RATES OF CHRONOMETERS

ON TRIAL

FOR PURCHASE BY THE BOARD OF ADMIRALTY,

AT THE

ROYAL OBSERVATORY, GREENWICH.

1854.

NAME OF MAKER.	Number.	Whether Pocket, 1, 2, or 8 Days.	Construction of Escapement and Balance, from the description furnished by the Maker.	(I.)—WEEKLY SUMS OF DAILY RATES									
				Jan. 7–14 *	Jan. 14–21 *	Jan. 21–28 *	Jan. 28 to Feb. 4. *	Feb. 4–11 ‡	Feb. 11–18 †	Feb. 18–25 ‡	Feb. 25 to March 4 †	March 4–11	March 11–18
Poole	1585	2	Auxiliary compensation to the balance, as in former years.	s	s − 2·2	s − 4·0	s − 1·1	s − 5·0	s − 4·9	s − 5·5	s − 6·0	s − 6·0	s − 1·5
Glover	275	2	Auxiliary compensation to the balance, somewhat differing from Eiffe's.	− 7·3	− 7·5	− 8·0	− 8·0	− 3·5	− 4·7	− 2·3	− 3·5	− 4·5	− 1·9
Reid and Sons	1104	2	Ordinary construction.	....	− 7·4	− 10·0	− 13·5	− 5·5	+ 1·5	+ 1·0	− 1·5	− 9·2	− 6·3
Dent	2449	2	Dent's patent balance; see pamphlet, "On the Errors of Chronometers," p. 23.	....	− 1·3	− 4·1	− 4·1	− 5·6	− 5·9	− 4·0	— 4·6	− 5·9	− 6·0
Eiffe	203	2	Eiffe's auxiliary to balance by application to pendulum spring, as in former years.	....	+ 25·6	+ 25·9	+ 27·9	+ 39·1	+ 36·5	+ 37·5	+ 37·5	+ 27·9	+ 30·6
Tidmas	6557	2	Original auxiliary compensation to the balance, at extreme temperatures.	....	+ 8·6	+ 8·2	+ 6·8	+ 16·9	+ 22·5	+ 21·0	+ 23·1	+ 10·5	+ 18·5
Lister and Sons	539	2	Auxiliary compensation to the balance, as in former years.	....	− 10·1	− 10·4	− 11·0	− 10·5	− 4·5	− 7·0	− 7·7	− 6·3	− 3·5
Clark and Son	1877	2	Poole's auxiliary compensation to the balance.	....	....	+ 9·0	+ 2·3	+ 12·1	+ 23·6	+ 28·0	+ 28·3	+ 3·7	+ 12·0
Hewitt and Son	2059	2	Ulrich's new auxiliary compensation to the balance.	....	....	....	....	....	....	....	....	....	− 36·2
Hewitt and Son	2057	2	Eiffe's auxiliary to balance, with a small original alteration.	....	− 13·0	− 13·0	− 13·0	− 2·1	+ 1·1	+ 7·8	+ 10·2	− 9·5	− 5·5
Brock *	107	2	Ordinary construction.	+ 10·1	+ 11·5	+ 15·3	+ 10·1	+ 14·0	+ 31·4	+ 38·2	+ 44·7	+ 29·3	+ 32·8
M'Clellan	148	2	Original auxiliary compensation to the balance, at extreme temperatures.	....	....	....	....	....	....	....	+ 8·6	+ 21·1	+ 18·9
Sewill	837	2	Eiffe's auxiliary to balance, with a small alteration (as Hewitt & Son 2057).	....	− 15·5	— 14·3	− 10·1	+ 12·6	+ 19·5	+ 22·5	+ 24·8	− 7·4	+ 3·6
Dixon	420	2	Auxiliary compensation to the balance, unpublished.	.... *	− 5·5 *	− 3·5 *	− 3·0 *	− 13·0 ‡	− 8·5 ‡	− 13·0 ‡	− 16·0 ‡	− 0·5	− 0·2
Chronometrical Thermometer	...	...	.....	+ 2202·0	+ 1880·0	+ 1781·5	+ 1711·0	− 388·5	−1068·0	−1476·0	−1294·5	+ 1357·0	+ 955·5
Extremes of Temperature as shown by the Self-Registering Thermometer	...	...	.....	° ° 35—45	° ° 34—49	° ° 33—49	° ° 29—53	° ° 41—85	° ° 70—82	° ° 67—91	° ° 66—85	° ° 42—55	° ° 48—57

* During these weeks the Chronometers were exposed to the external air outside a North window.

