

RATES OF CHRONOMETERS
ON TRIAL
FOR PURCHASE BY THE BOARD OF ADMIRALTY,
AT THE
ROYAL OBSERVATORY, GREENWICH.
1874.

AT THE ROYAL OBSERVATORY, GREENWICH, 18

IN THE ORDER OF TIME.																		NAME		No.
																		or		
																		MAKER.		
April 4—11	April 11—18	April 18—25	April 25—May 2	May 2—9	May 9—16	May 16—23	May 23—30	May 30 to June 6	June 6—13	June 13—20	June 20—27	June 27 to July 4	July 4—11	July 11—18	July 18—25	July 25 to Aug. 1	Aug. 1—8			
+ 87	+ 94	+ 44	+ 45	+ 102	+ 113	+ 81	+ 69	+ 75	+ 70	+ 70	+ 96	+ 114	+ 115	+ 67	+ 104	+ 124	+ 123	Swell	2884	
+ 87	+ 94	+ 44	+ 45	+ 102	+ 113	+ 81	+ 69	+ 75	+ 70	+ 70	+ 96	+ 114	+ 115	+ 67	+ 104	+ 124	+ 123	Swell	2884	
+ 15	+ 34	+ 01	- 05	00	- 10	- 08	+ 11	+ 24	- 18	- 08	+ 50	+ 34	+ 14	+ 06	+ 04	+ 10	+ 05	Kailburg	3093	
+ 15	+ 34	+ 01	- 05	00	- 10	- 08	+ 11	+ 24	- 18	- 08	+ 50	+ 34	+ 14	+ 06	+ 04	+ 10	+ 05	Kailburg	3093	
+ 40	+ 56	+ 39	+ 30	+ 73	+ 63	+ 41	+ 39	+ 20	+ 10	+ 25	+ 49	+ 26	+ 20	+ 20	+ 45	+ 43	+ 40	McGregor and Co.	2568	
- 25	- 06	+ 14	+ 05	+ 02	+ 08	- 14	+ 19	+ 15	+ 05	- 15	- 15	- 13	- 16	- 14	+ 14	+ 35	+ 40	Reid and Sons	2468	
+ 23	+ 41	+ 09	+ 10	+ 50	+ 35	+ 18	- 08	- 35	- 40	- 20	- 39	- 76	- 80	- 46	- 34	- 30	- 20	Gowland	1305	
+ 46	+ 33	+ 22	+ 10	+ 70	+ 70	+ 51	+ 49	+ 20	+ 25	+ 45	+ 41	- 01	- 05	+ 45	+ 53	+ 45	+ 45	Highley	5435	
+ 46	+ 33	+ 22	+ 10	+ 70	+ 70	+ 51	+ 49	+ 20	+ 25	+ 45	+ 41	- 01	- 05	+ 45	+ 53	+ 45	+ 45	Highley	5435	
+ 35	+ 31	+ 01	- 15	+ 05	+ 03	- 14	- 21	+ 05	+ 07	+ 68	+ 05	+ 72	+ 68	+ 63	+ 67	+ 40	+ 27	Keys	3683	
+ 82	+ 63	+ 62	+ 85	+ 100	+ 97	+ 99	+ 69	+ 85	+ 85	+ 105	+ 115	+ 72	+ 53	+ 63	+ 97	+ 60	+ 70	Lowry	1776	
+ 159	+ 168	+ 114	+ 117	+ 198	+ 127	+ 134	+ 146	+ 135	+ 150	+ 120	+ 116	+ 101	+ 93	+ 149	+ 172	+ 170	+ 147	Kailburg	2871	
- 00	- 65	- 31	- 23	- 40	- 50	- 29	- 01	- 10	- 07	- 08	- 33	- 01	- 04	- 03	- 12	- 08	- 15	Johannsen	2133	
+ 127	+ 109	+ 74	+ 62	+ 108	+ 116	+ 106	+ 79	+ 80	+ 100	+ 142	+ 175	+ 173	+ 175	+ 136	+ 144	+ 130	+ 132	Keys	3684	
+ 127	+ 109	+ 74	+ 62	+ 108	+ 116	+ 106	+ 79	+ 80	+ 100	+ 142	+ 175	+ 173	+ 175	+ 136	+ 144	+ 130	+ 132	Keys	3684	
+ 195	+ 216	+ 206	+ 198	+ 225	+ 225	+ 221	+ 234	+ 197	+ 177	+ 128	+ 130	+ 127	+ 143	+ 117	+ 203	+ 230	+ 183	Penlington & Hutton	1820	
+ 20	+ 41	+ 24	+ 30	+ 65	+ 75	+ 51	+ 44	+ 40	+ 25	+ 45	+ 35	- 44	- 66	- 00	+ 25	+ 55	+ 45	Brotherston	5417	
+ 100	+ 151	+ 189	+ 205	+ 203	+ 192	+ 191	+ 179	+ 170	+ 170	+ 130	+ 183	+ 226	+ 195	+ 195	+ 203	+ 220	+ 220	C. Frodsham	3510	
+ 38	+ 68	+ 99	+ 105	+ 125	+ 111	+ 124	+ 135	+ 135	+ 135	+ 135	+ 150	+ 110	+ 100	+ 142	+ 165	+ 135	+ 142	C. Frodsham	3510	
- 82	+ 101	+ 84	+ 97	+ 92	+ 85	+ 71	+ 54	+ 55	+ 70	+ 85	+ 115	+ 120	+ 130	+ 95	+ 124	+ 105	+ 80	James Poole & Co.	1764	
