

this chronometer was bad, its rate being unsteady and very large, between 20 sec. and 30 sec. daily, and it is likely that errors of some consequence were thus introduced.

The first result on 13th January is the mean of two sets, in which the decimals of seconds were ^a.10 and ^a.23. On 26th December three clock-stars only were observed at W, instead of the usual number, six at least; but the observations were good, and full weight has therefore been given to the night's work.

9. Auckland.

Date.	Operators.	Resulting Diff. of Longitude.	Time, determination by.
1874.		M. S.	
Dec. 26	H at A sends to D at B	A east of B 9 52.75	H at A; D at B
	D at B sends to H at A	" 9 52.61	
Dec. 29	H at A sends to P at B	" 9 52.32	H at A; P at B
	P at B sends to H at A	" 9 52.05	
1875.			
Jan. 5	H at A sends to P at B	" 9 52.37	H at A; P at B
	P at B sends to H at A	" 9 52.06	

Mean difference of longitude A east of B... 9 52.36

It is necessary to remark that as Mr. Heale has not sent me his reductions for examination, I cannot vouch for their accuracy; but the results give no reason to suppose that they are otherwise than correct. The time observations at A were taken with a small (two-feet) portable transit instrument by Troughton and Simms, kindly lent me by Messrs. Coates and Co., of Christchurch.

Note on the Longitude of Wellington Observatory and the Latitude of Burnham.

10. Although the extra meridianal observations of the moon for longitude, taken at Burnham with the altazimuth in November and December last, have not yet been reduced, an *approximate* longitude has been worked out from the observed meridianal transits of the moon. According to this approximate determination, the longitude of the transit-pier at Burnham appears to be 11h. 29m. 12s.44 east of Greenwich. The errors of the moon's tabular right ascensions have been taken into account in this reduction; but the result remains affected by the personal equations of the observers, both as regards transits of stars and transits of the moon, which have not yet been ascertained. Though the determination, therefore, can only be regarded as approximate, it may nevertheless be interesting to compare it with those previously arrived at by others, and given in the documents enumerated in the foot-note.*

1. The approximate absolute longitude of the transit-pier at Burnham	H. M. S.
obtained as above by ourselves is	11 29 12.44 E.
Wellington Observatory transit-pier east of the Burnham transit-pier	
by galvanic signals	9 52.37

Palmer's approximate longitude of Wellington Observatory ... 11 39 4.81 E.

2. Adopting the longitude of Melbourne Observatory as fundamental, and equal to 9h. 39m. 54s.80; and the telegraphic difference of longitude from Melbourne to Sydney Observatory as +24m. 55s.81, we get 10h. 4m. 50s.61 as the longitude of Sydney Observatory. The chronometric difference from Fort Macquarie (Sydney), to Pipitea Point (Wellington), determined by Captain Stokes, R.N., is +1h. 34m. 15s.53. Hence we have,—

	H. M. S.
Longitude of Sydney Observatory...	10 4 50.61 E.
Correction to Fort Macquarie	+2.63
Pipitea Point, East of Fort Macquarie	+1 34 15.53
Correction to Wellington Observatory	—2.88

Stokes's longitude of Wellington Observatory ... 11 39 5.89 E.

3. The chronometric difference between Garden Island (Sydney) Observing Station and the Cathedral, Wellington, determined by Captain Nares, of H.M.S. Challenger, is +1h. 34m. 15s.47. Hence we have,—

	H. M. S.
Longitude of Sydney Observatory...	10 4 50.61 E.
Correction to Garden Island Station	+5.73
Cathedral, Wellington, East of Garden Island	+1 34 15.47
Correction to Wellington Observatory	—2.01

Nares's longitude of Wellington Observatory 11 39 9.80 E.

This differs nearly four seconds from Stokes's result, but Captain Nares admits that in all probability Stokes's is the more trustworthy of the two, as in the Challenger's case twenty-one days elapsed between the time observations at Sydney and those at New Zealand, while the interval in Stokes's case was probably much shorter.

4. Separate determination of absolute longitude by transits of the moon which were made in 1869–70–71 at Rockside, Dunedin, by Messrs. Thomson and McKerrow, and at the

* Parliamentary Paper, 1871, G. No. 23. Supplement to the *New Zealand Gazette* No. 12, 1871. Report by Dr. Hector to the Colonial Secretary, 9th September, 1874, enclosing Memorandum on Longitude by Captain Nares, R.N.