‡ During these weeks the Chronometers were placed in the chamber of a stove heated by gas to a moderate temperature.

† During these weeks the Chronometers were placed in the chamber of a stove heated by gas to a high temperature.

The rate given by the first five days of trial is in every case omitted.

IN THE ORDER OF TIME.

March 18–25	Mar. 25 to April 1	April 1–8	April 8–15	April 15–22	April 22–29	April 29 to May 6 †	May 6–13 †	May 13–20 †	May 20–27	May 27 to June 3	June 3–10	June 10–17	June 17–24	June 24 to July 1	July 1–8	NAME OF MAKER.	Number.
s − 4·5	s − 4·0	s − 1·5	s + 0·4	s + 2·6	s − 1·4	s − 2·1	s − 3·0	s − 5·1	s − 3·3	s − 2·8	s − 1·8	s − 2·0	s − 3·0	s − 2·5	s − 1·1	Poole	1585
− 0·2	+ 2·6	+ 2·5	+ 2·5	+ 5·5	+ 3·0	+ 4·0	+ 3·0	+ 5·0	+ 2·5	+ 4·0	+ 7·0	+ 8·0	+ 9·0	+ 11·0	+ 11·4	Glover	275
− 5·5	− 3·3	− 3·7	− 3·1	+ 0·1	− 3·2	− 11·3	− 12·5	− 11·1	− 5·4	− 5·5	− 4·5	− 2·0	− 1·6	− 0·6	− 2·3	Reid and Sons	1104
− 4·5	− 4·5	− 7·0	− 6·5	− 2·5	− 3·6	+ 7·1	+ 6·5	+ 8·3	+ 2·2	+ 0·8	+ 1·2	+ 2·5	+ 3·5	+ 4·0	+ 3·2	Dent	2449
+ 29·0	+ 31·0	+ 32·5	+ 32·5	+ 34·9	+ 31·6	+ 38·5	+ 36·5	+ 38·4	+ 35·1	+ 35·0	+ 36·7	+ 39·3	+ 40·4	+ 42·6	+ 40·0	Eiffe	203
+ 15·0	+ 18·5	+ 24·0	+ 24·4	+ 27·4	+ 16·7	+ 17·5	+ 18·4	+ 22·0	+ 31·1	+ 30·5	+ 31·9	+ 33·0	+ 33·1	+ 37·0	+ 34·5	Tidmas	6557
− 2·1	− 0·9	− 3·5	− 2·5	− 1·1	+ 0·6	− 16·5	− 16·5	− 13·7	+ 5·7	+ 9·0	+ 11·0	+ 12·0	+ 10·0	+ 11·5	+ 12·0	Lister and Sons	539
+ 6·5	+ 8·5	+ 13·3	+ 13·7	+ 16·0	+ 6·5	+ 21·5	+ 17·0	+ 7·5	+ 6·0	+ 14·5	+ 21·4	+ 25·1	+ 19·8	+ 23·6	+ 20·3	Clark and Son	1877
− 35·5	− 35·5	− 34·5	− 36·0	− 33·6	− 34·9	− 31·5	− 35·5	− 36·6	− 14·9	− 11·0	− 4·5	− 2·0	− 5·4	+ 1·9	− 3·0	Hewitt and Son	2059
− 3·0	− 2·0	− 2·1	− 1·4	+ 0·8	− 0·8	+ 23·5	+ 30·5	+ 38·5	+ 27·5	+ 26·0	+ 30·5	+ 28·6	+ 28·4	+ 31·0	+ 29·2	Hewitt and Son	2057
+ 31·0	+ 34·6	+ 38·6	+ 39·5	+ 41·9	+ 39·6	+ 42·0	+ 47·8	+ 58·7	+ 57·5	+ 58·5	+ 64·0	+ 66·0	+ 69·9	+ 76·1	+ 74·1	Brock	107
+ 29·0	+ 29·5	+ 30·8	+ 30·2	+ 28·0	+ 37·3	+ 3·2	+ 7·5	+ 17·0	+ 42·9	+ 36·7	+ 36·2	+ 32·7	+ 31·5	+ 33·5	+ 37·0	McClellan	148
− 4·6	+ 3·1	+ 11·0	+ 12·0	+ 17·6	+ 6·4	+ 32·0	+ 30·8	+ 34·6	+ 18·6	+ 18·3	+ 18·2	+ 25·5	+ 28·5	+ 32·4	+ 27·7	Sewill	837
− 0·8	− 1·1	− 0·5	− 1·4	+ 1·0	− 2·0	− 59·3 †	− 59·0 †	− 41·2 †	− 10·0	− 7·2	− 6·8	− 9·0	− 15·1	− 19·9	− 18·5	Dixon	420
+ 1414·8	+ 1254·7	+ 735·5	+ 701·0	+ 581·5	+ 1204·0	− 2569·0	− 2635·5	− 2714·0	+ 401·5	+ 665·0	+ 711·0	+ 420·0	+ 229·0	+ 23·0	+ 247·0		
° ° 42–55	° ° 45–55	° ° 51–58	° ° 52–61	° ° 50–64	° ° 44–65	° ° 58–102	° ° 80–104	° ° 80–104	° ° 54–64	° ° 54–62	° ° 52–59	° ° 56–63	° ° 57–72	° ° 59–73	° ° 58–66		

