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Drawings of Jupiter's Third Satellite.

The accompanying drawings of detail on the third satellite of Jupiter, were made through the 24 inch Clark glass of the Lowell Observatory during parts of February and March, 1897. Beginning in the latter part of January occasional drawings were made, but the atmosphere was not perfectly steady and there always seemed to be an element of uncertainty in the markings suspected. On February 20th, after making a few drawings of that uncertain kind, an interval of extremely good seeing revealed the »Great Northern Belt« in longitude 260° to 20°, with perfect distinctness and definition, indicating the character of the markings to be expected. On the following night the vertical line in longitude 0° was seen, and on the third night this vertical line was seen to have moved towards the left (terrestrial west) giving at once a rough estimate of the period of rotation.

During the first week insufficient care was taken with the orientation; so it is probable that certain early drawings are slightly in error in that respect, and allowance has been made for that in constructing the map. From February 20th to March 1st the drawings were compared and carefully studied from night to night, but, beginning on March 2d and continuing through this series, no comparisons were made with previous observations, in order to make each night's work absolutely independent.

The smaller series of eight drawings shows several attempts to discover signs of surface movement within the three to five hours of continuous observation. None could be detected and the rotation, therefore, is not approximately twenty-four hours; it must therefore be very closely one week, as shown by the larger series of sketches, or nearly the same as this satellite's period of revolution about Jupiter. Recent observations (Flagstaff, May 14th and subsequent dates) not only confirm the map but indicate a period of rotation of $7^d\,5^h.1 \pm 1^h.2$, or one hour longer than its period about its primary. This difference of one hour, it will be observed, is less than the probable error. An ephemeris will be published in a subsequent article, but for the present, it is sufficient to state that all drawings of detail made from January to July, 1897, can be identified by the inferior conjunction with Jupiter, during which the detail in the third column of the larger collection of drawings, is visible.

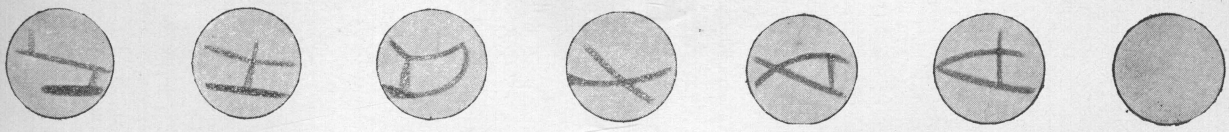
The lines thus discovered on this satellite, are extremely narrow. Recent observations with a power of 750 and good seeing have led me to this view, the maximum width being estimated at less than 0".1 or 200 miles. Judging by the obliteration of lines while seeing is growing worse it seems probable that the most conspicuous lines are not wider than the others but are intrinsically darker.

In order to prepare a map, a small ball of wood was painted white, graduated and mounted in a pasteboard circle so that it could represent the satellite. Each drawing was then carefully placed upon this globe in its proper position, and the Mercator's projection plotted off from the resulting combination. The only lack of agreement occurred between longitudes 135° and 180° and observations now going on are supplying the needed data.

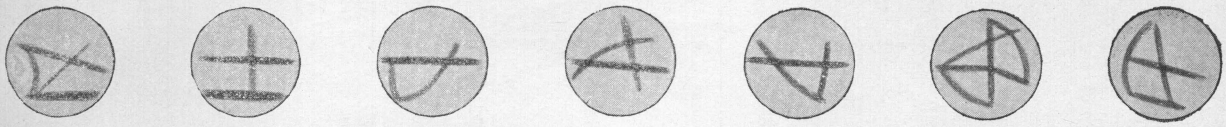
Work was carried on upon the other satellites during the same period of good seeing in Mexico. Drawings were made of the Fourth which indicate that it is covered by a series of markings similar to those found on the Third. Its period of rotation is also probably nearly equal to its period of revolution about Jupiter. Markings were seen on the second and first satellites and the first was seen to be most remarkably elongated and to vary in its elongation, as Professor W. H. Pickering was the first to discover. Observations are now being carried on to verify, correct and enlarge the results already obtained.

Lowell Observatory, Flagstaff, Arizona, U. S. A., May 23, 1897. *A. E. Douglass.*

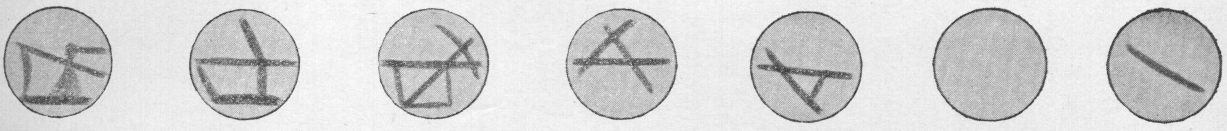
Drawings from which map was made, showing that period is either 7^d or 21^h, direct motion, or 27^h retrograde.



Febr. 20 Febr. 21 Febr. 22 Febr. 23 Febr. 24 Febr. 25



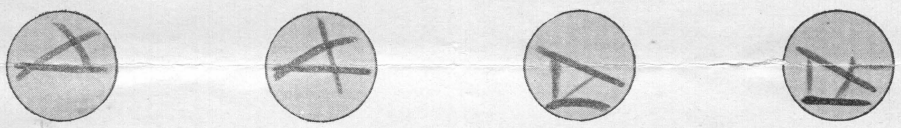
Febr. 27 Febr. 28 March 1 March 2 March 3 March 4 March 5



March 6 March 7 March 8 March 9 March 10 March 12

(No observations on February 26 or March 11).

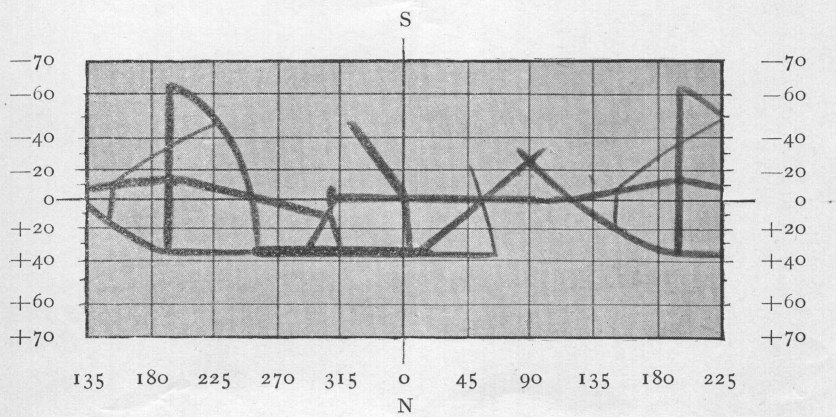
Drawings showing that period is not approximately 24 hours and must therefore be 7^d, direct motion.



March 2, $11^h.8$ March 2, $14^h.8$ March 6, $10^h.2$ March 6, $14^h.5$

March 8, $12^h.9$ March 8, $14^h.3$ March 9, $11^h.7$ March 9, $13^h.1$

Map, on Mercator's projection, reduced from globe.



Lowell Observatory, Mexico, 1897. *A. E. Douglass*, Observer.