Mercury. By Percival Lowell.

(*Communicated by the Secretaries.*)

The markings on the planet's disc proved at once to be conspicuous. To reduce them to a scale I may say that they were easier to see than all the markings on *Mars* except the most salient ones, such as the so-called Seas. So visible were they at all times—for the air had to be distinctly bad to obliterate them—that observations had not been made more than a day or two, before the rotation period of the planet was patent.

Further communication upon this planet I intend to give later.

Lowell Observatory:
1896 *October* 21.

[In addition to those reproduced, Mr. Lowell sends several prints of drawings of *Mercury*, which have been placed in the Library.—Eds. *M.N.*]

Determination of the Rotation Period and Surface Character of the Planet Venus. By Percival Lowell.

(*Communicated by the Secretaries.*)

The rotation period of *Venus* has hitherto been a matter of doubt. I beg therefore to communicate to the Society the following observations made by me during August, September, and October of this year, which prove that rotation to be performed in the same time as the planet's orbital revolution. I send drawings by me and by my assistant, Mr. Drew. Comparison of the drawings will show their conclusive character, and from them I have been able to construct the accompanying chart.

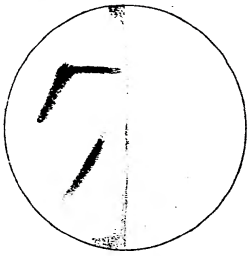
In the construction of the chart I have taken for the zero longitude that longitude which is upon the central meridian as observed from the Sun when the planet is in the line of apsides of its orbit, either at perihelion or at aphelion, such being the most natural origin to adopt.

In orienting the different drawings of the disc the libration in longitude due to the excentricity of the planet's orbit is added to or subtracted from the value resulting from the planet's orbital revolution. In the case of *Venus* the resulting change is very small, never amounting to more than 47′ at its maximum.

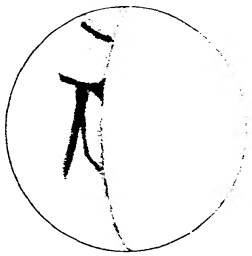
The planet's axis of rotation is substantially perpendicular to the plane of its orbit, as the observations have not yet disclosed any deviation from this position.

In the names for the markings I have selected such as seemed appropriate to the Planet of Love. The markings themselves are

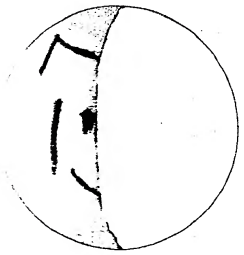
MERCURY, 1896.



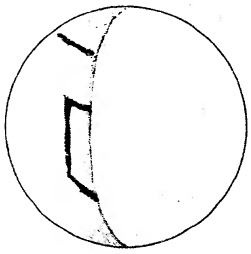
Sep. 14, 2h 52m
λ = 98°



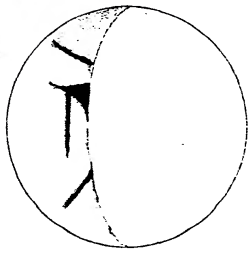
Sep. 19, 5h
λ = 115°



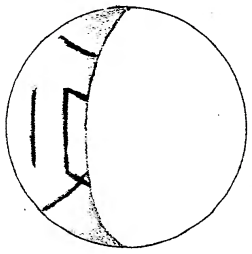
Sep. 23, 3h 12m
λ = 130°



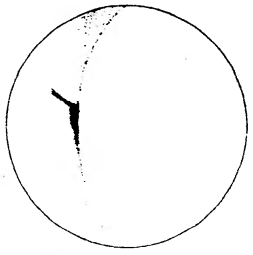
Sep. 23, 3h 30m
λ = 130°



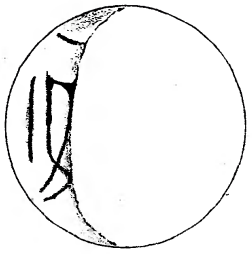
Sep. 23, 4h
λ = 130°



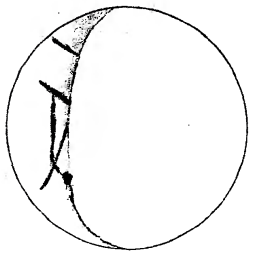
Sep. 23, 4h 42m
λ = 130°



Sep. 25, 2h 13m
λ = 138°



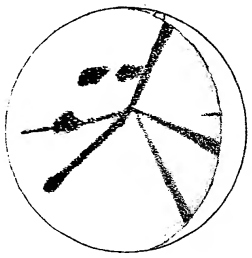
Sep. 26, 3h 22m
λ = 141°



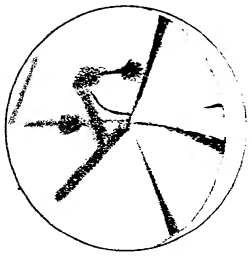
Sep. 26, 3h 56m
λ = 141°

Percival Lowell, del.