- 154	- 88	- 81	- 70	- 115	- 153	- 134	- 99	- 95	- 117	- 130	- 110	- 133	- 93	- 150	- 100	- 105	- 100	Williams	3383	
+ 145	+ 183	+ 234	+ 263	+ 250	+ 270	+ 278	+ 299	+ 290	+ 290	+ 258	+ 221	+ 154	+ 100	+ 182	+ 248	+ 280	+ 295	Swell	3222	
- 30	- 19	+ 29	+ 45	+ 37	+ 48	+ 60	+ 96	+ 93	+ 100	+ 135	+ 117	+ 96	+ 67	+ 135	+ 155	+ 160	+ 167	Hennsey	4968	
- 103	- 89	- 185	- 140	- 100	- 119	- 125	- 130	- 98	- 120	- 97	- 33	- 30	- 89	- 61	- 63	- 72	- 70	Hennsey	4968	
+ 123	+ 114	+ 74	+ 65	+ 125	+ 115	+ 101	+ 51	+ 13	+ 15	+ 115	+ 111	+ 51	+ 33	+ 05	+ 20	+ 50	+ 30	Whiffin	2273	
+ 95	+ 96	+ 64	+ 80	+ 125	+ 125	+ 108	+ 107	+ 145	+ 155	+ 211	+ 205	+ 255	+ 235	+ 247	+ 263	+ 235	+ 240	Penlington	1820	
+ 115	+ 211	+ 214	+ 205	+ 230	+ 235	+ 236	+ 219	+ 195	+ 202	+ 133	+ 123	+ 147	+ 130	+ 145	+ 195	+ 220	+ 200	Fletcher	3369	
+ 105	+ 61	+ 10	+ 20	+ 52	+ 60	+ 29	- 14	- 07	+ 02	- 12	- 15	+ 21	+ 34	+ 05	+ 35	+ 15	+ 10	Hennsey	4968	
+ 105	+ 61	+ 10	+ 20	+ 52	+ 60	+ 29	- 14	- 07	+ 02	- 12	- 15	+ 21	+ 34	+ 05	+ 35	+ 15	+ 10	Hennsey	4968	
+ 173	+ 169	+ 114	+ 113	+ 215	+ 215	+ 171	+ 104	+ 60	+ 57	+ 103	+ 125	+ 209	+ 226	+ 119	+ 136	+ 140	+ 145	McGregor and Co.	2568	
- 185	- 145	- 145	- 120	- 120	- 120	- 115	+ 135	+ 131	+ 250	+ 258	+ 221	+ 154	+ 100	+ 262	+ 288	+ 300	+ 295	Lowry	1776	
+ 65	+ 21	+ 74	+ 95	+ 100	+ 92	+ 109	+ 114	+ 100	+ 75	+ 75	+ 35	- 75	- 115	+ 17	+ 18	+ 30	+ 35	Shepherd and Son	1810	
+ 65	+ 21	+ 74	+ 95	+ 100	+ 92	+ 109	+ 114	+ 100	+ 75	+ 75	+ 35	- 75	- 115	+ 17	+ 18	+ 30	+ 35	Shepherd and Son	1810	
- 120	- 124	- 91	- 90	- 110	- 118	- 101	- 81	- 85	- 90	- 65	- 85	- 105	- 200	- 149	- 123	- 125	- 130	Shepherd and Son	1810	
+ 105	+ 61	+ 10	+ 20	+ 52	+ 60	+ 29	- 14	- 07	+ 02	- 12	- 15	+ 21	+ 34	+ 05	+ 35	+ 15	+ 10	Whiffin	2273	
+ 15	+ 03	- 23	- 20	- 22	+ 13	+ 01	- 16	- 30	- 25	+ 33	- 12	+ 35	+ 110	+ 93	- 80	- 85	- 80	Swell	3247	
+ 107	+ 79	+ 186	+ 175	+ 148	+ 145	+ 139	+ 232	+ 245	+ 245	+ 307	+ 281	+ 210	+ 191	+ 215	+ 250	+ 235	+ 245	Murhead and Sons	4763	
+ 155	+ 164	- 21	- 23	- 95	- 38	- 16	+ 44	+ 50	+ 75	+ 180	+ 264	+ 276	+ 265	+ 113	+ 115	+ 73	+ 30	Davson	2084	
- 75	- 74	- 19	- 13	- 90	- 37	- 54	+ 04	+ 30	+ 37	+ 83	+ 140	+ 173	+ 207	+ 200	+ 210	+ 180	+ 175	James Poole & Co.	1764	
- 75	- 74	- 19	- 13	- 90	- 37	- 54	+ 04	+ 30	+ 37	+ 83	+ 140	+ 173	+ 207	+ 200	+ 210	+ 180	+ 175	Russell and Son	2084	
+ 90	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	James Poole & Co.	1129	
+ 0980	+ 1141	+ 354	+ 345	+ 970	+ 900	+ 674	+ 1924	+ 2870	+ 2465	+ 8415	+ 15300	+ 2204	+ 23836	+ 7193	+ 5567	+ 1345	+ 1620	Chromothermal Thermometer.		
50—56	40—55	55—66	55—66	51—57	51—59	55—63	55—66	62—75	62—73	63—78	70—80	66—86	82—96	70—76	76—67	76—63	70—64	...		
Extraneous Temperature as shown by the Self-Registering Thermometer.																				

