LICK OBSERVATORY BULLETIN

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OBSERVATIONS OF THE SIXTH, SEVENTH, AND EIGHTH SATELLITES
OF JUPITER

The outer satellites of *Jupiter*, the sixth, seventh, and eighth, have been under observation near the opposition of June, 1912, with the thirty-six inch Crossley Reflector of the Lick Observatory. The positions published herewith have been reduced from measurements made with the Harkness-Stackpole measuring engine. Two settings were made on each end of the star trails and three on the satellites in each coördinate for both direct and reversed position of the plate.

The four-constant method, as published by Dr. C. D. Perrine, *L. O. Bulletin*, 4, 77, 79, 1906, and *Popular Astron.*, 15, 145, 1907, has been followed. The plate constants have been determined from five or six catalogue stars. The positions of these stars have been taken from as many catalogues as were known to contain reliable data. Positions from individual catalogues differing in right ascension or declination more than two seconds of arc from the mean of the remaining positions were not utilized. It was found necessary on two or three plates to deduce positions of stars from other plates on which sufficient catalogue stars could be found.

As is the plan with the new Crossley, the photographs were taken in the principal focus, the duration of exposure ranging from forty-five to one hundred and twenty minutes. At first the guiding was done by computing the position angle and amount of

Jupiter's motion and compensating for this motion by the moving wire system in the reticle of the guiding telescope. In the case of the seventh and eighth this method gave a perceptible trail to the image of the satellites. It was then decided to compensate for the motion of the satellites themselves, after which very round images were obtained in much shorter time.

To test the accuracy of *Jupiter's* ephemeris and also to serve as a check on the catalogues employed, a series of photographs of the planet was taken. By means of an occulting shutter sufficient stars for determining the plate constants, together with good measurable images of *Jupiter*, were obtained. For determining the geocentric parallax of *Jupiter* the value of $\log \Delta$ for May 27th was taken as 0.6353 and for June 18th as 0.6388.

The positions of intermediate stars determined in the process of this work are published in the second list.

Acknowledgements are due to Director Campbell for setting us this problem, to Dr. Curtis for many helpful suggestions and for placing the apparatus at our disposal, and to Mr. Tucker who determined the meridian circle position of star B.D. $-21^{\circ}, 4377$.

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W. F. MEYER.

July 12, 1912.

COLLECTED RESULTS

SATELLITE VI

Plate	Date	P.S.T.	Duration of Exposure	α 1912.0	δ 1912.0	Reduction to App. α	δ	Geocentric Parallax Factors $\log p^{\alpha} \Delta$	$\log p^{\delta} \Delta$
2587	1912 May	10 ^d 13 ^h 49 ^m 30 ^s	89m	16 ^h 42 ^m 44 ^s .49	—21° 27' 17".7	+2 ^s .06	—12".1	8.5274	0.8750
2590		11 13 23 00	63	42 19.13	25 53.5	+2.08	—12.2	8.1741 _n	0.8751
2595		15 13 24 00	135	40 33.60	20 1.4	+2.14	—12.2	8.4089	0.8746
2596		16 12 53 30	120	40 7.45	18 33.8	+2.16	—12.2	8.5019 _n	0.8744
2597		21 12 46 30	77	37 52.16	—21 11 11.9	+2.28	—12.5	7.0178	0.8741
2614	June	16 9 41 30	45	16 26 56.69	—20 37 56.6	+2.55	—13.2	9.1859 _n	0.8644

SATELLITE VII

2587	1912 May	10 13 ^h 49 ^m 30 ^s	89m	16 ^h 44 ^m 28 ^s .36	—21° 50' 5".0	+2 ^s .11	—12".0	8.4764	0.8769
2593		13 13 19 00	76	42 48.97	48 6.9	+2.11	—12.1	7.8794 _n	0.8770
2595		15 13 24 00	135	41 41.24	46 32.9	+2.14	—12.1	8.3663	0.8766
2596		16 12 53 30	120	41 8.07	45 45.5	+2.16	—12.1	8.5314 _n	0.8764
2597		21 12 46 30	77	38 17.49	41 7.9	+2.29	—12.4	6.0681	0.8765
2612	June	15 10 3 00	70	16 25 21.82	—21 9 59.9	+2.54	—13.2	9.0553 _n	0.8702

