

RATES OF CHRONOMETER WATCHES
ON TRIAL
FOR PURCHASE BY THE BOARD OF ADMIRALTY,
AT THE
ROYAL OBSERVATORY, GREENWICH,
FROM 1913 AUGUST 2 TO 1913 NOVEMBER 22.

RATES OF CHRONOMETER WATCHES ON TRIAL FOR PURCHASE BY THE ADMIRALTY AT THE

Order of Merit.	NAME OF MAKER.	No.	ADDRESS OF MAKER.	(1) WEEKLY RATES IN													
				Aug. 2-9.	Aug. 9-16.	Aug. 16-23.	Aug. 23-30.	Aug. 30 to Sept. 6.	Sept. 6-13.	Sept. 13-20.	Sept. 20-24.	Sept. 24-27.	Sept. 27-30.	Sept. 30 to Oct. 4.			
				Watch Horizontal. Dial up.													
				Watch Vertical. Pendant. up.	Watch Vertical. Pendant. right.	Watch Vertical. Pendant. left.	Watch Vertical. Pendant. up.	Watch Vertical. Pendant. up.	Watch Vertical. Pendant. up.	Watch Vertical. Pendant. up.	Watch Vertical. Pendant. up.	Watch Vertical. Pendant. up.	Watch Vertical. Pendant. up.	Watch Vertical. Pendant. up.	Watch Vertical. Pendant. up.	Watch Vertical. Pendant. up.	
1	H. White & Co.	2055	63 Chesapide, London, E.C.	- 3.4	- 2.8	- 1.2	0.0	- 2.9	- 4.2	- 1.9	- 7.5	+ 12.1	+ 9.1	+ 0.7			
2	H. White & Co.	2050	63 Chesapide, London, E.C.	- 3.5	- 4.2	- 3.0	- 2.2	- 3.8	- 2.8	+ 0.8	- 2.8	+ 7.7	+ 4.4	+ 6.1			
3	Wartski.	2042	13 New Bond Street, London, W.	- 1.5	- 0.2	+ 0.9	+ 2.2	+ 0.8	- 3.8	- 3.0	+ 3.7	- 2.7	- 4.8	+ 6.8			
4	A. Johannsen & Co.	6998	149 Minories, London, E.	+ 1.8	+ 0.9	- 0.9	+ 0.2	- 3.8	- 7.6	- 11.3	- 2.5	- 12.1	- 31.0	- 4.7			
5	R. Künzler.	51937	31 St. George's Place, Birmingham	+ 6.0	+ 6.3	+ 6.6	+ 7.5	+ 7.4	+ 9.1	+ 11.5	+ 12.3	+ 23.1	- 7.5	+ 16.3			
6	H. White & Co.	2058	63 Chesapide, London, E.C.	- 1.5	+ 1.0	+ 0.4	+ 3.5	+ 0.5	- 2.6	- 0.5	+ 2.8	- 16.1	- 14.0	+ 8.6			
7	H. White & Co.	1981	63 Chesapide, London, E.C.	+ 1.7	+ 2.9	+ 2.7	+ 5.5	- 0.4	- 4.2	+ 1.0	+ 3.8	+ 5.1	+ 5.6	+ 6.3			
8	Riddels, Ltd.	51611	Donsall Place, Belfast	- 13.5	- 15.8	- 16.1	- 15.1	- 16.4	- 13.5	- 21.1	- 14.2	- 15.2	- 12.8	- 10.7			
9	Lewis Donne & Son.	2576	Birchin Lane, London, E.C.	+ 1.8	+ 1.3	- 1.1	+ 1.0	+ 0.3	- 8.4	- 11.9	- 9.1	- 3.8	- 8.4				
10	Birch & Gaydon	2571	159 Finchurch Street, London, R.C.	+ 11.0	+ 11.9	+ 12.4	+ 12.9	+ 10.1	+ 13.3	+ 13.2	+ 7.9	+ 6.3	+ 7.7	+ 12.4			
