REPORT ON OBSERVATIONS OF TRANSIT OF *MERCURY*, MAY 7, 1924,

By F. B. LITTELL.

[Communicated by Captain Edwin T. Pollock, U. S. Navy, Superintendent, U. S. Naval Observatory.]

In response to a circular sent out by the U. S. Naval Observatory suggesting that observations be made of the contact times of the transit of *Mercury* of May 7, 1924, the following observations have been received. In all cases the observations have been compared with the predicted times, and the residuals O — C are given. Mr. J. E. Willis has checked the computation of these quantities.

In addition to the visual observations, two photographs of *Mercury* on the *Sun's* disk were made at the Van Vleck Observatory of Wesleyan University.*

*See *Popular Astronomy*, June–July, 1924, for details of the visual and photographic observations at the Van Vleck Observatory.

An approximate computation of the residuals O — C for the photographic observations seems to indicate a general agreement in size and uncertainty with the visual observations.

Besides those who reported observations, there were 11 observers who reported that preparations had been made, but that cloudy weather had prevented carrying out the plans. This was also the case at the Naval Observatory.

The observations are arranged in the order of the longitudes of the observatories. The times are Greenwich Mean Times, the hour, which was 9 for contacts I and II and 17 for contacts III and IV, being omitted.

TRANSIT OF *MERCURY*, MAY 7, 1924

Observatory	Latitude	Longitude	Observer and Assistants		Obs. and Comp. T. I	Obs. and Comp. T. II	O — C I	O — C II	Aperture	Magnifying Power
	° ′	° ′			m s	m s	s	s	in.	
	° ′	° ′				m s		s	in.	
1. Harvard	+42 22.6	+ 71 7.1	Harlan T. Stetson	O	.....	44 38.5	.....	−48.0	4.0	
Astr. Lab.			C. W. Bruce	C	.....	45 26.5				
2. "	"	"	M. F. Jordan	O	.....	44 46.5	.....	−40.0	8.0	
				C	m s	45 26.5	s			
3. Harvard	+42 22.8	+ 71 7.8	Edward S. King	O	42 16.5	44 38.5	−10.9	−48.0	15.0	132
Col. Obsy.			Frank L. Bowie	C	42 27.4	45 26.5				
4. Wellesley	+42 17.6	+ 71 18.2	John C. Duncan	O	42 45.	44 30.	+17.5	−56.6	6.0	75
				C	42 27.5	45 26.6				
5. "	"	"	Leah B. Allen	O	.....	44 19.	.....	−67.6	12.0	120
				C	.....	45 26.6				
6. Mount	+42 15.3	+ 72 35.1	Anne S. Young	O	42 54.	44 45.	+25.8	−42.3	2.5	25
Holyoke			Catherine Stillman	C	42 28.2	45 27.3				
7. "	"	"	Alice H. Farnsworth	O	42 55.6	44 50.5	+27.4	−36.8	1.8	14
				C	42 28.2	45 27.3				
8. Wesleyan	+41 33.3	+ 72 39.4	Frederick Slocum	O	42 11.	44 41.	−17.0	−46.1	20.0	
University				C	42 28.0	45 27.1				
9. "	"	"	B. W. Sitterly	O	42 4.	44 25.	−24.0	−62.1		
				C	42 28.0	45 27.1				
10. "	"	"	N. W. Storer	O	42 5.	44 44.	−23.0	−43.1		
				C	42 28.0	45 27.1				
11. "	"	"	U. S. Lyons	O	42 59.	44 46.	+31.0	−41.1		
				C	42 28.0	45 27.1				
12. Litchfield	+41 44.8	+ 73 13.4	Richard S. Chisolm	O	.....	45.5	.....	.....	3.0	40
Conn.			Alain C. White	C	.....	45 27.4				
13. Princeton	+40 21.0	+ 74 39.4	R. S. Dugan	O	42 38.4	45 1.4	+ 9.5	−26.5	9.5	76
			J. O. Stewart	C	42 28.9	45 27.9				
14. Syracuse	+43 0.8	+ 76 8.5	E. D. Roe, Jr.	O	42 20.	45 20.5	−10.4	− 8.9	6.5	100
			Josephine R. Roe	C	42 30.4	45 29.4				

