

From Lunar Distances to Radio Pulses: Engineering the Longitude of Sydney

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Published longitude determinations pertaining to Sydney Observatory, 1770–2026

Year	Authority/ Source	Location	Published longitudes (E)		Notes	Ref.
			° ' "	hh mm ss.ss		
1770	Cook	Botany Bay	151 23 00	10 04 43.58	Lunar distances; recorded as 208° 37' W	1, 2
1788	Dagelet	Botany Bay	151 25 30		Converted from 149° 06' 30" E of Paris	3
1788	Dawes	Dawes Point	151 21			4
1788	Dawes	Dawes Point	151 18 50	10 05 12.78		2
1788	Hunter	Dawes Point	151 13			5
1788	Hunter	Dawes Point	151 19 43	10 05 16.32		2
1788	Dawes and Hunter	Dawes Point	151 19 30	10 05 18		5, 6
1788	Bradley	Sydney	151 20 38	10 05 19.98		2, 7, 8
1790	Phillip	Dawes Point	151 19 30		Misprint: "159"	9
1793	D'Espinoza	Port Jackson	151 12 45	10 04 48.45	Also referenced as 10h 04m 51s (46)	2
1793	Malaspina (Marachino)	Port Jackson	151 17 53	10 05 08.98		2
1793	Scott	Sydney Observatory	151 02 30		Solar eclipse of 11 (12) March 1793	10
1793	Scott	Sydney Observatory	151 10 15		Occultation of Jupiter's second satellite	10
1793	Scott	Sydney Observatory	151 18 08		Lunar distances	10
1793– 1794	Cook	South coast of New Zealand	150 52 18		Transportation of three chronometers	10
1793– 1795	Broughton, Crosbie (Crossby)	Port Jackson	151 09 03	10 04 33.65	Naval astronomical observations	2
1795– 1796	Flinders	Cattle Point	151 17 12	10 05 06.25		2
1798	Collins	Sydney	151 19 30			11
1802	De Freycinet	Port Jackson	151 08 32	10 04 31.58		2
1802– 1803	Flinders	Cattle Point	151 11 09	10 04 44.72	Also referenced as 10h 04m 47.3s (46)	2, 5
1817	King	Sydney	151 17 29	10 05 07.38		2
1822	Rümker	Sydney	151 17 30	10 05 07.45		2
1822– 1823	Brisbane	Parramatta Observatory	151 15 32	10 04 59.58	Based on an independent meridian	2
1835	Rümker	Sydney		10 04 56.38		2
1770– 1835	Multiple	Dawes Point		10 04 58.36	Mean of all deter- minations; reduced to Dawes Point	2
1840	Tyers	Port Essington/Fort Macquarie	151 15 14	10 05 09.3	Lunar distances and chronometer transportation; adopted	2, 5, 12
1840	Tyers	Sydney Observatory		10 04 58.38	Fort Macquarie measurement reduced to Sydney Observatory	2
1841 (Mar)	Stokes	Sydney	151 16 45		Chronometer transportation	12
1841 (Aug)	Arrowsmith	Fort Macquarie	151 14 40		Re-determination of the NSW–South Australia boundary	13