The Chronometer McClellan 148 was deposited on January 9, but its rates being so irregular as to imply some accidental cause of failure, it was taken away for examination on January 28, and returned for further trial on February 20.

The order of arrangement of the Chronometers in these Tables is determined solely by consideration of their irregularities of rate, as expressed in the columns "Difference between the Greatest and Least" and "Greatest Difference between one Week and the next," without reference to the duration of the Trial. The position of Hewitt and Son 2059, and of McClellan 148, is therefore not necessarily correct.

NAME OF MAKER.	Number.	Whether Pocket, 1, 2, or 8 Days.	Construction of Escapement and Balance, from the description furnished by the Maker.	(II.)—WEEKLY SUMS OF DAILY RATES									
				Jan. 7—14 *	Jan. 14—21 *	Jan. 21—28 *	Jan. 28 to Feb. 4. *	March 18—25	March 4—11	Mar. 25 to April 1	April 22—29	March 11—18	April 1—8
Poole	1585	2	Auxiliary compensation to the balance, as in former years.	....	− 2·2	− 4·0	− 1·1	− 4·5	− 6·0	− 4·0	− 1·4	− 1·5	− 1·5
Glover	275	2	Auxiliary compensation to the balance, somewhat differing from Eiffe's.	− 7·3	− 7·5	− 8·0	− 8·0	− 0·2	− 4·5	+ 2·6	+ 3·0	− 1·9	+ 2·5
Reid and Sons	1104	2	Ordinary construction.	....	− 7·4	− 10·0	− 13·5	− 5·5	− 9·2	− 3·3	− 3·2	− 6·3	− 3·7
Dent	2449	2	Dent's patent balance; see pamphlet "On the Errors of Chronometers," p. 23.	....	− 1·3	− 4·1	− 4·1	− 4·5	− 5·9	− 4·5	− 3·6	− 6·0	− 7·0
Eiffe	203	2	Eiffe's auxiliary to balance by application to pendulum spring, as in former years.	....	+ 25·6	+ 25·9	+ 27·9	+ 29·0	+ 27·9	+ 31·0	+ 31·6	+ 30·6	+ 32·5
Tidmas	6557	2	Original auxiliary compensation to the balance, at extreme temperatures.	....	+ 8·6	+ 8·2	+ 6·8	+ 15·0	+ 10·5	+ 18·5	+ 16·7	+ 18·5	+ 24·0
Lister and Sons	539	2	Auxiliary compensation to the balance, as in former years.	....	− 10·1	− 10·4	− 11·0	− 2·1	− 6·3	− 0·9	+ 0·6	− 3·5	− 3·5
Clark and Son	1877	2	Poole's auxiliary compensation to the balance.	....	....	+ 9·0	+ 2·3	+ 6·5	+ 3·7	+ 8·5	+ 6·5	+ 12·0	+ 13·3
Hewitt and Son	2059	2	Ulrich's new auxiliary compensation to the balance.	....	....	....	....	− 35·5	....	− 35·5	− 34·9	− 36·2	− 34·5
Hewitt and Son	2057	2	Eiffe's auxiliary to balance, with a small original alteration.	....	− 13·0	− 13·0	− 13·0	− 3·0	− 9·5	− 2·0	− 0·8	− 5·5	− 2·1
Brock	107	2	Ordinary construction.	+ 10·1	+ 11·5	+ 15·3	+ 10·1	+ 31·0	+ 29·3	+ 34·6	+ 39·6	+ 32·8	+ 38·6
McClellan	148	2	Original auxiliary compensation to the balance, at extreme temperatures.	....	....	....	....	+ 29·0	+ 21·1	+ 29·5	+ 37·3	+ 18·9	+ 30·8
Sewill	837	2	Eiffe's auxiliary to balance, with a small alteration (as Hewitt & Son 2057).	....	− 15·5	− 14·3	− 10·1	− 4·6	− 7·4	+ 3·1	+ 6·4	+ 3·6	+ 11·0
Dixon	420	2	Auxiliary compensation to the balance, unpublished.	.... *	− 5·5 *	− 3·5 *	− 3·0 *	− 0·8	− 0·5	− 1·1	− 2·0	− 0·2	− 0·5
Chronometrical Thermometer	...	...	.....	+ 2202·0	+ 1880·0	+ 1781·5	+ 1711·0	+ 1414·8	+ 1357·0	+ 1254·7	+ 1204·0	+ 955·5	+ 735·5
Extremes of Temperature as shown by the Self-Registering Thermometer	...	...	.....	° ° 35—45	° ° 34—49	° ° 33—49	° ° 29—53	° ° 42—55	° ° 42—55	° ° 45—55	° ° 44—65	° ° 48—57	° ° 51—58