Observatory	Latitude	Longitude	Observer and Assistants		Obs. and Comp. T. I	Obs. and Comp. T. II	O—C I	O—C II	Aperture	Magnifying Power
15. Toronto	+43 40.0	+ 79 23.9	Louis B. Stewart	O	42 46.4	45 4.6	+13.9	−26.9	6.0	80
				C	42 32.5	45 31.5				
16. Denison University	+40 5.	+ 82 32.	Paul Biefeld	O	42 10.	45 25.	−24.0	− 7.9		
				C	42 34.0	45 32.9				
17. Ann Arbor	+42 16.8	+ 83 43.8	R. A. Rossiter W. J. Hussey H. I. Schiefer	O C	42 11.0 42 35.2	44 57.6 45 34.1	−24.2	−36.5	12.25	120
18. Eisbee, Arizona	+31 26.	+109 54.	E. W. Babbitt	O	.....	46 15.		+14.0	4.5	
				C	.....	46 1.0				
19. Berkeley	+37 52.4	+122 15.7	W. F. Meyer Maud W. Makemson	O C	43 6.1 43 14.8	44 50.1 46 13.3	− 8.7	−83.2	6.0	60
20. "	"	"	C. D. Shane Katherine Prescott	O C	43 1.8 43 14.8	45 12.0 46 13.3	−13.0	−61.3	4.0	40
21. Mare Island	+38 5.9	+122 16.4	T. J. J. See W. S. Trankle F. H. Lemmon	O C	43 28. 43 14.7	46 38. 46 13.2	+13.3	+24.8	5.0	
22. Manila	+14 34.7	−120 58.6	M. Selga	O	34 25.2	37 49.2	−34.1	−8.7	5.0	
				C	34 59.3	37 57.9				

OBSERVERS' NOTES

1. Howard mean time clock. Uncertainty of observation estimated to be 3 or 4 seconds.

2. Riefler sidereal clock and chronograph. Observation probably late, as through accident planet was not in field until the time of observed contact.

3. Frodsham chronometer. Aperture of telescope reduced to 9.5 inches. Estimate that *Mercury* had encroached by about an eighth of its diameter on *Sun* when first seen. Probably first contact came about 20 seconds earlier. Second contact, limbs of planet and *Sun* joined by a ligament; time taken while still joined. Complete separation about 5 seconds later. Uncertainty of observation estimated at 5 seconds.

4. Bond chronometer. Herschel diagonal eye-piece.

5. Bond chronometer, and chronograph. Herschel diagonal eye-piece.

6. Chronometer. Second contact, very uncertain because of poor seeing.

7. Sidereal clock, and chronograph. Second contact, just a guess.

8-11. *Sun's* image, 3 feet in diameter, projected on a glazed white card.

8. Chronograph. First contact, probably 2 or 3 seconds late. Second contact, time given above was for internal tangency. Uncertainty 3 seconds. The "black drop" let go 18 seconds later. Uncertainty, 1 or 2 seconds.

9. Chronometer. First contact, perhaps 2 seconds late. Second contact, internal tangency.

10. Chronometer. First contact, perhaps 2 seconds late. Second contact, first glimpse of light between planet and *Sun's* limb.

11. Chronometer. First contact, decided notch in *Sun* before recognized. Second contact, internal tangency. Completely on 18 seconds later.

12. Pocket watch and stop watch. Time given to half minute only. Estimated uncertainty 15 to 30 seconds.

13. Mean time clock and chronograph. Polarizing eye-piece. Limb of *Sun* fairly steady, but not much light. First contact, *Mercury* was a conspicuous dent in *Sun's* limb when time was noted. Second contact, waited 2 or 3 seconds while *Mercury* seemed to hang on to limb. Time certainly was not too late.

14. Chronometer and chronograph watch. Aperture of telescope reduced to 1.4 inches. First contact, think that, on account of irradiation or some other cause, the disc of *Mercury* made an impression on me as tangent before it really touched the disc of the *Sun*.

15. Sidereal clock and chronograph. First contact, estimated to be at least 10 seconds late. Second contact, very difficult owing to "black drop." Planet seemed greatly elongated with a dark nucleus at center; time was noted when the first glimmer of light appeared between the elongated planet and the *Sun's* limb. At that instant the dark nucleus was within the *Sun's* limb by nearly its own diameter. Others who also observed the *Sun's* image which was pro-

jected on a sheet of white paper, thought the contact occurred 6 seconds earlier.

