PHOTOGRAPHIC OBSERVATIONS OF THE NINTH SATELLITE OF SATURN

The following observations of Pickering's new satellite of Saturn are from the first photographs made with the new mounting for the Crossley 3-foot mirror. The focus of the telescope was determined on the night of November 5th, and on the following night an exposure was made which showed the new satellite. It was photographed on the succeeding four nights also. Following is a list of the plates secured:

No. of Plate.	Date.	P.S.T.	Duration.
	1904		
1345	November 6	6 ^h 33 ^m to 8 ^h 20 ^m	1 ^h 47 ^m
1346	" 7	6 32 8 32	2 0
1347	" 8	6 23 8 23	2 0
1350	" 9	6 30 8 30	2 0
1351	" 10	6 30 8 30	2 0

The image of Phoebe on the first plate is faint and diffuse. On the later plates it shows distinctly as a short trail. An exposure of a half hour under good conditions will be sufficient to give a measurable image. The image of Saturn is badly over-exposed on all the plates, and too large for accurate settings. It was measured on the first plate, however, and its position is included. Instead of the usual custom of determining position—angle and distance, I have, therefore, determined the absolute positions of the satellite referred to six catalogue stars. Following are the resulting coördinates of Phoebe for 1904.0 freed from the effects of refraction. The necessary corrections for parallax are attached but not applied.

POSITIONS OF PHOEBE FOR 1904.0

Plate No.	Date 1904	P.S.T.	α	δ	Parallax.	
					α	δ
1345	November 6	7 ^h 26 ^m 5	21 ^h 8 ^m 22.734	—17° 40' 46".86	+0.016	+0".72
1346	" 7	7 32	8 29.862	—17 40 13.16	.018	.72
1347	" 8	7 23	8 37.168	—17 39 35.58	.017	.72
1350	" 9	7 30	8 44.929	—17 38 56.66	.019	.71
1351	" 10	7 30	21 8 53.161	—17 38 16.00	+0.020	+0.71

SATURN

1345	" 6	7 26.5	21 9 50.067	—17 33 32.76	+0.016	+0.72
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MEAN PLACES OF COMPARISON STARS FOR 1904.0

*	α	δ	Authority.
1	21 ^h 7 ^m 33.33	—17° 34' 22".4	Washington A.G. Zones
2	8 24.67	—17 57 38.5	" "
3	8 46.97	—17 40 4.7	" "
4	9 23.62	—17 36 57.7	" "
5	9 36.11	—17 58 17.7	" "
6	21 9 44.42	—17 44 33.6	" "

A comparison of the observed position of Saturn with that in the American Ephemeris gives the following residuals, observed—ephemeris

$\Delta\alpha$,	—0".052
$\Delta\delta$,	—0".29

The observations of Phoebe have been compared with Pickering's ephemeris in *Annals H. C. O.*, Vol. LIII, No. III, page 72. The positions of Saturn used in computing the angles and distances were obtained from the photograph on November 6th, and from the American Ephemeris on the subsequent dates. Following are the residuals, observed—ephemeris

	p .	s .
November 6	0".0	—1".4
7	—0.1	—1.4
8	0.0	—1.4
9	0.0	—1.4
10	0.0	—1.4

Phoebe is of about the 17th photographic magnitude. This series of plates also contains images of Iapetus, Hyperion, Titan and Rhea, which are far enough from the planet to be seen distinctly. Their positions will be published later.

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November 28, 1904.