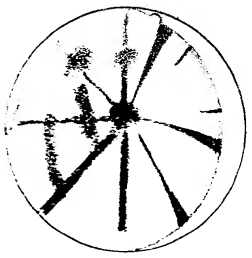
VENUS, 1896.



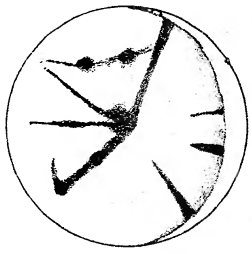
Oct. 13, $2^h 55^m$ to $3^h 4^m$
$\lambda = 37°$



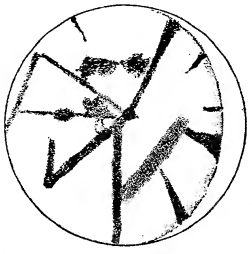
Oct. 14, $1^h 59^m$ to $2^h 12^m$
$\lambda = 37°$



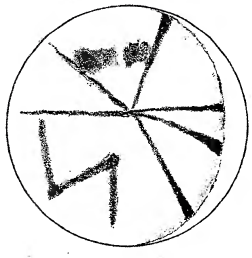
Oct. 14 $3^h 13^m$ to 18^m
$\lambda = 37°$



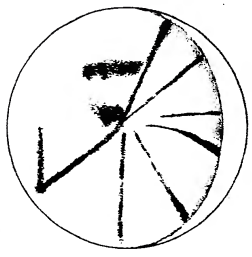
Oct. 14, $3^h 50^m$
$\lambda = 37°$



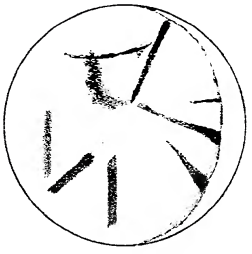
Oct. 15, $0^h 5^m$ to 14^m
$\lambda = 37°$



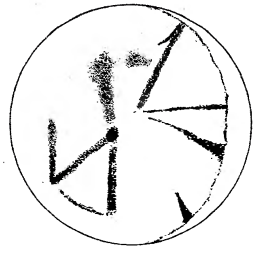
Oct. 15, 1^h
$\lambda = 37°$



Oct. 15, $2^h 10^m$ to 21^m
$\lambda = 37°$



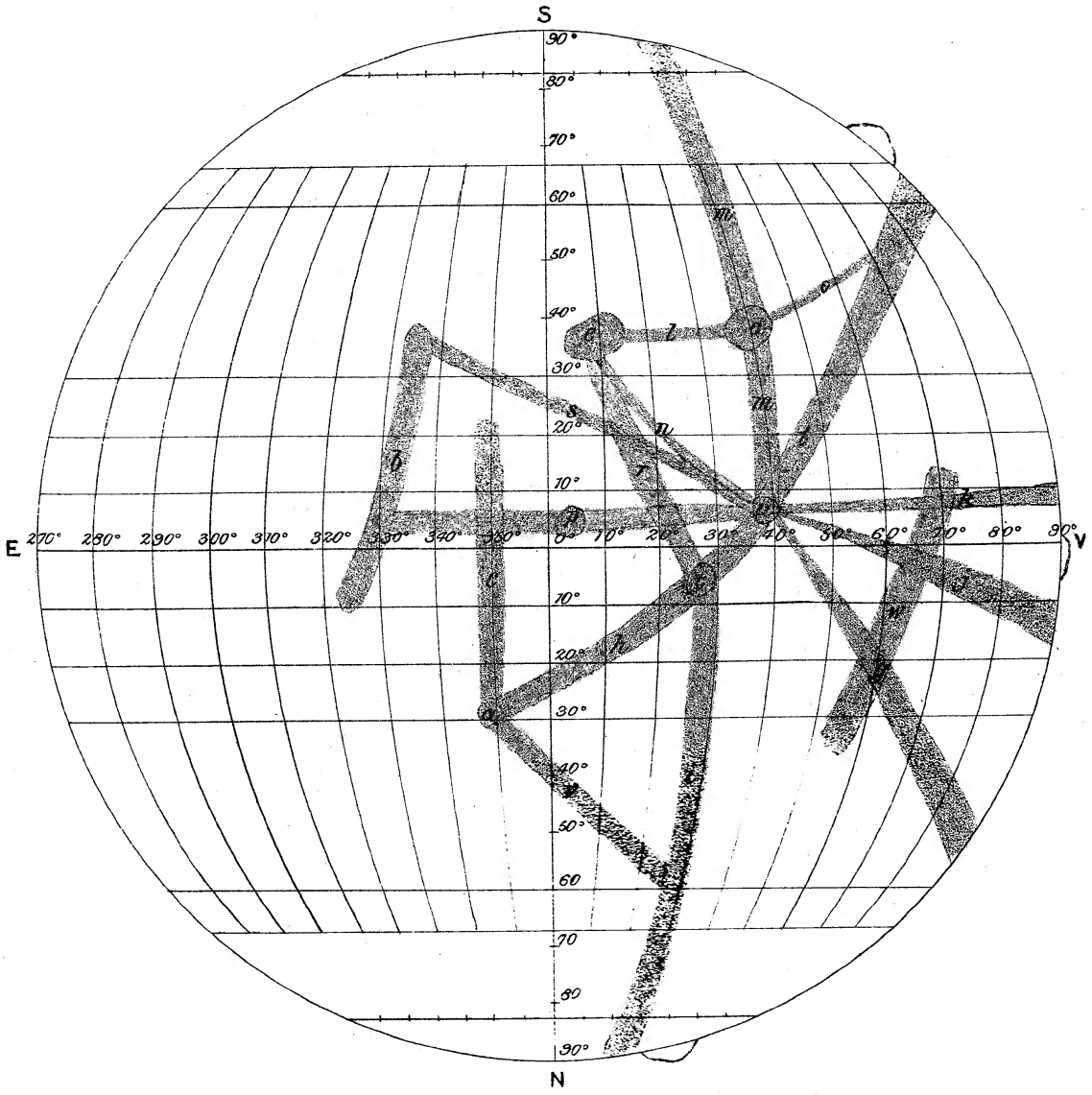
Oct. 15, $3^h 48^m$ to 54^m
$\lambda = 37°$



