.0	16.8	10.0	87.5 - 85.1	36.8	Usher & Cole.....	2007
53.9	+ 27.9	75.5 - 84.3	78.6	18.3	9.5	51.0 - 51.5	37.3	Carley & Clemence.....	51788
38.1	+ 4.4	51.0 - 55.2	53.9	4.7	7.4	67.1 - 87.5	37.5	J. Sewell.....	5505
38.1	+ 8.1	89.7 - 88.2	91.5	15.5	11.0	100.8 - 85.1	37.8	C. Frodham & Co.....	10552
51.0	+ 8.7	64.7 - 66.0	66.5	19.5	9.1	63.2 - 75.3	37.7	A. Johannes & Co.....	6380
68.6	+ 15.7	75.5 - 84.3	78.6	17.3	10.7	92.3 - 78.6	38.7	E. Dent & Co.....	55232
50.1	+ 16.6	62.8 - 66.2	64.9	21.1	10.7	61.1 - 61.8	41.1	A. W. Webb.....	5710
38.1	+ 20.6	51.0 - 55.2	53.9	24.4	9.8	67.1 - 67.8	42.0	A. Johannes & Co.....	6473
62.2	+ 15.2	49.7 - 54.6	51.0	24.0	9.9	100.8 - 85.1	43.8	Usher & Cole.....	2060
51.2	+ 16.9	81.0 - 88.5	85.1	23.1	10.9	100.8 - 85.1	44.9	S. Smith & Son.....	8007
53.9	+ 6.9	75.5 - 84.3	78.6	22.9	11.8	78.6 - 51.0	46.5	Gardner.....	4419
98.1	+ 17.4	49.7 - 54.6	51.0	26.0	11.4	51.0 - 51.5	48.8	E. Dent & Co.....	55146

The Chronometers are placed in order of merit, their respective positions being determined by consideration of the irregularities of rate exhibited in the above Table. The Trial No. a + 2b is taken as a measure of the irregularities of rate.

Only those Chronometers have been included in this list for which 3 did not exceed 12 seconds.

RATES OF POCKET CHRONOMETERS ON TRIAL FOR PURCHASE BY THE ADMIRALTY,

(1) WEEKLY RATES IN ORDER OF TIME.

