of a magnitude during this time. Each observation consisted of four sets, of four settings each. The mean of the times, expressed in Julian Days and decimals, is given in the first column of Table I. The observed difference in magnitude of Eunomia and the comparison star is given in the second column. It appeared from a study of these observations that the times of maximum could be expressed by the formula $J. D. 2416920.116 + 0.1267 E$. The values of E and of the phase are given in the third and fourth columns. It appeared from the observations that Eunomia, when at maximum on the first day, was about 0.77 magnitudes fainter than the comparison star, and 1.11 on the last day. The exact value for each day is given in the fifth column, and was found by assuming, from an inspection of the curves, the approximate values, and applying a small correction dependent on the condition that the sum of the positive and negative residuals from the light curve should be equal. It will be noticed that the diminution in the mean brightness of Eunomia, which is thus indicated, is not perfectly uniform. This may be due in part to the variations, if any, in the comparison star or in the mean light of Eunomia. Subtracting the numbers in the fifth column from those in the second, gives the observed brightness, compared with the maximum brightness after correcting for the varying mean brightness. This is given in the sixth column. The seventh column contains the residual found by subtracting the magnitude, according to the light curve represented in Table II, from the results given in the sixth column. It will be noticed that the average value of these residuals is only ± 0.016 .

The form of light curve is shown in Table II, the corresponding phases and magnitudes being given in the first and second columns.

Table II. Light curve.

Phase	Mag.	Phase	Mag.
0 ^d 00	0 ^m 00	0 ^d 07	0 ^m 36
0.01	0.02	0.08	0.28
0.02	0.05	0.09	0.20
0.03	0.11	0.10	0.11
0.04	0.19	0.11	0.04
0.05	0.31	0.12	0.01
0.06	0.39		

It will be noticed that the period, 0^d1267, does not differ greatly from that of (7) Iris, 0^d1295 (see A. N. 3932), and that in both cases it is still doubtful whether this period should be doubled. A careful series of observations by Mr. Leon Campbell, using Argelander's method, seems to indicate that in the case of Eunomia the period should perhaps be doubled, and that the intervals between the successive minima are alternately long and short. It is difficult to see on theoretical grounds how this can be the case, or how the alternate maxima or minima can differ in intensity, if the variation in light is wholly due to the unsymmetrical form of the body.

It is unfortunate that no easy means exists for observing and following known asteroids, except when near opposition.

Table III. Ephemeris of Eunomia.

J. D.	RA. 1855	Decl. 1855	J. D.	RA. 1855	Decl. 1855
6920	8 ^h 7 ^m 6	+13° 15'	6940	8 ^h 11 ^m 0	+12° 53'
6925	8 7.5	+13 12	6945	8 13.4	+12 44
6930	8 9.0	+13 7	6950	8 16.7	+12 33
6935	8 9.1	+13 1			

Table III contains the approximate positions of Eunomia on the dates given in the first column. The right ascensions and declinations for 1855 are given in the second and third columns. This is the most convenient epoch both

for visual and for photographic observations, since the positions may be compared directly with those of adjacent stars in the Durchmusterung.

Harvard College Observatory, 1905 April 8.

Edward C. Pickering.

Brightness of Jupiter's satellites.

(Harvard College Observatory Circular No. 95).

For many years the four brighter satellites of Jupiter have been suspected of variability. Each of these satellites appears faint when very near Jupiter. This is a subjective effect, and is always produced when a bright object is near a stellar image. It is very marked before or after the occultation of a bright star or planet by the Moon. Various other defects of the eye render the results of direct comparison of the satellites uncertain. A series of measures of the satellites has accordingly been made by Prof. Wendell, with the polarizing photometer attached to the 15-inch Tele-

scope of this Observatory and described in the second paragraph of Circular No. 25. The plan proposed was that each satellite should be compared with the other three on three nights, and that two measures, each consisting of four sets of four settings each, should be made each night. By reversing the prism and images, and placing the latter equidistant from Jupiter, known sources of error were eliminated. The total number of settings required was 576, but unfortunately the approach of Jupiter to the Sun rendered it impossible to secure all the desired measures. The results

are given in Table I, the six possible combinations being given in the six lines. The order of brightness of the satellites was always, III, I, II and IV. The brighter of the two satellites compared is given in the first column, the fainter in the second. The times of observation, expressed in Julian Days and decimals, omitting the three left-hand figures 241, are given in the third column. The mean of all the measures is given in the fourth column, and the residuals from the mean, expressed in hundredths of a magnitude, are given for the different days in the next three columns. A least square solution, from the results in the fourth column, gave the values 0.42, 0.16, and 0.64, for the three intervals, III to I, I to II, and II to IV, respectively. The computed values of all the intervals are given in the eighth column, and the residuals found by subtracting them from the observed values given in the third column are given in the ninth column. In 1877 and 1878, measures of the satellites of Jupiter were made here and are described in Volume XI, Chapter VIII. The difference in

