Compliments of the Author.

The Polar Cap of Mars.

A. E. DOUGLASS.

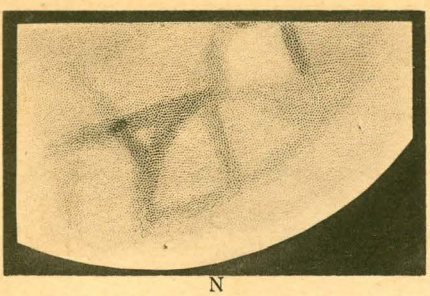
Mars.

PERCIVAL LOWELL.

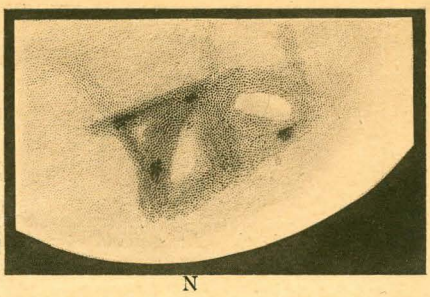
Reprint from ASTRONOMY AND ASTRO-PHYSICS. Nov. 1894

MARS.

PLATE XXXII.



N

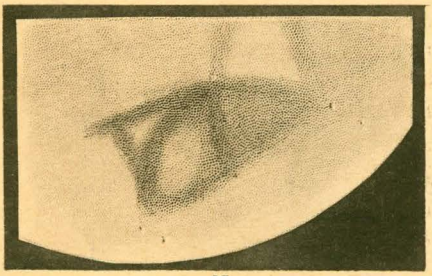


N

TRIVIUM CHARONTIS REGION.

1894, Sept. 22, 19h 20m, G. M. T.
Same as Sept. 23, 20h 43m. Seeing 3 to 5.

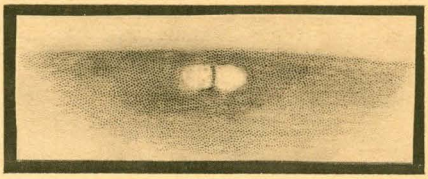
1894, Sept. 24, 20h 15m, G. M. T.
Power 630. Seeing 6.



N

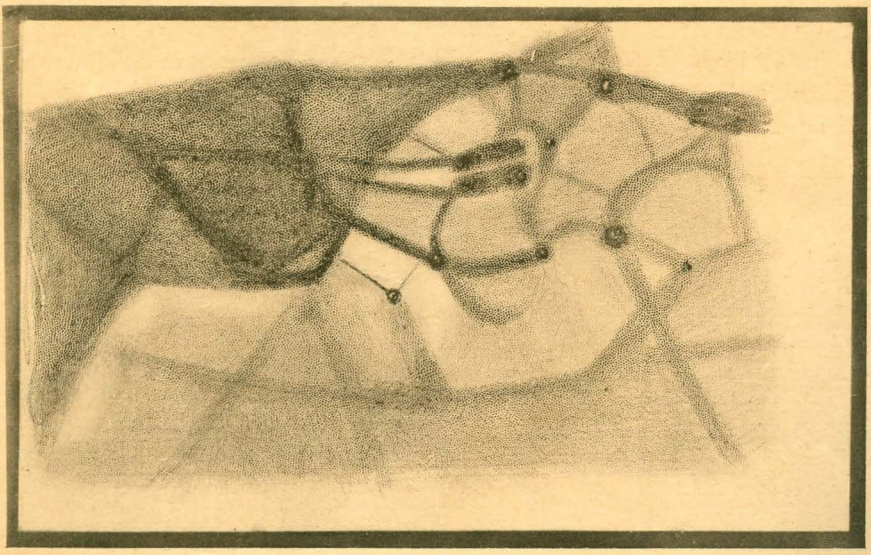
TRIVIUM CHARONTIS REGION.

1894, Sept. 25, 21h 54m, G. M. T. Power 630.
Seeing 3. Scale same as two above, 4mm. = 1″.



S. SNOW.

Oct. 5, 11h 59m, G. M. T. Power 860.
Seeing 7. Scale 20mm. = 1″.



SOLIS LACUS REGION.

1894, Oct. 8, 13h 13m to 14h 05m.
Power 420. Seeing 4 to 9. Scale 4mm. = 1″.

THE POLAR CAP OF MARS.

A. E. DOUGLASS.

Flagstaff, A.T. October 17, 1895.
Revised January 31, 1896.

The recent disappearance of the Martian snow cap renders more interesting its position and size as observed during the week preceding this occurrence. On October 4 the following side (the side toward the Sun) of the cap was noticed to be much brighter than other portions, presenting an appearance similar to that of June last but on a much smaller scale. On October 5, at nearly 19^h, G. M. T., a very narrow dark line was observed dividing the cap into two slightly unequal parts, the following part being the larger and showing a very bright north-following edge. Three hours later a determination of its size and position was made. October 7, at about 19^h, G. M. T., the rift or dividing line in the cap was noticed to have a direction ~~*s.-f.* and *n.-f.*~~ and it was estimated that at $19^h\ 42^m$ it would have a direction perpendicular to the nearest part of the limb.