* During these weeks the Chronometers were exposed to the external air outside a North window.

‡ During these weeks the Chronometers were placed in the chamber of a stove heated by gas to a moderate temperature.

† During these weeks the Chronometers were placed in the chamber of a stove heated by gas to a high temperature.

The rate given by the first five days of trial is in every case omitted

IN THE ORDER OF TEMPERATURE.

June 3—10	April 8—15	May 27 to June 3	April 15—22	June 10—17	May 20—27	July 1—8	June 17—24	June 24 to July 1	Feb. 4—11 †	Feb. 11—18 ‡	Feb. 25 to Mar. 4 ‡	Feb. 18—25 ‡	Apr. 29 to May 6 †	May 6—13 †	May 13—20 †	NAME OF MAKER.	Number.
s − 1·8	s + 0·4	s − 2·8	s + 2·6	s − 2·0	s − 3·3	s − 1·1	s − 3·0	s − 2·5	s − 5·9	s − 4·9	s − 6·0	s − 5·5	s − 2·1	s − 3·0	s − 5·1	Poole	1585
+ 7·0	+ 2·5	+ 4·0	+ 5·5	+ 8·0	+ 2·5	+11·4	+ 9·0	+11·0	− 3·5	− 4·7	− 3·5	− 2·3	+ 4·0	+ 3·0	+ 5·0	Glover	275
− 4·5	− 3·1	− 5·5	+ 0·1	− 2·0	− 5·4	− 2·3	− 1·6	− 0·6	− 5·5	+ 1·5	− 1·5	+ 1·0	− 11·3	− 12·5	− 11·1	Reid and Sons	1104
+ 1·2	− 6·5	+ 0·8	− 2·5	+ 2·5	+ 2·2	+ 3·2	+ 3·5	+ 4·0	− 5·6	− 5·9	− 4·6	− 4·0	+ 7·1	+ 6·5	+ 8·3	Dent	2449
+36·7	+32·5	+35·0	+34·9	+39·3	+35·1	+40·0	+40·4	+42·6	+39·1	+ 36·5	+ 37·5	+ 37·5	+ 38·5	+ 36·5	+ 38·4	Eiffe	203
+31·9	+24·4	+30·5	+27·4	+33·0	+31·1	+34·5	+33·1	+37·0	+16·9	+ 22·5	+ 23·1	+ 21·0	+ 17·5	+ 18·4	+ 22·0	Tidmas	6557
+11·0	− 2·5	+ 9·0	− 1·1	+12·0	+ 5·7	+12·0	+10·0	+11·5	−10·5	− 4·5	− 7·7	− 7·0	− 16·5	− 16·5	− 13·7	Lister and Sons	539
+21·4	+13·7	+14·5	+16·0	+25·1	+ 6·0	+20·3	+19·8	+23·6	+12·1	+ 23·6	+ 28·3	+ 28·0	+ 21·5	+ 17·0	+ 7·5	Clark and Son	1877