Order of Merit.	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. 18-22	Sept. 22-26	Sept. 26-28	Sept. 28 to 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
	Pocket Chronometer Horizontal. Dial up.																	
	Pocket Chronometer Horizontal. Dial up.																	
	Pocket Chronometer Horizontal. Dial up.																	
1	+ 0.9	+ 2.9	+ 2.0	+ 1.8	+ 0.2	- 4.4	+ 1.6	+20.7	-14.0	+ 2.3	+ 1.8	- 3.3	-10.2	-11.5	-11.9	-13.4	-12.7	-11.1
2	+20.9	+11.0	+17.4	+13.9	+10.8	+ 7.5	+ 3.0	- 3.2	+ 3.3	- 0.9	+ 4.4	+ 5.1	+ 9.5	+ 6.3	+ 4.5	+ 2.8	+ 2.6	+ 4.0
3	- 6.2	- 6.0	- 2.8	- 1.5	- 2.3	- 2.8	-11.1	-11.0	- 9.6	-11.7	- 8.8	- 7.9	-11.1	- 9.0	-17.4	-13.1	-19.4	-27.0
4	+16.9	+10.8	+14.1	+25.1	+14.7	+24.5	+21.1	+33.1	+30.1	+31.3	+36.4	+30.0	+34.6	+37.6	+33.6	+33.3	+27.3	+19.1
5	- 3.0	- 4.3	- 7.0	- 6.9	- 8.9	- 9.0	- 4.4	+ 7.9	- 1.4	+19.6	+ 7.4	+ 2.1	-12.1	-14.8	-14.5	-14.4	-16.0	-15.3
6	+ 1.9	+ 4.5	+ 1.8	- 3.4	- 0.3	- 3.7	+ 8.2	+38.7	+46.4	+ 9.8	+38.0	+ 7.7	- 2.9	- 0.7	+ 1.5	+ 0.5	+ 1.7	+ 6.1
7	+10.5	+12.8	+10.1	+ 6.0	+ 8.9	+ 5.3	+16.1	- 0.9	+ 7.7	+ 5.4	+ 6.0	+18.6	+ 4.6	- 4.8	+ 7.1	- 1.3	+ 2.1	+ 4.8
8	-11.7	-12.0	-12.8	-11.2	-12.2	- 8.4	-15.5	-17.0	-14.9	+14.7	-11.7	- 9.5	-12.1	-24.8	-37.5	-30.2	-30.2	-41.2
9	+ 6.3	+10.4	+ 8.2	+11.8	+12.1	+ 9.4	0.0	+25.7	+27.1	-11.2	+26.6	+ 5.8	+20.0	+19.7	+25.6	+21.7	+20.9	+19.2
10	+13.7	+13.3	+24.8	+23.4	+22.8	+22.1	+ 8.9	-11.5	-105.5	-15.4	-45.9	+11.8	+26.6	+20.0	+13.3	+10.9	+13.8	+14.0
	67.1	71.5	73.9	66.1	63.7	62.3	86.0		86.8		90.4	90.3	63.1	63.2	56.3	55.9	54.6	52.9
	61.0	69.2	68.5	61.7	60.6	59.0	76.0		85.0		88.9	88.8	61.7	61.8	61.0	61.6	59.1	59.8
	70.0	74.1	76.1	67.7	66.8	64.5	89.2		92.2		91.7	92.0	64.8	63.8	63.6	58.6	67.9	56.5

* 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 Sept. 11 to Oct. 9, 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.

AT THE ROYAL OBSERVATORY, GREENWICH, FROM 1909 JULY 31 to 1909 NOVEMBER 20.

(2) ABSTRACT OF THE PRINCIPAL CHANGES OF RATE.

a.	b.	Difference of Weekly Rates.			c.	Trial Number.	NAME OF MAKER.	No.	ADDRESS OF MAKER.
		Pendant up —Dial up.	Pendant right —Dial up.	Pendant left —Dial up.					
$a + 2b + \frac{1}{2}(c + \frac{d+e}{3})$									
16.3	6.9	+12.2	-13.1	+3.2	30.1	Kullberg.....	7458	105, Liverpool Road, London, N.	
18.3	9.9	-3.5	-0.8	-5.0	38.1	Carley & Clemence.....	51618	30, Ely Place, Holborn Circus, E.C.	
25.5	8.4	-0.4	-0.1	-2.2	42.3	J. Player & Son.....	33498	Belford Street, Coventry.	
26.8	10.4	+9.2	+4.5	+5.7	47.6	S. Yeomans.....	93539	48, Spon Street, Coventry.	
18.1	14.2	+8.9	-0.2	+20.8	46.5	Kullberg.....	7456	105, Liverpool Road, London, N.	
11.9	11.9	+30.4	+38.4	+1.8	35.7	Kullberg.....	7460	105, Liverpool Road, London, N.	
23.4	14.0	-14.8	-9.7	-12.0	51.4	Carley & Clemence.....	51620	30, Ely Place, Holborn Circus, E.C.	
32.8	12.7	-1.9	-2.4	+27.2	58.2	Kullberg.....	7457	105, Liverpool Road, London, N.	
25.6	14.2	+23.8	+24.2	-14.1	54.0	S. Smith & Sons.....	19346	9, Strand, London, W.C.	
17.7	14.8	-54.1	-115.9	-25.8	47.3	S. Smith & Sons.....	19345	9, Strand, London, W.C.	
Mean Weekly Temperature.									
{ Extremes of Temperature as shown by the Self-Registering Thermometers.									
							The sign + indicates a gaining rate.		