11	H. White & Co.	2051	63 Chesapide, London, E.C.	- 10.9	- 10.7	- 8.4	- 5.1	- 9.5	- 9.2	- 5.1	+ 13.7	- 8.4	- 4.0	+ 17.9			
12	Bowden, F. E. & Sons.	51781	72 George Street, Plymouth.	+ 7.2	+ 6.8	+ 7.2	+ 11.0	+ 5.6	+ 6.8	+ 8.8	- 9.8	- 8.4	- 3.3	- 1.6			
13	Wm. Matthews.	42858	Elmcroft, 52 Holy Head Road, Coventry.	- 0.0	+ 1.7	+ 1.7	+ 1.6	+ 5.9	+ 4.7	- 2.7	- 13.8	- 36.4	- 19.8	- 10.7			
14	S. F. Stanley.	1867	46 Chancery Lane, London, E.C.	- 8.2	- 8.3	- 14.1	- 16.5	- 14.1	- 11.8	- 16.5	- 0.4	- 25.7	- 18.2	+ 1.8			
15	R. Künzler.	51930	31 St. George's Place, Birmingham.	- 14.0	- 13.7	- 13.4	- 17.3	- 15.7	- 17.5	- 25.8	- 30.8	- 33.4	- 25.4	+ 2.8			
16	Newsome & Co.	151346	14 & 15 The Butts, Coventry.	+ 14.8	+ 17.6	+ 21.5	+ 23.0	+ 28.9	+ 25.4	+ 17.6	- 8	+ 6.8	+ 7.2	+ 5.6			
17	A. Johannsen & Co.	7000	149 Minories, London, E.	- 9.0	- 8.3	- 5.1	- 1.9	- 4.8	+ 4.0	+ 5.5	+ 5.8	+ 1.2	- 23.6	+ 9.1			
18	J. Lilley & Son.	1787	10 London Street, Finchurch Street, E.C.	+ 9.1	+ 13.4	+ 15.8	+ 19.9	+ 21.9	+ 30.7	+ 18.9	+ 15.6	+ 32.9	+ 11.2	+ 25.6			
19	Austin & Williams.	1995	6 Conduit Street, London, W.	- 1.1	- 2.0	- 1.1	+ 0.4	- 8.2	- 9.5	- 2.1	- 5.6	- 9.8	- 64.9	+ 2.1			
20	E. H. & F. E. Sermon.	51941	10 Victoria Parade, Torquay.	+ 6.9	+ 2.0	+ 1.8	+ 1.3	+ 2.8	- 0.0	+ 12.1	+ 6.1	+ 7.0	+ 12.4	+ 5.4			
21	V. Kullberg.	8347	105 Liverpool Road, London, N.	+ 5.8	+ 3.0	+ 1.0	0.0	+ 0.3	- 0.9	+ 5.9	+ 1.4	- 24.5	- 35.9	- 19.6			
22	R. Künzler.	51890	31 St. George's Place, Birmingham.	+ 24.6	+ 24.3	+ 21.2	+ 19.5	+ 19.2	+ 30.2	+ 32.0	+ 54.8	+ 53.0	+ 18.7	+ 58.3			
23	Wm. Matthews.	43070	Elmcroft, 52 Holy Head Road, Coventry.	+ 9.2	+ 1.8	- 2.3	- 11.6	- 14.7	- 22.4	- 21.8	- 23.1	- 25.9	- 22.2	- 18.7			
24	R. Künzler.	51944	31 St. George's Place, Birmingham.	- 16.9	- 16.0	- 15.2	- 16.4	- 19.0	- 30.3	- 21.9	+ 9.5	+ 9.1	- 8.3	+ 17.5			
25	G. Rosseter.	51612	11 Bank Street, Teignmouth.	- 1.8	- 4.0	- 1.9	+ 2.2	+ 1.5	+ 1.5	+ 5.2	- 13.7	+ 15.9	+ 17.7	+ 24.7			
The sign + indicates a gaining rate.				64.0	65.0	66.5	68.5	65.9	64.0	88.9	90.3		87.9				
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.				60.3	63.9	64.9	66.4	64.2	62.3	84.2	89.3		87.5				
				65.4	66.2	68.7	70.6	69.8	65.2	91.6	91.3		90.2				