On October 8 the position and size of the snow cap was again taken, but the rift was not observed though it was in a favorable position. At this observation the cap appeared about three times as large in area as on the 5th and 12th of the month. A lower power eyepiece (630 diameters instead of 840) was used in this case alone, which might explain some of the increase in size by irradiation; but the whole change cannot be thus disposed of. On August 19 a comparison had been made between powers 630 and 420 between which the difference in irradiation should be more noticeable, but no disagreement in the size of the snow cap was found. The snow cap seems actually to have been of larger size on October 8.

No further observations were made upon this object until October 12 at $20^h\ 26^m$, G. M. T. when its size and position were obtained but no rift was seen. The seeing, 3 or 4 on a scale of 10, was not sufficiently good to show it had there been one. On October 13 no polar cap was visible nor has any sign of one been seen since up to the present time (October 17). Since this disappearance no part of the region occupied by the snow cap has appeared as bright as regions close to the northern limb. The region seems different in no respect from the preceding and following limbs of the planet.

The results of the observations are here presented:

Position of Snow Cap.	d	h		Computed Distance from Pole.
Central Oct.	12	20.4	G. M. T.	
Turned 50° toward *p.*	"	8 21.4	"	4°.3 wt. 2
" 83° " "	"	5 21.9	"	5°.0 " 3
Mean distances from south pole				4°.7
Longitude				59°.

Size of snow cap:

Oct. 12.9 E. and W. 0″.72 = 140 miles in longitude.
N. and S. 0″.36 = 175 miles in latitude.
(1° = 36.84 miles) area ~~10,500~~ square miles.

Oct. 8.9 E. and W. 0″.99 = 193 miles.
N. and S. 0″.72 = 380 miles.
Area ~~64,500~~ square miles.
By computation, width in longitude ~~146~~ miles.
By computation, width in latitude ~~128~~ miles.

Oct. 5.9 E. and W. 0″.81 = 157 miles in latitude.
N. and S. 0″.36 = 220 miles in longitude.
Area 27,900 square miles.

From nearness to the limb E. and W. measures should have about three times the weight of N. and S. measures.

Rift in snow cap.

Oct. 5.8 rift pointed at (equatorial) long. 101.6
Oct. 7.8 rift pointed at (equatorial) long. 92.4

Mean direction of rift toward longitude 97.0 at the equator.

Since Flammarion gives no instance of the complete disappearance of the snow at either pole we may consider the present case to be the first recorded. The smallest minimum given in "La Planète Mars" was observed by Schiaparelli in 1879 at the south pole. The measured diameter of the cap was 3°.8 ~~or~~ (140 miles) ~~or 1.6 times as large~~ as on October 12. ~~Moreover Schiaparelli's minimum occurred 75 days after summer solstice~~, but he was inclined to attribute nearly half of this size to irradiation and thought 2° or 74 miles an equally probable figure.

Schiaparelli's minimum occurred 75 days after the summer solstice and for about 55 days longer the cap did not reach 10° in diameter. In the present opposition October 12 was but 42 days after the summer solstice and 130 days after the solstice will bring us to January 8, 1895. Therefore, while it is impossible to say whether or not we shall have occasional reappearances of the polar cap, it seems unlikely that it will attain any great size for some months to come.

LOWELL OBSERVATORY, Flagstaff, A. T., Oct. 17, 1894.

MARS.

PERCIVAL LOWELL.

On Sept. 24th an interesting observation was made here by Mr. Douglass of what appears to have been the formation and subsequent dissipation within twenty-four hours of a cloud over the western half of Elysium, that part of it which lies between Galaxias and Hyblæus. Three accompanying drawings of his show what occurred. On Sept. 22d and 23d the area referred to was of about the same brilliancy as the eastern half of the region, but on Sept. 24th he observed the western half much brighter than the eastern, almost as brilliant as the polar cap; on Sept. 25th the western half had faded again and become darker than the other. Their appearances suggest clouds, forming presumably over high ground, since neither Galaxias nor Hyblæus were in any way obscured. On the contrary he found the canals perceptibly darker.

Solis Lacus has shown a longitudinal division. The division detected by Mr. Douglass begins in the Nectar, a light line running along the middle of it, which is continued, much fainter, through the Lake of the Sun. The best seeing is necessary to see this. Under poorer seeing Solis Lacus has appeared to him triple horizontally, an effect caused chiefly by the dark patches that show in his drawing.

Mr. Douglass finds a small rift in the minute snow-cap which is further interesting as being possibly about the last one to occur before the weather turns cold and the cap begins to increase again.

LOWELL OBSERVATORY, Oct. 12, 1894.

Thread values (June to Nov. 11, 1894)

In Term. Obs.

½ of $\frac{1}{10}$ th.	=	.11
.1	=	.16
.2	=	.26
.3	=	.35
.4	=	.43
.5	=	.54
.6	=	.64
.7	=	.75
.8	=	.86
.9	=	.96
1.0	=	1.07
1.1	=	1.18

Correction of table fig 2

Σ+W 0".86 = 168

N+S 0".43 = 210

area 26928

Σ-W. 1".18 = 232

N+S. 0".86 = 456

—— Area 89488

Long 316

Lat 276

Σ+W .0".96 = 188

N+S 0".43 = 264

Area 37944

From Obns on disk

change = $\frac{107}{90}$ = 1.2

Cor: add $\frac{1}{5}$ th. size) + $\frac{35}{25}$ th area ($\frac{7}{5}$ th 47)

($\frac{9}{25}$

$\frac{25}{20}$ or $\frac{30}{24}$