The Chronometers are placed in order of merit, their respective positions being determined by consideration of the irregularities of rate exhibited in Table III. The Chronometer Isaac 1129 was purchased by the Admiralty during the course of the trial, to replace a Navy Chronometer sold to another Department. On account of the shorter trial, its rates are not comparable with those of the other Chronometers; it is in consequence placed in a separate division. Another Chronometer, having exhibited such irregularities in its rates as to indicate some derangement of its mechanism, was withdrawn by the maker, by permission.

NAME or MAKER.	No.	Winter 2 or 3 days.	ADDRESS or MAKER.	Construction of Escapement and Balance, from the Description furnished by the Maker.	(III).—ABSTRACT OF THE			
					First Day of First Week of Rating.	Last Day of Last Week of Rating.	Number of Days.	Least Weekly Sum.
Sewill.....	3084	2	30, Cornhill, London.	Auxiliary compensation.	January 10	August 8	30	+ 2.5
Kulberg.....	2883	2	105, Liverpool Road, London.	Improved ordinary balance.	January 10	August 8	30	- 2.5
Sewill.....	3072	2	30, Cornhill, London.	Auxiliary compensation.	January 10	August 8	30	- 6.1
McGregor and Co.....	3408	2	45, Clyde Place, Glasgow.	Auxiliary to balance acting in extremes.	January 10	August 8	30	- 2.7
Reid and Sons.....	3408	2	41, Grey Street, Newcastle-on-Tyne.	Auxiliary compensation.	January 10	August 8	30	- 7.5
Howland.....	1305	2	178, High Street West, Sunderland.	Auxiliary compensation.	January 10	August 8	30	- 8.0
Highly.....	5435	2	45, High Street, Sharness.	Auxiliary acting in cold.	January 10	August 8	30	- 6.0
Childenden.....	793	2	10, Wilton Road, Hackney, London.	Balance as in former years.	January 10	August 8	30	- 7.0
Key.....	363	2	15, Crown Street, Strand, London.	Auxiliary compensation.	January 10	August 8	30	- 2.1
Lowry.....	1776	2	66, High Street, Belfast.	A safe auxiliary compensation to balance.	January 10	August 8	30	0.0
Kulberg.....	2871	2	105, Liverpool Road, London.	Kulberg's flat rim balance, without auxiliary.	January 10	August 8	30	+ 3.0
Johannsen.....	1823	2	149, Minster, London.	Auxiliary compensation.	January 10	August 8	30	- 8.9
Key.....	344	2	15, Crown Street, Strand, London.	Auxiliary compensation.	January 10	August 8	30	- 2.5
Johannsen.....	1820	2	149, Minster, London.	Auxiliary compensation.	January 10	August 8	30	- 12.0
Penington and Hutton.....	2137	2	2 & 3, St. George's Crescent, Liverpool.	Auxiliary compensation.	January 10	August 8	30	- 11.0
Brotherton.....	5417	2	11, Spencer Street, Goswell Road, London.	Construction as in former years.	January 10	August 8	30	- 6.6