* The Weekly Rates have been computed from the rates for three days.
During the period Sept. 13 to Oct. 1, the watches 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.

ROYAL OBSERVATORY, GREENWICH, FROM 1913 AUGUST 2 TO 1913 NOVEMBER 22.

ORDER OF TIME.							(2) ABSTRACT OF THE PRINCIPAL CHANGES OF RATES.													
Oct. 4-11.	Oct. 11-18.	Oct. 18-25.	Oct. 25 to Nov. 1.	Nov. 1-8.	Nov. 8-15.	Nov. 15-22.	Difference between greatest and least Weekly Rates.		Difference of Weekly Rates.			a + 2b + $\frac{1}{2}(c + \frac{d+e}{2})$	Total Number.	NAME OF MAKER.	No.	Order of Merit.				
Watch Horizontal. Dial up.						Dial up. a.	Dial up. b.	Pendant up. c.	Pendant right Dial up. d.	Pendant left Dial up. e.										
- 0.6	- 6.6	- 5.7	- 2.8	- 3.0	- 1.9	- 2.4	6.6	6.0	- 2.1	+ 13.4	+ 10.4	18.6	23.7	H. White & Co.	2055	1				
+ 7.8	+ 3.4	+ 4.1	+ 7.2	+ 8.5	+ 9.5	+ 7.7	13.7	4.4	- 2.4	+ 3.4	+ 0.1	22.5	24.3	H. White & Co.	2050	2				
- 3.8	- 3.7	- 2.2	- 0.8	- 1.0	- 0.9	- 2.5	6.0	2.7	+ 8.7	- 24.1	- 39.8	11.4	26.5	Wartski.	2042	3				
- 5.0	- 6.2	- 5.9	- 3.1	- 3.0	- 1.1	- 4.9	12.6	4.0	+ 4.6	- 3.9	- 22.8	20.6	27.4	A. Johannsen & Co.	6998	4				
+ 13.1	+ 5.9	+ 6.5	+ 11.3	+ 6.0	+ 7.4	+ 8.9	7.2	7.2	+ 2.0	+ 10.8	- 19.8	21.6	27.7	R. Künzler	51937	5				
+ 0.1	- 4.8	- 8.6	- 3.7	- 3.4	+ 1.0	- 1.4	12.1	4.9	+ 5.9	- 15.9	- 13.8	21.9	29.9	H. White & Co.	2058	6				
+ 6.5	+ 10.6	+ 9.1	+ 7.8	+ 11.7	+ 13.1	+ 37.4	17.3	5.9	+ 0.7	+ 1.0	+ 1.5	29.1	29.9	H. White & Co.	1981	7				
- 19.6	- 17.9	- 20.5	- 23.7	- 22.1	- 21.0	- 20.4	10.2	7.6	+ 7.9	+ 5.2	+ 7.6	25.4	31.5	Riddels, Ltd.	51611	8				
- 8.1	- 13.9	- 13.2	- 8.8	- 3.2	- 1.0	- 5.6	15.7	7.9	- 1.9	- 0.8	- 1.0	31.5	32.8	Lewis Donne & Son	2576	9				
+ 22.8	+ 20.8	+ 14.4	+ 15.6	+ 17.2	+ 23.4	+ 19.5	13.3	6.4	- 7.8	- 11.7	- 10.8	26.1	7.6	Birch & Gaydon	2571	10				
+ 2.1	- 4.0	- 7.9	- 4.7	- 1.6	- 1.1	- 2.0	13.0	6.1	+ 17.3	- 6.9	- 2.5	25.2	35.5	H. White & Co.	2051	11				
+ 15.7	+ 14.9	+ 11.9	+ 11.0	+ 11.7	+ 12.6	+ 9.0	10.1	5.4	- 18.0	- 30.7	- 15.6	29.9	36.0	Bowden, F. E. & Sons.	51781	12				
- 0.3	+ 1.1	+ 0.9	+ 1.0	+ 1.7	+ 4.3	+ 6.0	8.7	7.4	- 10.8	- 34.9	- 13.3	23.5	37.8	Wm. Matthews	42358	13				
- 20.3	- 17.9	- 19.5	- 20.5	- 21.7	- 23.1	- 23.8	15.6	5.8	+ 19.1	- 7.3	+ 0.2	27.2	38.1	S. F. Stanley	1867	14				
- 9.4	- 11.1	- 13.2	- 14.6	- 20.3	- 20.9	- 19.9	16.4	8.3	+ 3.6	- 15.8	- 7.8	33.0	38.7	R. Künzler	51930	15				
+ 20.2	+ 21.6	+ 20.3	+ 17.8	+ 18.8	+ 18.1	+ 16.3	14.1	7.8	- 17.0	- 12.1	- 11.7	29.7	42.2	Newsome & Co.	151346	16				
+ 9.0	+ 2.3	+ 3.8	+ 7.7	+ 6.3	+ 10.3	+ 9.7	13.3	9.5	+ 0.4	- 6.1	- 30.9	38.3	44.7	A. Johannsen & Co.	7000	17				
+ 32.1	+ 30.7	+ 33.6	+ 36.4	+ 37.8	+ 39.7	+ 36.5	30.6	4.3	- 4.9	+ 7.4	- 14.3	39.2	45.3	J. Lilley & Son	1787	18				
+ 1.5	- 9.9	- 9.6	- 9.3	- 7.5	- 6.5	- 8.0	11.4	11.4	- 1.5	- 9.0	- 64.6	34.2	47.3	Austin & Williams	1995	19				
+ 2.6	- 10.4	- 8.1	- 3.3	+ 1.4	+ 1.5	+ 3.5	22.5	13.0	- 1.6	- 0.4	+ 5.0	48.5	50.2	E. H. & F. E. Sermon.	51941	20				
+ 11.2	+ 12.6	+ 16.2	+ 17.0	+ 16.1	+ 12.8	+ 9.3	17.9	6.8	- 17.7	- 33.1	- 44.5	31.5	53.3	V. Kullberg.	8347	21				
+ 31.6	+ 27.3	+ 24.9	+ 25.4	+ 30.5	+ 30.1	+ 24.5	12.8	11.8	+ 24.8	+ 21.2	- 13.1	36.4	54.5	R. Künzler.	51890	22				
- 3.5	- 15.1	- 16.8	- 16.2	- 18.1	- 17.0	- 19.0	31.6	9.3	- 3.2	- 10.7	- 7.0	50.2	54.8	Wm. Matthews.	43070	23				
- 7.7	- 14.7	- 23.4	- 23.0	- 22.5	- 25.1	- 23.5	17.4	8.7	+ 28.3	+ 23.9	+ 11.5	34.8	54.9	R. Künzler.	51944	24				
+ 21.8	+ 12.3	+ 13.6	+ 16.0	+ 25.9	+ 26.3	+ 23.6	30.3	9.9	- 8.0	+ 2.4	+ 4.2	50.1	55.2	G. Rossett.	51612	25				
Mean Weekly Temperature.																				
87.9	60.2	60.6	63.7	62.8	61.7	60.2														
90.8	59.4	59.4	59.5	60.4	58.5	57.2														
89.1	61.7	61.8	66.1	65.1	65.0	61.9														
Extremes of course as shown by the Self-Registering Thermometer.																				