1859	Scott	Garden Island	151 14 59	10 04 59.96	Lunar culminations (meridian transits)	5, 14
1859–1860	Stone	Garden Island		10 04 47.32	Lunar culminations; final result	15
1860	Scott	Garden Island		10 04 59.86	Lunar culminations	17
1860	Scott	Garden Island		10 04 46.66	Lunar culminations; w.r.t. Greenwich, revised	18, 19
1859–1861	Scott, Stone	Sydney Observatory		10 04 45.74	Mean of lunar culminations	16
1861	Scott	Sydney Observatory		10 04 44.43	Lunar culminations; w.r.t. the Cape of Good Hope, revised	18, 19
1861	Scott	Sydney Observatory	151 15	10 05 06.84	Mean of 1860 lunar culminations	16, 20
1862	Scott	Sydney Observatory		10 04 45.79	Lunar culminations	21, 22, 23
1863	Russell	Sydney Observatory		10 04 50.50	Lunar culminations; w.r.t. Greenwich	22
1867	Stone	Sydney Observatory		10 04 47.32	Lunar culminations, 1859–1861	15, 23, 27
1869	Todd	Sydney Observatory		10 04 48.97	Adopted	2, 23
1864–1870	Clemens, Tebbutt	Windsor Observatory		10 04 49.66	Stellar occultations	18, 26
1871	Russell	Sydney Observatory		10 04 50.91	Lunar culminations; w.r.t. Greenwich	22
1872	Russell	Sydney Observatory		10 04 51.08	Lunar culminations; w.r.t. Greenwich	22
1872	Ellery	Melbourne Observatory		10 04 46.0	Adopted	23, 27
1872	Ellery	Melbourne Observatory		10 04 50.6	Using Melbourne Obs. as reference	23
1872	<i>Nautical Almanac</i>	Sydney Observatory		10 04 59.86		27
1873	Russell	Sydney Observatory		10 04 51.07	Lunar culminations; w.r.t. Greenwich	22
1874	Russell	Sydney Observatory		10 04 50.47	Lunar culminations; w.r.t. Greenwich	22
1874	Scott	Sydney Observatory		10 04 45.79	Lunar culminations	2
1863–1874	Scott, Russell	Sydney Observatory		10 04 50.806	Lunar measurements; re-reductions by Stone	18, 22, 24
1863–1874	Ellery	Sydney Observatory		10 04 50.57	w.r.t. Melbourne Observatory	22, 25
1863–1874	Palmer	Sydney Observatory		10 04 49.46	w.r.t. New Zealand locations	22
1878	Tebbutt	Windsor Observatory		10 04 53.38	Revised Windsor values	16
1878	Tebbutt	Windsor Observatory		10 04 51.37; 10 04 54.13	Stellar occultations	2; 28, 29
1878	Russell	Sydney Observatory		10 04 50.8	Newly adopted standard	30
1860–1878	Multiple	Sydney Observatory		10 04 49.22	Mean of all lunar measurements	2
1880	Tebbutt	Windsor Observatory		10 04 50.62	Lunar occultations; revised	31
1880	Tebbutt	Windsor Observatory		10 05 50.57	Lunar occultations; newly revised	32
1883	Russell?	Sydney Observatory		10 04 54.62	Transposition from Parramatta Obs.	50
1883	Russell?	Sydney Observatory		10 04 48.965	Best available based on all determinations	50

1883	Telegraphic reports	Sydney Observatory	151 12 22		Telegraphic determination	5
1883	Telegraphic reports	Sydney Observatory		10 04 48.450	Combined telegraphic value	33
1884	Telegraphic reports	Sydney Observatory		10 04 49.39 ± 0.182	Eastern telegraphic chain	35
1884	Auwers	Sydney Observatory		10 04 49.60	Lunar data using the revised telegraphic longitude difference w.r.t. Melbourne Obs.	35, 36, 37
1880–1884	Tebbutt	Windsor Observatory		10 04 50.64 10 04 48.52	Lunar occultations; w.r.t. Melbourne Obs.	18, 25
1885	Tebbutt	Windsor Observatory		10 04 49.82	Lunar culminations; combined	37
1883–1885	Telegraphic reports	Sydney Observatory		10 04 49.54	Telegraphic determination; <i>Nautical Almanac</i> for 1898 onwards	2, 34
1887	Telegraphic reports	Sydney Observatory		10 04 48.474	Telegraphic determination; mean	38, 50
1895	Biancchi	Sydney Observatory		10 04 49.44	Mean of absolute and telegraphic methods	36
1896–1897	<i>Nautical Almanacs</i>	Sydney Observatory		10 04 48.9	1882 Transit of Venus; based on (45)	39, 40
1897	Tebbutt	Windsor Observatory		10 04 49.99	Lunar occultations; revised	41
1903	Telegraphic reports	Sydney Observatory	151 12 20		East–West cables	5
1904	Klotz	Fort Macquarie	151 12 58	10 04 49.20	East–West cables	42
1883–1904	Multiple	Sydney Observatory		10 04 49.31	Telegraphic determination; final value	2
1903–1905	Telegraphic reports	Station “E” (time-ball tower)	151 12 23.1		East–West cables	5
1907	Merfield	Sydney Observatory		10 04 49.26	East–West cables	42
1921	Cooke	Sydney Observatory		10 04 48.98	Wireless signals	2
1923	Todd	Sydney Observatory		10 04 49.93 ± 0.581	Lunar method	2, 36
1923	Dodwell	Sydney Observatory		10 04 49.06	Mean of all measurements since Cook 1770	2
1926	IAU/IUGG	Sydney Observatory		10 04 49.191	Misprint: “19h”. Adopted.	49
1927	Imperial General Staff Map	Sydney Observatory	151 12 17.85		Adopted geodesy; survey adjustment	47
1935–1944	Australian Survey Corps	Sydney Observatory	151 12 17.85	10 04 49.19	National triangulation network origin ^(a)	43
1986	AGD66 ^(b)	Sydney Observatory	151 12 12.1			5
2002	GDA94 ^(c)	Sydney Observatory	151 12 16			5
2020	Modern geodetic (WGS84) ^(d)	Sydney Observatory	~151 12 17.0		Satellite geodesy; depends on datum/epoch	48
2026	GDA94	Sydney Observatory	151 12 16.47		Satellite geodesy	44