Oct. 15, $4^h 37^m$
$\lambda = 37°$

Percival Lowell, del.

CHART OF VENUS.



Percival Lowell, del.

long and narrow ; but, unlike the finer markings on *Mars*, they have the appearance of being natural, not artificial. They are not only permanent, but permanently visible whenever our own atmospheric conditions are not so poor as to obliterate all detail on the disc. They are thus evidently not cloud-hidden at any time. But the whole disc, dark and light portions alike, is brightened as by a luminous atmosphere. When compared with the appearance of the disc of *Mercury* or of our own Moon, the appearance of the disc of *Venus* is such as to make the presence of a very substantial atmosphere evident. Measures of the polar and equatorial diameters confirm this deduction by disclosing by comparison with *Mercury* a visible twilight arc.

There is no distinctive colour in any part of the planet other than its general brilliant straw-colour hue. The markings, which are of a straw-coloured grey, bear the look of being ground or rock, and it is presumable from this that we see simply barren rock or sand weathered by æons of exposure to the Sun. The markings are perfectly distinct and unmistakable, and conclusive as to the planet's period of rotation.

There is no certain evidence of any polar caps. Only once have I seen anything which might be so construed, and even that is perfectly explicable by a greater luminosity of the surface at those points. The planet's surface presents as dead an appearance as does that of our own Moon.

Lowell Observatory:
1896 *October* 21.

[In addition to those reproduced, Mr. Lowell sends several prints of drawings of *Venus*, which have been placed in the Library.—Eds. *M.N.*]

Index to Map of Venus.

a Eros
b Psyche regio
c Hermione regio
d Ashtoreth regio
e Ashera
f Anchises regio
g Hero regio
h Aphrodite regio
i Æneas regio
j Anteros regio
k Adonis regio
l Dione regio
m Paris regio
n Hymenæus regio
o Hephæstos regio
p Istar
q Somnus regio
r Cytherea regio
s Cyprus regio
t Pothos
u Bilit
v Astarte regio
w Libentina regio

Lowell Observatory:
1896 *October.*

Determination of the Diameter and the Compression of the Planet Mars from Observations with the Repsold Heliometer of the Royal Observatory, Göttingen. By Professor W. Schur.

(*Communicated by the Astronomer Royal.*)

The question of the compression of *Mars* is still open, as the former measures of the equatorial and the polar diameter may be influenced by errors of estimation to which the eye is liable in the measurement of discs in different directions with respect to the vertical line.

But since small reversion prisms are used on the eyepiece of the heliometer, with which the image of a celestial body, *e.g.* the line joining a double star or the diameter of a planetary disc, can be made to appear in any direction with respect to the vertical line, it is possible to get free from these subjective influences.

I have, therefore, awaited the opposition of *Mars* of this year, which is so favourable on account of the high declination of the planet, with great anxiety to observe the equatorial and the polar diameter with the said precautions.

All instrumental errors and the very small correction for defect of illumination according to the ephemeris of Mr. Marth are taken into account.

The diameter of the object-glass is 162 millimetres and the power used 174.

The following are results of four nights, where v and h denote the measurements with apparent vertical and horizontal movements of the images in the field of the eyepiece.

Date.	Mean Time Göttingen.	Areographic latitude.	Measured diameter.	Diameter in mean distance from the Sun.	Mean of v and h.
1896.	h m	°	"	"	"
Dec. 2	11 45	90	16·81v	6·19	6·15
			16·60h	6·11	
		0	17·06v	6·28	6·30
			17·16h	6·32	
		0	17·03h	6·27	6·23
			16·79v	6·18	
		90	16·66h	6·13	6·10
			16·49v	6·07	
11	10 19	90	16·52h	6·14	6·13
			16·45v	6·11	
		0	17·04h	6·33	6·30
			16·85v	6·26	
		0	16·92v	6·29	6·32
			17 09h	6·35	