Order of Merit.	NAME OF MAKER.	No.	ADDRESS OF MAKER.	(1) WEEKLY RATES IN																		
				Aug. 2-9.	Aug. 9-16.	Aug. 16-23.	Aug. 23-30.	Aug. 30 to Sept. 6.	Sept. 6-13.	Sept. 13-20.	Sept. 20-24.	Sept. 24-27.	Sept. 27-30.	Sept. 30 to Oct. 4.	Watch Horizontal. Dial up.				Watch Vertical. Pendant up.	Watch Vertical. Pendant right.	Watch Vertical. Pendant left.	Watch Vertical. Pendant up.
				+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+	+
26	J. Lilley & Son	1786	10 London Street, Fenchurch Street, E.C.	+ 9.3	+ 8.5	+ 10.5	+ 16.2	+ 14.6	+ 14.8	+ 15.9	+ 29.2	+ 0.0	+ 33.8	+ 39.2								
27	V. Kullberg	8945	105 Liverpool Road, London, N.	+ 12.9	+ 9.1	+ 10.8	+ 13.1	+ 7.0	+ 11.9	+ 20.0	+ 28.5	+ 13.0	+ 15.6	+ 39.4								
28	C. W. Fenn	2043	Harrow Road, Wembley, Middlesex.	- 11.2	- 7.2	- 3.2	- 0.2	- 8.0	- 10.9	- 0.6	+ 1.8	- 72.1	- 27.3	- 11.0								
29	Newsome & Co.	151838	14 & 15 The Butts, Coventry.	+ 0.1	+ 6.2	- 8.5	- 9.7	- 10.4	- 5.8	+ 5.1	- 3.9	- 6.3	+ 0.7	+ 2.5								
30	R. Künzler	51932	31 St. George's Place, Birmingham	- 27.6	- 32.9	- 34.8	- 35.2	- 40.5	- 41.9	- 26.6	- 19.3	- 18.4	- 31.3	- 13.5								
31	R. Künzler	51941	31 St. George's Place, Birmingham	+ 1.7	+ 6.2	+ 7.0	+ 7.6	+ 10.6	- 1.2	- 10.0	+ 15.9	+ 7.5	- 0.7	+ 19.4								
32	H. White & Co.	20564	63 Chapside, London, E.C.	- 8.5	- 10.1	- 9.5	- 8.6	- 13.8	- 16.1	- 2.7	+ 4.4	+ 16.6	+ 35.7	+ 8.8								
33	F. H. Phillips	1983	4 Finsbury Pavement, London, E.C.	+ 4.5	- 3.8	- 6.3	- 2.4	- 14.1	- 9.6	- 1.5	- 15.4	+ 23.1	- 25.4	- 13.7								
34	J. Lilley & Son	1791	10 London Street, Fenchurch Street, E.C.	- 3.5	+ 1.6	+ 9.6	+ 5.5	+ 3.9	+ 6.2	+ 0.1	+ 11.4	- 44.8	+ 14.2	+ 13.7								
35	F. A. Chandler	2041	4 Victoria Terrace, Leamington Spa.	- 10.1	- 10.6	- 7.3	- 6.6	- 12.9	- 10.0	- 3.6	- 3.9	- 53.9	- 5.4	- 15.9								
36	S. Yeomans	85993	43 Spout Street, Coventry	- 2.9	+ 7.3	+ 5.0	+ 3.7	+ 19.3	+ 8.3	+ 9.9	+ 15.1	+ 35.0	+ 0.9	+ 23.8								
37	R. Künzler	51949	31 St. George's Place, Birmingham	- 4.9	- 5.0	- 5.3	- 4.6	- 9.4	- 9.7	+ 2.1	+ 10.7	- 2.3	+ 13.9	+ 22.1								