C. Frodsham.....	3519	2	84, Strand, London.	Three compensation bar balance.	January 10	August 8	30	+ 3.5
C. Frodsham.....	3554	2	84, Strand, London.	Balance with continuous auxiliary.	January 10	August 8	30	+ 3.8
James Poole and Co.....	5656	2	33, Spencer Street, Clerkenwell, London.	Auxiliary compensation.	January 10	August 8	30	- 3.4
Williams.....	1768	2	2, Butte Docks, Cardiff.	Auxiliary compensation.	January 10	August 8	30	- 17.5
Sewill.....	3322	2	61, South Castle Street, Liverpool.	Auxiliary compensation.	January 10	August 8	30	+ 10.0
Hennessy.....	4940	2	5, Wind Street, Swansea.	Auxiliary compensation.	January 10	August 8	30	- 6.7
Howland.....	2772	2	178, High Street West, Sunderland.	Auxiliary compensation.	January 10	August 8	30	- 11.5
Whiffin.....	352	2	10, Clonduley Square, Ilkington, London.	Auxiliary compensation.	January 10	August 8	30	+ 0.5
Penington.....	2136	2	2 & 3, St. George's Crescent, Liverpool.	Auxiliary compensation.	January 10	August 8	30	- 0.9
Fletcher.....	3369	2	148, Leadenhall Street, London.	Auxiliary compensation.	January 10	August 8	30	+ 8.7
Hennessy.....	4958	2	5, Wind Street, Swansea.	Auxiliary compensation.	January 10	August 8	30	- 10.7
Davison.....	4895	2	6, Side, Newcastle-on-Tyne.	Auxiliary compensation.	January 10	August 8	30	- 10.7
McGregor and Co.....	3408	2	45, Clyde Place, Glasgow.	Auxiliary compensation.	January 10	August 8	30	- 1.7
Lowry.....	1776	2	66, High Street, Belfast.	A safe auxiliary compensation to balance.	January 10	August 8	30	+ 1.4
Shepherd and Son.....	1810	2	58, Leadenhall Street, London.	Auxiliary to balance.	January 10	August 8	30	- 11.5
Reid and Sons.....	2402	2	41, Grey Street, Newcastle-on-Tyne.	Auxiliary compensation.	January 10	August 8	30	- 20.9
Shepherd and Son.....	1789	2	58, Leadenhall Street, London.	Auxiliary to balance.	January 10	August 8	30	- 22.7
Whiffin.....	351	2	10, Clonduley Square, Ilkington, London.	Auxiliary compensation.	January 10	August 8	30	- 9.0
Sewill.....	3247	2	61, South Castle Street, Liverpool.	Auxiliary compensation.	January 10	August 8	30	- 9.5
Mairhead and Sons.....	771	2	30, Bohannan Street, Glasgow.	Double auxiliary.	January 10	August 8	30	- 10.5
Davison.....	4963	2	6, Side, Newcastle-on-Tyne.	Auxiliary compensation.	January 10	August 8	30	- 4.8
James Poole and Co.....	5655	2	33, Spencer Street, Clerkenwell, London.	Auxiliary compensation.	January 10	August 8	30	- 0.7
Russell and Son.....	2784	2	30 & 32, Slater Street, Liverpool.	Auxiliary compensation.	January 10	August 8	30	- 20.4
Isaac.....	1129	2	147, Liverpool Road, London.	Balance as in former years; no auxiliary.	January 10	April 11	13	+ 2.0

The sign + indicates that the rate is gaining.