Notes:

All longitude values in this table, irrespective of the locality of their determination, pertain to the current (2026) location of Sydney Observatory.

^(a) Prior to 1966, Australian mapping commonly used a Transverse Mercator projection referenced to Clarke ellipsoids (Clarke and James, 1866; Clarke, 1880). AGD66^(b) introduced the Australian National

Spheroid and a continentally adjusted datum. This Australian National Grid (ANG) was surveyed by the Royal Australian Survey Corps.

^(b) Australian Geodetic Datum 1966.

^(c) Since 2000, all Australian states and territories have adopted the Geocentric Datum of Australia 1994 (GDA94). Since its implementation, the Australian plate has moved approximately 1.6 m. Australia's coordinates are therefore no longer aligned with Global Navigation Satellite Systems (GNSS) such as GPS (Global Positioning System). Therefore, as of 15 December 2017, Australia implemented a new datum known as the Geocentric Datum of Australia 2020 (GDA2020). On 1 January 2020, New South Wales and Victoria adopted GDA2020, with other states progressively adopting the new datum (Wintour, 2020–2025).

^(d) World Geodetic System 1984.

Table references:

(1) Cook and Beaglehole (1955); (2) Dodwell (1923); (3) Dagelet (1788); (4) Dawes (1788); (5) Read (2015); (6) Hunter and Dawes (1788); (7) Bradley (1969); (8) McGuffie and Henderson-Sellers (2012); (9) Phillip (1790); (10) Scott (1865); (11) Collins (1798); (12) Tyers (1841); (13) Arrowsmith (1841); (14) Scott (1860a); (15) Stone (1867); (16) Tebbutt (1878b); (17) Scott (1860b); (18) Tebbutt (1897b); (19) Scott (1862a); (20) Scott (1861); (21) Scott (1862b); (22) Russell (1878); (23) Ellery (1872); (24) Russell (1881); (25) Tebbutt (1880b); (26) Clemens (1896); (27) NEP (1872); (28) Tebbutt (1878a); (29) Tebbutt (1879c); (30) Russell (1879); (31) Tebbutt (1880a); (32) Tebbutt (1880c); (33) Tebbutt (1883); (34) Ellery et al. (1886); (35) Baracchi (1895); (36) Auwers (1884); (37) Tebbutt (1885); (38) *South Australian Register* (1887); (39) Nautical Almanac Office (Royal Greenwich Observatory) (1896); (40) Nautical Almanac Office (United States Naval Observatory) (1896/1897); (41) Tebbutt (1897a); (42) Merfield (1907); (43) Australian Survey Corps (1935–1944); (44) Latitude (2026); (45) Stone (n.d.); (46) *Australian Star* (1908); (47) Great Britain, War Office (1927); (48) Geoscience Australia (2020); (49) Commission Internationale des Longitudes par T.S.F.; (50) Sydney Observatory (1883?).

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