38	A. Mears & Co.	1957	73-75 High Street, Camden Town.	- 11.6	- 12.2	- 11.5	- 11.6	- 15.6	- 14.9	- 4.5	+ 1.2	- 42.7	- 4.2	+ 8.6								
39	D. Buckney	32039	35-37 Broad Street House, London, E.C.	+ 3.1	+ 2.0	+ 2.9	+ 1.5	+ 4.7	+ 3.0	- 3.1	+ 10.5	+ 7.9	+ 6.5	+ 8.1								
40	Smith (B.)	596	26 Duke Street, Manchester Square, W.	- 5.6	+ 0.6	- 0.7	+ 0.8	+ 3.8	+ 3.0	- 6.2	+ 24.9	- 54.6	+ 3.3	+ 34.8								
41	R. Künzler	51900	31 St. George's Place, Birmingham	- 9.8	- 14.0	- 10.0	- 6.6	- 4.7	- 0.4	+ 0.5	- 54.4	- 8.2	+ 12.1	- 67.4								
42	F. A. Chandler	1712	4 Victoria Terrace, Leamington Spa.	- 4.4	- 4.0	- 1.5	- 0.4	- 0.1	- 0.6	+ 2.7	- 17.2	- 8.9	- 30.3	- 17.0								
43	R. Künzler	51915	31 St. George's Place, Birmingham	- 3.5	- 0.5	- 0.3	+ 1.2	+ 3.9	+ 9.6	+ 23.3	+ 21.9	+ 41.3	+ 14.2	+ 34.1								
44	A. Johannsen & Co.	6999	149 Minories, London, E.	+ 4.2	+ 5.9	+ 6.9	+ 10.7	+ 10.1	+ 11.9	+ 3.6	+ 14.7	- 23.7	- 52.0	- 20.3								
45	J. Lilley & Son	1789	10 London Street, Fenchurch Street, E.C.	- 7.1	- 8.0	- 6.9	- 2.7	- 4.1	- 2.6	+ 5.1	- 18.6	+ 11.2	- 13.8	- 20.1								
46	Mappin & Webb	12366	158 Oxford Street, London, W.	+ 15.9	+ 14.9	+ 14.9	+ 16.7	+ 3.1	- 2.9	+ 11.3	- 0.0	- 20.3	- 42.5	+ 3.3								
47	R. Künzler	51942	31 St. George's Place, Birmingham	- 10.0	- 12.6	- 3.7	- 0.7	- 5.4	- 7.9	+ 1.5	+ 34.3	+ 58.6	- 5.8	+ 37.1								
48	Wright & Craighed ..	8233	319 St. John Street, Clerkenwell, E.C.	- 4.4	- 4.3	- 2.8	- 0.0	- 7.6	- 4.6	+ 8.8	- 6.3	+ 3.7	+ 5.6	+ 8.9								
49	Usher & Cole	31879	339 St. John Street, Clerkenwell, E.C.	+ 4.4	+ 6.1	+ 10.2	+ 9.8	+ 2.2	- 7.4	+ 8.5	+ 0.5	- 30.3	- 54.6	+ 4.0								
50	Reid & Sons	52024	Gem Buildings, Blackett Street, Newcastle	+ 3.0	+ 6.3	+ 10.9	+ 12.8	+ 2.8	+ 2.1	+ 13.0	- 7.0	- 8.9	- 6.5	- 5.3								
The sign + indicates a gaining rate.				64°0	65°0	66°5	68°5	65°9	64°0	68°9	90°3	87°9										
The quantities a, b, c, d, e, in the formula $a + 2b + \frac{1}{2}(c + \frac{d^2}{e})$, are taken numerically, without regard to sign.				60°3	63°9	64°9	66°4	64°2	62°3	84°2	89°3	87°5										
				60°3	63°9	64°9	66°4	64°2	62°3	84°2	89°3	87°5										