magnitude there found between Jupiter and the four satellites, and given on page 246 in the second column of Table XLVIII, is for Satellite I, 8.13; for II, 8.27; for III, 7.76; for IV, 8.89. The corresponding differences between the magnitudes of the satellites are given in the tenth column of Table I. Thus, for Satellites I and III, we have, $8.13 - 7.76 = 0.37$, which is entered in the first line of the column. The differences between these and the computed values are found by subtracting the values in the eighth column from those in the tenth and are entered in the eleventh column. It will be noticed that all of these differences are negative, that is, that the interval between the satellites appeared to be less in the earlier than in the later observations. Correcting this difference, for which there is no obvious explanation, by multiplying the results in the tenth column by 1.08 and subtracting the products from the computed values given in the eighth column, we have the residuals given in the twelfth column.

Table I. Results of observations.

Br.	Ft.	Julian Days	Mean	I	II	III	C	O—C	XI	Res.	Res.
III	I	6900.592, 6907.524	0.42	00	00, 00	—	0.42	0.00	0.37	—0.05	—0.02
III	II	6904.538, 6906.528, 6918.542	0.62	00, 00	00, 04 _n	01 _n , 03	0.58	+0.04	0.51	—0.07	—0.03
III	IV	6905.526, 6911.524, 6915.522	1.18	00, 01	02 _n , 02 _n	01	1.22	—0.04	1.13	—0.09	0.00
I	II	6902.528, 6909.533, 6916.547	0.14	05 _n , 05 _n	05, 00, 00	02	0.16	—0.02	0.14	—0.02	—0.01
I	IV	6922.518	0.83	00, 00	—	—	0.80	+0.03	0.76	—0.04	+0.02
II	IV	6911.549, 6920.520, 6928.518	0.66	08 _n	04, 06	02 _n	0.64	+0.02	0.62	—0.02	+0.03

The average value of the 26 residuals in the fifth, sixth and seventh columns is ± 0.020 , and of the 6 residuals in the eighth column, is ± 0.025 . The average value

of the residuals in the twelfth column is even smaller, ± 0.018 . There appears therefore to be no evidence of variation during the time that these measures were made.

Harvard College Observatory, 1905 April 11.

Edward C. Pickering.

Osservazioni di piccoli pianeti e di comete

fatte col micrometro circolare al rifrattore equatoriale di 8 pollici del R. Osserv. di Brera in Milano.

Data	T. m. Milano	$\Delta\alpha$	$\Delta\delta$	Cf.	α app.	$\log p.\Delta$	δ app.	$\log p.\Delta$	Red. ad l. app.	*
1904 (419) Aurelia.										
Lugl. 9	11 ^h 11 ^m 7 ^s	+0 ^m 20 ^s 99	+ 1' 54".4	16	18 ^h 17 ^m 57 ^s 15	7.734	—17° 1' 47".2	0.617	+3 ^s 06 +11".5	1
1905 (78) Diana.										
Genn. 0	9 56 28	—0 20.28	+ 1 57.5	8	6 41 51.51	9.427 _n	+36 17 57.0	0.281	+1.21 —10.3	2
1	15 55 14	+0 53.33	+ 8 2.4	16	6 40 27.07	9.645	+36 15 5.4	0.505	+1.23 —10.1	3
2	9 8 38	+0 3.42	+ 6 13.4	16	6 39 37.17	9.525 _n	+36 13 16.4	0.356	+1.24 —10.1	3
4	9 49 13	—0 35.21	— 4 39.8	12	6 37 15.36	9.382 _n	+36 7 22.7	0.263	+1.27 —9.8	4
8	10 10 56	—1 36.77	+14 31.7	9	6 32 41.36	9.189 _n	+35 53 6.8	0.206	+1.30 —9.4	5
12	9 50 5	+0 4.26	— 4 34.6	8	6 28 25.57	9.193 _n	+35 35 28.1	0.218	+1.33 —8.8	6
14	8 36 38	+0 8.14	+ 4 10.9	16	6 26 28.43	9.450 _n	+35 25 46.7	0.324	+1.33 —8.6	7
1905 (71) Niobe.										
Febb. 5	9 29 41	—0 45.78	— 0 34.1	8	7 21 21.76	9.036 _n	+34 7 25.1	0.252	+1.34 —8.7	8
6	9 1 59	—1 44.40	— 7 44.7	10	7 20 23.14	9.194 _n	+34 0 14.6	0.277	+1.34 —8.6	8
7	8 59 49	+0 34.19	— 1 4.6	11	7 19 24.90	9.177 _n	+33 52 49.8	0.278	+1.33 —8.5	9