SATELLITE VIII

2603	1912 June	5 11 ^h 21 ^m 00 ^s	100m	16 ^h 37 ^m 58 ^s .70	—20° 54' 52".2	+2 ^s .48	—12".7	8.7573 _n	0.8719
2604		6 11 42 00	120	37 23.39	53 27.0	+2.48	—12.8	7.1616 _n	0.8728
2605		7 11 53 00	100	36 47.81	52 1.2	+2.49	—12.8	8.5114	0.8723
2606		8 11 26 00	100	36 13.49	50 38.5	+2.49	—12.8	8.2230 _n	0.8724
2608		9 11 23 00	100	35 38.66	49 13.9	+2.49	—12.8	8.1275 _n	0.8723
2613		15 11 27 00	70	32 13.57	40 49.1	+2.55	—12.9	8.7344	0.8728
2615		16 11 00 00	80	16 31 40.92	—20 39 29.5	+2.57	—13.0	7.7073	0.8717

CORRECTIONS TO JUPITER'S POSITION

Plate	Date	P.S.T.	α 1912.0	Red. to App.	Geoc. Parallax	Observed App. α_o	From Am. Eph. App. α_c	$\Delta\alpha$ (O—C)
2600	1912 May	27 11 ^h 35 ^m 20 ^s	16 ^h 38 ^m 22 ^s .399	+2.346	—0 ^s .024	16 ^h 38 ^m 24 ^s .721	16 ^h 38 ^m 24 ^s .712	+0 ^s .009
2601		27 11 51 45	38 22.107	2.346	0.016	38 24.465	38 24.343	0.094
2618	June	18 10 00 05	26 49.228	2.573	0.022	26 51.791	26 51.668	0.111
2619		18 10 32 23	26 48.470	2.573	—0.006	26 51.037	26 51.017	0.020
2620		18 10 49 35	16 26 48.124	+2.573	+0.003	16 26 50.700	16 26 50.663	+0.037
Mean								+0.046

Plate	Date	P.S.T.	δ 1912.0	Red. to App.	Geoc. Parallax	App. δ_o	App. δ_c	$\Delta\delta$
2600	1912 May	27 11 ^h 35 ^m 20 ^s	—21° 19' 33".53	—12".55	+1".72	—21° 19' 44".36	—21° 19' 44".74	+0".38
2601		27 11 51 45	21 19 32.53	12.55	1.73	21 19 43.35	21 19 44.08	+0.73
2618	June	18 10 00 05	20 58 24.04	13.36	1.71	20 58 35.69	20 58 34.65	—1.04
2619		18 10 32 23	58 22.81	13.36	1.72	20 58 34.45	20 58 33.42	—1.03
2620		18 10 49 35	—20 58 21.23	—13.36	+1.72	—20 58 32.87	—20 58 32.76	—0.11
Mean								—0.21

STAR POSITIONS DETERMINED

B.D. Number	α 1912.0	δ 1912.0	No. of Obs.	
—21, 4377	16 ^h 25 ^m 27 ^s .62	—21° 15' 38".1	(1)	Tucker, Meridian Circle.
20, 4505	16 27 10.09	—20 35 44.2	(3)	From Crossley plates.
20, 4531	16 33 9.18	—20 24 39.1	(1)	From Crossley plates.
20, 4535	16 35 16.12	—20 51 9.6	(1)	From Crossley plates.
21, 4408	16 40 33.58	—21 31 51.7	(1)	From Crossley plates.
21, 4409	16 40 47.76	—21 54 35.3	(1)	From Crossley plates.
21, 4417	16 42 55.55	—21 21 51.4	(2)	From Crossley plates.
Faint Stars not in B.D.				
(e)	16 ^h 25 ^m 49 ^s .32	—20° 53' 12".2	(2)	From Crossley plates.
(c)	16 35 00.26	—21 4 16.8	(1)	From Crossley plates.
(d)	16 35 32.85	—20 30 55.6	(1)	From Crossley plates.
(b ¹)	16 35 49.39	—20 48 41.3	(1)	From Crossley plates.
(a)	16 37 25.10	—20 47 12.8	(1)	From Crossley plates.
(b)	16 42 22.22	—21 11 40.1	(2)	From Crossley plates.