The sign + indicates a gaining rate.

The quantities a, b, c, d, e , in the formula $a + 2b + \frac{1}{2}(c + \frac{2d}{3} + \frac{e}{4})$, are taken numerically, without regard to sign.

* The Weekly Rates have been computed from the rates for three days.
During the period Sept. 13 to Oct. 11, the watches 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.

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

ORDER OF TIME.							(2) ABSTRACT OF THE PRINCIPAL CHANGES OF RATES.										NAME OF MAKER.		No.	Order of Merit.
Oct. 4-11.	Oct. 11-18.	Oct. 18-25.	Oct. 25 to Nov. 1.	Nov. 1-8.	Nov. 8-15.	Nov. 15-22.	Difference between greatest and least Weekly Rates.	Greatest difference between one week and the next.	Difference of Weekly Rates.			a+2b	Trial Number $a + 2b + \frac{1}{2}(c + \frac{2d}{3} + \frac{e}{4})$							
Watch Horizontal. Dial up.							Dial up. a.	Dial up. b.	Pendant up - Dial up. c.	Pendant right - Dial up. d.	Pendant left - Dial up. e.									
+ 23.1	+ 19.1	+ 20.7	+ 23.9	+ 21.7	+ 26.2	+ 23.7	19.6	9.0	+ 12.2	- 22.0	- 55.8	37.6	56.7	J. Lilley & Son	1786	26				
+ 39.8	+ 33.1	+ 32.5	+ 32.7	+ 33.3	+ 41.5	+ 41.3	34.5	8.1	+ 4.1	- 11.9	- 14.3	50.7	57.2	V. Kullberg	8945	27				
+ 6.4	+ 3.9	- 2.2	- 2.2	- 2.4	- 4.9	- 8.6	17.6	10.3	+ 3.5	- 75.0	- 30.2	38.2	57.5	C. W. Fenn	2043	28				
+ 12.1	+ 5.0	- 2.2	- 2.9	+ 0.2	+ 0.9	+ 1.2	22.5	14.7	+ 7.9	+ 2.3	+ 9.3	51.9	57.8	Newsome & Co.	151338	29				
- 22.2	- 27.6	- 43.0	- 43.1	- 42.1	- 37.9	- 42.4	20.9	15.4	+ 8.0	+ 6.0	- 6.9	51.7	57.9	R. Künzler	51932	30				
+ 6.2	- 0.8	- 2.1	- 4.7	- 10.4	- 11.6	- 12.7	23.3	11.8	+ 19.6	+ 9.4	+ 1.2	46.9	58.5	R. Künzler	51941	31				
- 1.3	- 14.2	- 19.2	- 18.2	- 15.3	- 17.4	- 16.7	18.6	13.4	+ 8.6	+ 18.6	+ 37.7	45.4	59.1	H. White & Co.	2054	32				
- 0.0	+ 0.2	+ 4.7	+ 7.3	+ 6.5	+ 2.2	- 0.2	21.4	11.7	- 13.8	+ 23.9	- 24.6	49.8	59.8	F. H. Phillips	1983	33				
+ 9.4	+ 17.9	+ 19.2	+ 22.7	+ 24.4	+ 26.8	+ 26.8	30.3	8.5	+ 7.8	- 49.6	+ 4.4	47.3	61.0	J. Lilley & Son	1791	34				
- 4.3	- 20.6	- 18.2	- 15.1	- 8.1	- 13.0	- 17.5	17.0	16.3	- 5.9	- 49.9	- 1.4	49.6	61.2	F. A. Chandler	2041	35				
+ 18.7	+ 8.1	+ 15.4	+ 16.9	+ 7.7	+ 11.3	+ 11.9	22.2	15.6	+ 5.2	+ 20.7	- 13.4	53.4	61.7	S. Yeomans	85993	36				
+ 14.7	+ 0.5	- 3.1	- 5.0	- 3.5	- 4.5	- 8.6	24.4	15.2	+ 8.0	- 10.7	+ 10.5	54.8	62.3	R. Künzler	51949	37				
+ 11.0	+ 2.3	+ 6.8	+ 16.0	+ 17.0	+ 14.6	+ 7.8	31.9	10.4	+ 1.6	- 46.0	- 7.5	52.7	62.4	A. Mears & Co.	1957	38				
- 5.3	+ 10.3	+ 6.7	+ 4.8	+ 10.6	+ 9.0	+ 4.8	18.7	15.6	+ 16.0	+ 14.6	+ 13.2	49.9	62.5	D. Buckney	32039	39				
+ 1.0	+ 5.2	+ 7.7	+ 11.2	+ 10.1	+ 12.0	+ 10.9	18.2	9.2	+ 32.5	- 52.0	+ 5.9	36.6	62.6	Smith (B.)	596	40				
+ 0.8	- 4.3	- 11.3	- 9.0	- 4.4	- 6.7	- 14.0	14.8	7.3	- 61.6	- 8.9	+ 11.4	29.4	63.6	R. Künzler	51900	41				
+ 3.5	- 11.9	- 7.2	- 0.9	- 3.1	- 3.8	- 9.3	15.4	15.4	- 20.2	- 12.0	- 33.4	46.2	63.9	F. A. Chandler	1712	42				
+ 20.5	+ 5.3	+ 9.8	+ 14.2	+ 9.8	+ 8.0	+ 10.7	23.8	15.2	+ 6.6	+ 19.9	- 7.2	56.2	64.0	R. Künzler	51915	43				
+ 13.2	+ 23.7	+ 26.5	+ 28.2	+ 29.9	+ 31.7	+ 30.7	23.1	8.3	+ 6.4	- 31.8	- 63.1	44.7	64.6	A. Johannsen & Co.	6999	44				
+ 13.4	+ 12.7	+ 14.1	+ 20.0	+ 19.9	+ 21.8	+ 13.1	29.8	8.7	- 23.7	+ 1.9	- 52.1	47.2	65.8	J. Lilley & Son	1789	45				
+ 9.0	- 0.7	+ 6.3	+ 8.9	+ 6.2	+ 9.6	+ 8.2	19.6	14.2	- 8.5	- 30.5	- 52.7	48.0	66.2	Mappin & Webb	12366	46				
+ 2.9	- 3.4	- 5.5	- 4.8	- 4.0	- 9.4	- 12.7	16.6	9.4	+ 43.5	+ 56.4	- 8.0	34.4	66.9	R. Künzler	51942	47				
+ 14.9	+ 10.5	+ 14.0	+ 13.8	+ 19.9	+ 25.0	+ 24.2	32.6	13.4	- 10.6	- 8.2	- 5.4	59.4	67.0	Wright & Craighed	8233	48				
- 0.3	- 9.8	- 3.8	- 2.0	+ 5.8	+ 7.0	+ 2.8	20.0	15.9	- 1.8	- 24.4	- 58.7	51.8	68.3	Usher & Cole	31879	49				
+ 7.1	- 7.9	- 7.1	- 7.5	- 5.8	- 7.2	- 11.6	24.6	15.0	- 16.3	- 19.0	- 16.6	54.6	68.7	Reid & Sons	52024	50				
87.9	86.2	86.8	85.7	82.8	81.7	86.2	Mean Weekly Temperature.													
86.8	86.4	86.4	86.5	86.4	86.5	87.2	Extremes of Temperature as shown by the Self-Registering Thermometer.													