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

PRINCIPAL CHANGES OF RATE.						NAME	No.
In what Week.	Greatest Weekly Sum.	In what Week.	Difference between the Greatest and Least.	Greatest Difference between one Week and the next.	Before and after what Day.	OR MAKER.	
March 7 to 14†; March 14 to 21†	+ 12.4	July 25 to August 1	9.9	5.7	May 2	Sewill.....	3084
February 28 to Mar. 7	+ 6.0	June 20 to 27†	9.5	0.1	May 19†	Kulberg.....	2883
January 31 to Feb. 7	+ 3.0	June 13 to 20†	11.1	6.2	April 18	Sewill.....	3072
February 7 to 14	+ 5.6	May 2 to 9	11.2	6.3	February 14	McGregor and Co.....	3408
March 21 to 28†	+ 4.0	August 1 to 8	11.5	6.6	February 14	Reid and Sons.....	2402
July 4 to 11†	+ 3.0	May 2 to 9	13.0	6.0	† March 28†	Howland.....	1305
February 7 to 14	+ 7.0	May 2 to 9; May 9 to 16	12.4	6.5	May 2	Johannsen.....	1823
March 21 to 28†	+ 5.6	February 7 to 14	12.6	6.5	May 2	Childenden.....	793
May 23 to 30	+ 10.5	June 20 to 27†	12.6	7.0	March 7†	Key.....	363
January 24 to 31	+ 11.5	June 20 to 27†	11.5	7.7	March 7†	Lowry.....	1776
January 10 to 17	+ 17.2	July 18 to 25	14.2	6.5	† July 11	Kulberg.....	2871
February 7 to 14	+ 3.5	June 20 to 27†	12.4	7.7	March 7†	Johannsen.....	1820
January 17 to 24	+ 17.5	June 20 to 27†; July 4 to 11†	15.0	6.5	March 7†	Key.....	364
April 4 to 11	+ 1.0	March 14 to 21†	13.0	8.0	May 2	Johannsen.....	1820
January 10 to 17	+ 20.4	May 23 to 30	12.4	8.6	July 18	Penington and Hutton.....	2137
July 4 to 11†	+ 7.5	May 9 to 16	14.1	7.9	† June 27†	Brotherton.....	5417
January 24 to 31	+ 22.6	July 4 to 11†	19.1	8.5	† June 20†	C. Frodsham.....	3519
April 4 to 11	+ 16.3	July 18 to 25	12.5	8.9	† April 4	C. Frodsham.....	3554
January 17 to 24	+ 13.0	July 4 to 11†	10.4	8.3	March 7†	James Poole and Co.....	5656
February 7 to 14	- 4.7	March 7 to 14†	12.6	11.1	March 7†	Williams.....	1768
July 4 to 11†	+ 29.9	May 23 to 30	19.9	8.2	† July 11	Sewill.....	3322
January 10 to 17	+ 16.7	August 1 to 8	23.4	9.3	† July 11	Hennessy.....	4940
March 14 to 21†; March 21 to 28†	+ 6.9	May 23 to 30	10.4	8.5	March 7†	Howland.....	2772
July 11 to 18	+ 9.9	February 7 to 14	20.4	11.2	† April 4	Whiffin.....	352
January 10 to 17	+ 20.5	June 20 to 27†	20.6	7.1	March 7†	Penington.....	2136
March 14 to 21†	+ 23.6	May 16 to 23	17.9	11.0	† April 4	Fletcher.....	3369
March 28 to April 4†	+ 8.2	February 21 to 28	18.7	11.7	† April 4	Hennessy.....	4958
March 7 to 14†	+ 3.0	July 4 to 11†	18.7	11.9	† July 11	Davison.....	4895
March 7 to 14†	+ 22.6	July 4 to 11†	24.3	11.1	† April 4	McGregor and Co.....	3408
January 24 to 31	+ 25.0	May 30 to June 6; Aug. 1 to 8	23.6	11.9	May 30	Lowry.....	1776
July 4 to 11†	+ 11.4	May 23 to 30	22.9	13.2	† July 11	Shepherd and Son.....	1810
February 7 to 14	- 3.0	May 9 to 16	26.3	13.1	March 7†	Reid and Sons.....	2402
January 24 to 31	- 3.0	March 7 to 14†	19.7	16.8	March 7†	Shepherd and Son.....	1789
January 10 to 17	+ 20.7	July 4 to 11†	24.3	11.1	† April 4	Whiffin.....	351
July 11 to 18	+ 13.1	February 7 to 14	21.6	20.5	† July 11	Sewill.....	3247
February 7 to 14	+ 28.1	June 20 to 27†	38.6	13.5	March 7†	Mairhead and Sons.....	771
February 7 to 14	+ 27.6	June 27 to July 4†	32.4	19.5	March 7†	Davison.....	4963
January 24 to 31	+ 29.6	July 18 to 25	29.3	15.3	March 7†	James Poole and Co.....	5655
January 10 to 17	+ 21.0	July 18 to 25	54.4	24.1	March 7†	Russell and Son.....	2784
March 7 to 14†	+ 9.0	April 4 to 11	7.0	3.5	† March 28†	Isaac.....	1129

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 Chronometer Isaac 1129 was purchased by the Admiralty during the course of the trial, to replace a Navy Chronometer sold to another Department. On account of the shorter trial, its rates are not comparable with those of the other Chronometers; it is in consequence placed in a separate division. Another Chronometer, having exhibited much irregularity in its rates as to indicate some derangement of its mechanism, was withdrawn by the maker, by permission.