− 4·5	−36·0	−11·0	−33·6	− 2·0	−14·9	− 3·0	− 5·4	+ 1·9	....	....	....	....	− 31·5	− 35·5	− 36·6	Hewitt and Son	2059
+30·5	− 1·4	+26·0	+ 0·8	+28·6	+27·5	+29·2	+28·4	+31·0	− 2·1	+ 1·1	+ 10·2	+ 7·8	+ 23·5	+ 30·5	+ 38·5	Hewitt and Son	2057
+64·0	+39·5	+58·5	+41·9	+66·0	+57·5	+74·1	+69·9	+76·1	+14·0	+ 31·4	+ 44·7	+ 38·2	+ 42·0	+ 47·8	+ 58·7	Brock	107
+36·2	+30·2	+36·7	+28·0	+32·7	+42·9	+37·0	+31·5	+33·5	....	....	+ 8·6	....	+ 3·2	+ 7·5	+ 17·0	McClellan	148
+18·2	+12·0	+18·3	+17·6	+25·5	+18·6	+27·7	+28·5	+32·4	+12·6	+ 19·5	+ 24·8	+ 22·5	+ 32·0	+ 30·8	+ 34·6	Sewill	837
− 6·8	− 1·4	− 7·2	+ 1·0	− 9·0	−10·0	−18·5	−15·1	−19·9	−13·0	− 8·5	− 16·0	− 13·0	− 59·3	− 59·0	− 41·2	Dixon	420
									‡	‡	‡	‡	†	†	†		
+711·0	+701·0	+665·0	+581·5	+420·0	+401·5	+247·0	+229·0	+ 23·0	−388·5	−1068·0	−1294·5	−1476·0	−2569·0	−2635·5	−2714·0		
° ° 52—59	° ° 52—61	° ° 54—62	° ° 50—64	° ° 56—63	° ° 54—64	° ° 58—66	° ° 57—72	° ° 59—73	° ° 41—85	° ° 70—82	° ° 66—85	° ° 67—91	° ° 58—102	° ° 80—104	° ° 80—104		

The Chronometer McClellan 148 was deposited on January 9, but its rates being so irregular as to imply some accidental cause of failure, it was taken away for examination on January 28, and returned for further trial on February 20.

The order of arrangement of the Chronometers in these Tables is determined solely by consideration of their irregularities of rate, as expressed in the columns "Difference between the Greatest and Least" and "Greatest Difference between one Week and the next," without reference to the duration of the Trial. The position of Hewitt and Son 2059, and of McClellan 148, is therefore not necessarily correct.