RATES OF CHRONOMETER WATCHES ON TRIAL FOR PURCHASE BY THE ADMIRALTY AT THE

Order of Merit.	NAME OF MAKER.	No.	ADDRESS OF MAKER.	(1) WEEKLY RATES IN													
				Aug. 2-8.	Aug. 9-15.	Aug. 16-23.	Aug. 23-30.	Aug. 30 to Sept. 6.	Sept. 6-13.	Sept. 13-20.	Sept. 20-24.	Sept. 24-27.	Sept. 27-30.	Sept. 30 to Oct. 4.			
				* Watch Horizontal. Dial up.										Watch Vertical. Pendant up.	Watch Vertical. Pendant right.	Watch Vertical. Pendant left.	Watch Vertical. Pendant up.
														+	+	+	+
51	H. Samuel	35248	Market Street, Manchester.....	- 0-0	- 14-9	- 11-9	- 5-8	- 13-8	- 14-6	- 22-4	- 1-6	- 42-2	- 42-5	+ 9-3			
52	H. Samuel	35244	Market Street, Manchester.....	- 3-0	- 2-9	- 0-8	- 12-7	- 11-2	- 7-1	- 1-0	- 13-7	- 51-6	- 15-7	- 11-6			
53	Kendal & Dent	10611	106 Cheapside, London, E.C.....	- 4-7	+ 0-1	+ 5-2	+ 3-8	+ 7-5	+ 4-1	+ 14-6	+ 5-3	+ 4-2	- 18-4	- 12-8			
54	Goddard & Co.	1859	7 Canonile Street, Bishopsgate, E.C.....	- 10-7	- 15-8	- 17-7	- 14-6	- 23-6	- 23-0	- 11-6	+ 18-4	- 85-2	- 29-2	+ 13-1			
55	Usher & Cole	28610	339 St. John Street, Clerkenwell, E.C.....	+ 5-2	+ 6-0	+ 7-1	+ 11-7	+ 6-7	- 1-8	+ 11-6	- 44-5	- 12-1	- 46-0	- 32-0			
56	V. Kullberg	6014	105 Liverpool Road, London, N.....	+ 18-9	+ 18-1	+ 15-9	+ 12-1	+ 0-4	- 5-5	- 3-7	- 6-7	- 26-6	- 21-2	- 22-2			
57	H. White & Co.	2058	63 Cheapside, London, E.C.....	- 3-0	- 3-3	- 2-8	- 1-4	- 14-5	- 7-0	+ 8-5	- 26-1	- 23-3	- 31-0	+ 13-0			
58	J. Hewitt	61719	Holy Head Road, Coventry.....	+ 9-1	+ 8-0	+ 9-1	+ 9-8	+ 4-3	- 3-0	+ 5-3	- 22-6	- 3-7	- 25-2	- 28-7			
59	F. C. Selfe	2068	19 Royal Hill, Greenwich, S.E.....	- 8-9	- 9-5	- 8-0	- 7-9	- 8-3	- 6-1	+ 16-4	+ 43-1	- 33-6	- 11-7	+ 49-4			
60	Usher & Cole	28667	339 St. John Street, Clerkenwell, E.C.....	+ 20-7	+ 16-9	+ 10-9	+ 7-9	+ 1-4	+ 7-3	+ 6-1	+ 34-5	+ 67-2	+ 63-0	+ 37-3			
61	Wm. Matthews	43069	Elmcroft, 52 Holy Head Road, Coventry.....	+ 0-3	+ 1-2	- 0-1	- 0-9	+ 1-7	- 0-5	- 1-7	- 72-6	- 26-8	- 123-2	- 99-8			
62	H. L. Brown & Son	61679	65 Market Place, Sheffield.....	+ 70-1	+ 70-2	+ 68-8	+ 71-8	+ 72-0	+ 68-2	+ 78-9	+ 40-6	+ 46-2	+ 59-0	+ 41-1			
63	A. Johannsen & Co.	7002	149 Minories, London, E.....	- 1-9	+ 1-5	+ 4-7	+ 7-8	+ 4-8	+ 7-8	+ 17-7	+ 7-9	- 56-0	- 62-1	+ 8-4			
The sign + indicates a gaining rate.				64-0	65-0	66-5	68-5	65-9	64-0	88-9	90-3		87-9				
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.				60-3	63-9	64-9	66-4	64-2	62-3	84-2	89-3		87-5				
				65-4	66-2	68-7	70-6	69-8	65-2	91-6	91-3		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 Sept. 13 to Oct. 11, the watches 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.