16. Riefler mean time clock and chronograph.

17. Time noted on two Negus Sidereal chronometers independently. First contact, the lag in observing exterior tangency was probably 8 or 10 seconds. Second contact, the uncertainty in the observed time of interior tangency is not over 3 seconds.

18. Waltham watch.

19. Mean time chronometer. Aperture of telescope reduced to 4 inches. Observations are in doubt by 15 to 20 seconds due to boiling at limb of *Sun*.

20. Sidereal chronometer. First contact approximately 20 seconds late. Second contact in doubt by approximately 8 seconds.

21. Aperture reduced to 3 inches. Diagonal eyepiece and red shade-glass used. First contact may be slightly late. Second contact may be a little late, on account of the "black drop."

22. Chrongraph used. The *Sun's* image was projected on a screen attached to the finder of the equatorial telescope. Clouds prevented observations of first and second contacts. The effect of irradiation was rather strong. No drop or appendage of any kind could be seen.

U. S. Naval Observatory, Washington, D.C.
June 30, 1924.

OBSERVATIONS OF 1923 PE,

WITH THE 26-INCH REFRACTOR OF THE U. S. NAVAL OBSERVATORY,

BY ERNEST CLARE BOWER.

[Communicated by CAPTAIN EDWIN T. POLLOCK, U. S. NAVY, Superintendent.]

G. M. T.	App. α	App. δ	Obj.−★	Comp.	Log $p\rho$	Ap. pl. red. of ★	Seeing	★
1923	h m s	° ′ ″	s ′ ″			s ″		
Nov. 10.66069	1 21 34.03	+16 54 32.2	+13.52 +2 13.5	*d*10, 8	8.904 0.518	+3.60 +18.2	*f*	1
13.58426	1 24 0.06	+15 20 43.4	− 5.79 −5 56.6	*d*10, 8	9.104*n* 0.551	+3.59 +17.9	*f*	2
14.56686	1 24 52.99	+14 49 41.5	+ 4.10 −1 56.6	*d*10, 8	9.231*n* 0.565	+3.58 +17.8	*f*	3
17.61979	1 27 49.52	+13 15 28.1	− 2.69 −3 13.5	*d*10, 9	7.274 0.578	+3.54 +17.3	*f*	4
28.63688	1 40 59.11	+ 8 15 6.2	+ 4.39 +2 5.0	*d*11, 9	9.047 0.652	+3.45 +15.1	*p*	5
Dec. 1.57780	1 45 6.83	+ 7 7 58.1	−12.36 −4 54.6	*d*11, 8	8.641*n* 0.664	+3.43 +14.4	*f*	7
3.56647	1 48 2.24	+ 6 25 58.7	+ 1.14 −1 45.6	*d*10, 8	8.822*n* 0.672	+3.41 +13.8	*g*	8
12.55688	2 2 29.38	+ 3 51 19.9	+10.06 +5 36.0	*d*10, 8	8.715*n* 0.701	+3.40 +11.7	*f*	9

Nov. 13. Near faint star during half the observation. Nov. 17. Faint. Moonlight. Nov. 28. 13½m. Faint. Dec. 1, 13½m. Dec. 3. Faint first half. Dec. 12. Faint. Poor observation. Haze.

Mean Places of Comparison Stars for Beginning of Year

★	α	δ	Authority	★	α	δ	Authority
	h m s	° ′ ″			h m s	° ′ ″	
1	1 21 16.91	+16 52 0.5	Astr Bor +16.0120, 23; +17.0116, 118; +17.0124, 64	5	1 40 51.27	+8 12 46.1	Comp with 6, 1923 Dec. 1
				6	1 40 38.94	+8 9 50.1	Astr Tul +7.0140, 21
2	1 24 2.26	+15 26 22.1	Astr Bor +15.0124, 17; +16.0120, 81	7	1 45 15.76	+7 12 38.3	Astr Tul +7.0140, 57; +7.0148, 2
				8	1 47 57.69	+6 27 30.5	Astr Tul +7.0148, 96
3	1 24 45.31	+14 51 20.3	Astr Bor +15.0124, 77	9	2 2 15.92	+3 45 32.2	Comp with 10, 1924 Feb. 16
4	1 27 48.67	+13 18 24.3	Astr Bor +14.0128, 41	10	1 59 59.94	+3 43 29.9	A.G. Albany 586

U. S. Naval Observatory, Washington, D. C.,
1924 July 14.