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Astronomy. — *"Observation of the moon during the Eclipse of the sun on Aug.* 21 1914 *and of the Transit of Mercury on Nov.* 7 1914, *made in the Leiden Observatory.* By J. Woltjer Jr. (Communicated by Prof. E. F. van de Sande Bakhuyzen).

(Communicated in the meeting of April 23, 1915).

I. Solar-eclipse of August 21, 1914.

During the eclipse of Aug. 21 1914, sun and moon passed over the meridian. At the suggestion of Professor E. F. van de Sande Bakhuyzen I have observed the declination of the south-limb of the moon with the transit-circle. The results of this observation including details concerning the method of reduction will be given here.

In order to obtain as large a number of pointings as possible Professor Bakhuyzen kindly undertook the reading of the microscopes (including those for the observation of the nadir).

The observed declination depends on the observation of the nadir. As two of the pointings had naturally to be made far outside the meridian, it was necessary to give special attention to the inclination and curvature of the horizontal wires. In 1911 an investigation on these points had been made; for this purpose a collimator provided with a level had been mounted on the south-pier; by means of one of the foot-screws the middle of the two horizontal wires of the collimator was pointed on various points of the horizontal wires of the meridian-telescope; by reading the level each time the inclination of the optical axis of the collimator becomes known and thus that of the line from the middle of the objective to the special point of the horizontal wire on which has been pointed.

The pointings were made on five different points of each wire, viz. on the centre and on two points on either side, one about half-way between the middle and the extreme vertical wire, and another just beyond the latter. In this manner the following corrections were deduced, to be applied to the declinations deduced from pointings at these points:

Clamp West	wire a:	$-0''.12$	$+0''.15$	$0''.00$	$-0''.11$	$-0''.33$
	wire b:	$-0''.67$	$0''.00$	$0''.00$	$+0''.04$	$-0''.08$

The points are given in order, starting from the side of the clamp.

The first and third pointing on the south-limb of the moon were made on wire a, the second on wire b. The following corrections to be applied to the zenith-distance were computed: $+0.''17$. $-0''.02$ $+0''41$.

On the ground of a number of nadir-determinations $6''.43$ was found as representing half the distance of the two horizontal wires. The refraction was calculated from tables in manuscript which are used in the observatory; these are based on BESSEL's constant and RADAU's theory. From observations made at the observatory it appears that this refraction has to be diminished by 0.2 %, and this correction has therefore been applied.

For the mean latitude of Leiden I have taken as the most probable value $52°9'19''.80$. The correction for the motion of the pole was deduced from the paper by ALBRECHT (A. N. 4749) for a moment 1.2 of a year prior to the eclipse; in this manner account was taken of the 14-monthly motion, but an error is introduced in the annual term. This error, however, seemed unimportant and in this way I found $\Delta\varphi = +0''.09$ [1]) and therefore for the instantanious latitude $52°9'19''.89$; this value [2]) was used in the reductions.

In order to pass from the observed declination of the limb to that of the centre of the moon I have taken into account the irregularities of the limb, which were very distinctly visible as the dark disc of the moon was projected on the bright disc of the sun. Using the profile given by HAYN (A. N. 4724) I have made a drawing of the part of the limb which was visible in the telescope and by the aid of notes, taken down during the observation, about the manner in which the pointings had been made, the corrections were estimated which had to be applied to the declinations as reduced with a mean radius of the moon; these corrections came to $-0''.70$, $-1''.90$,

1) Dr. ZWIERS from a preliminary discussion of the latest results for the motion of the pole, in continuation of his paper in these Proceedings for 1911, finds $\Delta\varphi = +0''.14$ (however not including the z-term).

2) From the preliminary results of ALBRECHT (A. N. 4802) for the variation of latitude in the year 1914 I find $\Delta\varphi = +0''.20$ *(added June 1915).*

— 1″.90. For the mean radius the value $R = 932''.58$ was taken, which is the value adopted by Newcomb in his last great work on the motion of the moon, as it seemed to me that the radius to be used in occultations must be the same as the mean radius of the very sharp profile of the moon which projects itself on the bright disc of the sun.