ROYAL OBSERVATORY, GREENWICH, FROM 1913 AUGUST 2 TO 1913 NOVEMBER 22.

ORDER OF TIME.							(2) ABSTRACT OF THE PRINCIPAL CHANGES OF RATES.										NAME or MAKER.		No.	Order of Merit.
Oct. 4-11.	Oct. 11-18.	Oct. 18-25.	Oct 25 to Nov. 1.	Nov. 1-8.	Nov. 8-15.	Nov. 15-22.	Difference between greatest and least Weekly Rates.	Dial up. a.	Greatest difference between one week and the next.	Dial up. b.	Difference of Weekly Rates.				Trial Number.					
Watch Horizontal. Dial up.									Pendant up -Dial up.	Pendant right -Dial up.	Pendant left -Dial up.	a + 2b	$\frac{1}{2}(a + 2b + c)$							
- 3-5	- 11-7	- 12-0	- 15-0	- 22-5	- 23-0	- 20-3	23-0	14-9	+ 16-9	- 29-2	- 29-5	52-8	71-1	H. Samuel	35248	51				
+ 3-9	- 13-3	- 12-9	- 10-1	- 14-7	- 12-8	- 7-1	18-6	17-2	- 14-2	- 53-1	- 17-2	58-0	71-8	H. Samuel	35244	52				
+ 14-6	- 1-6	- 4-1	- 2-1	+ 1-6	- 0-3	- 8-9	23-5	16-2	- 18-4	- 10-4	- 33-0	55-9	72-3	Kendal & Dent	10611	53				
- 6-8	- 20-4	- 17-9	- 14-6	- 8-2	- 6-9	- 7-1	16-8	13-6	+ 25-0	- 76-0	- 20-0	44-0	72-6	Goddard & Co.	1859	54				
+ 0-8	+ 1-3	- 0-9	+ 4-7	+ 5-3	+ 3-9	- 1-0	13-5	13-4	- 44-5	- 18-3	- 62-2	40-3	74-4	Usher & Cole	28610	55				
+ 4-9	- 8-2	- 14-7	- 9-3	- 2-5	- 4-3	- 7-8	33-6	13-1	- 15-1	- 27-2	- 21-8	59-8	75-6	V. Kullberg	6014	56				
+ 8-9	- 7-7	- 9-0	- 1-5	+ 4-9	+ 1-6	- 4-8	23-4	16-6	- 15-3	- 32-0	- 39-7	56-6	76-3	H. White & Co.	2058	57				
+ 9-7	- 4-9	- 7-2	- 4-5	- 7-3	- 9-9	- 14-4	24-2	14-6	- 38-2	- 11-2	- 32-7	53-4	77-3	J. Hewitt	61719	58				
- 2-8	+ 5-7	+ 4-7	+ 7-0	+ 7-1	+ 10-0	+ 7-1	26-4	10-3	+ 55-9	- 24-0	- 2-1	47-0	79-4	F. C. Selfe	2068	59				
+ 13-4	+ 2-8	+ 1-7	+ 5-5	+ 20-6	+ 18-8	+ 6-0	19-3	15-1	+ 26-1	+ 57-4	+ 53-2	49-5	81-0	Usher & Cole	28667	60				
+ 0-7	- 2-7	+ 2-0	+ 2-0	- 3-2	- 4-2	- 0-6	6-2	5-2	- 85-7	- 26-3	- 122-7	16-6	84-3	Wm. Matthews	43069	61				
+ 81-7	+ 68-0	+ 71-1	+ 56-6	+ 57-4	+ 57-9	+ 54-5	27-2	14-5	- 39-4	- 34-1	- 21-3	56-2	85-1	H. L. Brown & Son	61679	62				
+ 24-9	+ 16-6	+ 20-7	+ 27-0	+ 23-5	+ 30-3	+ 27-9	32-2	9-9	- 13-1	- 77-3	- 83-4	52-0	85-4	A. Johannsen & Co.	7002	63				
87-9	60-2	60-6	63-7	62-8	61-7	60-5	Mean Weekly Temperature.													
86-8	59-4	59-4	59-5	60-4	58-5	57-2	Extremes of Temperature as shown by the Self-Registering Thermometer.													
89-1	62-7	61-8	66-1	65-1	65-0	61-9														

Only those watches have been included in this list for which "b" did not exceed 18 seconds or for which $a + 2b$ did not exceed 60 or the trial number did not exceed 100.