(III.)—ABSTRACT OF THE PRINCIPAL

NAME OF MAKER.	Number.	Whether Pocket, 1, 2, or 8 Days.	Construction of Escapement and Balance, from the description furnished by the Maker.	First Day of First Week of Rating.	Last Day of Last Week of Rating.	Number of Weeks.	Least Weekly Sum.	In what Week.
Poole	1585	2	Auxiliary compensation to the balance, as in former years.	January 14	July 8	25	− 6·0	February 25 to March 4‡ March 4 to 11
Glover	275	2	Auxiliary compensation to the balance, somewhat differing from Eiffe's.	January 7	July 8	26	− 8·0	January 21 to 28* January 28 to February 4*
Reid and Sons	1104	2	Ordinary construction.	January 14	July 8	25	−13·5	January 28 to February 4*
Dent	2449	2	Dent's patent balance; see pamphlet, "On the Errors of Chronometers," p. 23.	January 14	July 8	25	− 7·0	April 1 to 8
Eiffe	203	2	Eiffe's auxiliary to balance by application to pendulum spring, as in former years.	January 14	July 8	25	+25·6	January 14 to 21*
Tidmas	6557	2	Original auxiliary compensation to the balance, at extreme temperatures.	January 14	July 8	25	+ 6·8	January 28 to February 4*
Lister and Sons	539	2	Auxiliary compensation to the balance, as in former years.	January 14	July 8	25	−16·5	April 29 to May 6† May 6 to 13†
Clark and Son	1877	2	Poole's auxiliary compensation to the balance.	January 21	July 8	24	+ 2·3	January 28 to February 4*
Hewitt and Son	2059	2	Ulrich's new auxiliary compensation to the balance.	March 11	July 8	17	−36·6	May 13 to 20†
Hewitt and Son	2057	2	Eiffe's auxiliary to balance, with a small original alteration.	January 14	July 8	25	−13·0	January 14 to 21* January 21 to 28* January 28 to February 4*
Brock	107	2	Ordinary construction.	January 7	July 8	26	+10·1	January 7 to 14* January 28 to February 4*
M^{c}Clellan	148	2	Original auxiliary compensation to the balance, at extreme temperatures.	February 25	July 8	19	+ 3·2	April 29 to May 6†
Sewill	837	2	Eiffe's auxiliary to balance, with a small alteration (as Hewitt and Son 2057).	January 14	July 8	25	−15·5	January 14 to 21*
Dixon	420	2	Auxiliary compensation to the balance, unpublished.	January 14	July 8	25	−59·3	April 29 to May 6†

* During these weeks the Chronometers were exposed to the external air outside a North window.

‡ During these weeks the Chronometers were placed in the chamber of a stove heated by gas to a moderate temperature.

† During these weeks the Chronometers were placed in the chamber of a stove heated by gas to a high temperature.

The rate given by the first five days of trial is in every case omitted.

CHANGES OF RATE.					NAME OF MAKER.	Number.
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.		
+ s 2·6	April 15 to 22	s 8·6	s 4·5	March 11	Poole	1585
+ 11·4	July 1 to 8	19·4	4·5	* February 4 ‡	Glover	275
+ 1·5	February 11 to 18 ‡	15·0	8·1	April 29 †	Reid and Sons	1104
+ 8·3	May 13 to 20 †	15·3	10·7	April 29 †	Dent	2449
+ 42·6	June 24 to July 1	17·0	11·2	* February 4 ‡	Eiffe	203
+ 37·0	June 24 to July 1	30·2	12·6	‡ March 4	Tidmas	6557
+ 12·0	June 10 to 17 / July 1 to 8	28·5	19·4	† May 20	Lister and Sons	539
+ 28·3	February 25 to March 4 ‡	26·0	24·6	‡ March 4	Clark and Son	1877
+ 1·9	June 24 to July 1	38·5	21·7	† May 20	Hewitt and Son	2059
+ 38·5	May 13 to 20 †	51·5	24·3	April 29 †	Hewitt and Son	2057
+ 76·1	June 24 to July 1	66·0	17·4	‡ February 11 ‡	Brock	107
+ 42·9	May 20 to 27	39·7	34·1	April 29 †	M°Clellan	148
+ 34·6	May 13 to 20 †	50·1	32·2	‡ March 4	Sewill	837
+ 1·0	April 15 to 22	60·3	57·3	April 29 †	Dixon	420

The Chronometer M°Clellan 148 was deposited on January 9, but its rates being so irregular as to imply some accidental cause of failure, it was taken away for examination on January 28, and returned for further trial on February 20.

The order of arrangement of the Chronometers in these Tables is determined solely by consideration of their irregularities of rate, as expressed in the columns "Difference between the Greatest and Least" and "Greatest Difference between one Week and the next," without reference to the duration of the Trial. The position of Hewitt and Son 2059, and of M°Clellan 148, is therefore not necessarily correct.