In the computation of the parallax I have assumed $\frac{1}{298.2}$ for the ellipticity of the earth, both for the calculation of the reduction to geocentric latitude and of the radius-vector of the earth at the place of observation, and for deducing the constant of the sine-parallax. I therefore assumed for the constant 3422″.47 (Newcomb, Astr. Pap. IX 1 p. 44) and a correction of + 0″.40 was applied to the N. A. value. The observations were made in the position of the instrument: Clamp-West and Circle A. was read; for the reduction of the declination so found to the mean of the two circles and the four positions of the instrument (objective and ocular-end can be interchanged and the instrument can be reversed) according to the investigations made in the observatory a correction of + 0″.11 must be applied to the declination. Moreover for the reduction to Auwers's system a correction of — 0″.16 has to be applied, for that to Newcomb's system one of — 0″.04.

The observations and their reduction are given in the following table, the first column indicates whether or not a reversing prism was used; the second column contains the hour-angle, at which the observation was made; the third the mean of the four microscopes for the moon; the fourth the same for the nadir; the fifth the sum of the corrections for division-errors, run, reduction to the meridian, flexure of the instrument, irregularities of the limb, distance, inclination and curvature of the wires, the sixth the correction for refraction, the seventh the zenith-distance obtained in that manner and the eighth the geocentric declination of the centre of the moon.

	t	Limb	Nadir	Corr.	Refr.	Zenith-dist. limb	Declination centre
without pr.	—74 s	140° 17′ 57″28	0° 7′ 41″56	—8″02	47″15	39° 50′ 39″45	+13° 12′ 35″52
with pr.	+14	17′ 21″48	"	+4″42	47″16	51 2″82	12′ 12″45
without pr.	+91	17′ 14″50	"	—9″80	47″17	51 24″03	11′ 51″51

By reducing the first and the third declination to the moment of the second one we finally obtain: $\delta = + 13° 12' 12''39$
12.45
11.80

The last pointing was made very near the end of the field and has therefore a smaller weight than the others. Taking the mean of the three with weights 1, 1, ½ we find: $\delta = +13°12'12''30$; reducing to the mean of the two circles and the four positions of the instrument we get: $\delta = +13°12'12''41$; finally we find for the declination

reduced to AUWERS's system:	$\delta = +13°\ 12'\ 12''25$	Time of observ. $23^h45^m9^s4$ M.T. Greenw.
,, ,, NEWCOMB's ,, :	$\delta = +13°\ 12'\ 12''37$	

A comparison with the Nautical Almanac gives:

Observ.— Calcul.: AUWERS's system: — 3″.58
NEWCOMB's ,, : — 3″.46.

II. TRANSIT OF MERCURY ON NOVEMBER 7 1914.

Using the great refractor of the observatory (aperture 266 mm.) I tried to observe the moments of inner and outer contact. At the first two contacts the sky was clouded over, so that only the last two could be observed. The power used was 170. As the moment of inner contact I took the breaking of the thread of light.

The times observed are

last inner contact: $2^h\ 6^m\ 24^s.8$ M.T. Greenwich
,, outer ,, : 2 8 43 ,, ,,

A comparison with the Nautical Almanac gives as the difference calculation minus observation:

last inner contact $+16^s.7$
,, outer ,, $+11^s$.

Leiden, April 1915.

Anatomy. — "*On the structure of the muscular abdominal wall of Primates.*" By W. A. MIJSBERG (Communicated by Prof. Dr. L BOLK).

(Communicated in the meeting of April 23, 1915).

In the publications relating to the myology of Primates, the muscles of the abdomen are usually discussed very superficially, and where that discussion is a more elaborate one, that greater elaboration is as a rule restricted to an excessively accurate description of the origins of these muscles. Less attention however is paid to the way in which these muscles contribute to the formation of the sheath of the M. rectus; no publication is even known to me, in which