

1902	M.Z. Wien	Vergleichungen	Nova	Röthe	1902	M.Z. Wien	Vergleichungen	Nova	Röthe
März 10	7 <sup>h</sup> 8	d (2 <sup>1</sup> / <sub>2</sub> ) N (1) f	7 <sup>m</sup> 93	—	April 14	8 <sup>h</sup> 5	f (1) N (2 <sup>1</sup> / <sub>2</sub> ) h	8 <sup>m</sup> 36	—
11	7.2	d (3) N (1) f	7.95	—			N (3) g (2) h	8.25	—
14	8.0	d (3) N (1) f	7.95	—	16	8.2	f (1) N (3) h	8.32	—
26	8.5	f (1) N (3) h	8.3	—			f (1) N (2) g	8.30	—
30	8.0	von f (1) N (3) h bis N = f	8.2	—	19	8.3	f (1) N (2 <sup>3</sup> / <sub>4</sub> ) h	8.34	—
April 4	7.8	f (3) N (4) h	8.5	—			f (1) N (2 <sup>1</sup> / <sub>4</sub> ) g	8.28	—
9	8.5	f (1) N (1) h	8.55	—	22	8.3	f (1) N (2) h	8.4	—
11	8.1	f (1) N (1) h	8.55	—			f (1) N (1) g	8.4	—
12	8.2	f (1) N (3) g	8.25	—	24	8.8	f (1) N (2 <sup>1</sup> / <sub>2</sub> ) h	8.36	—
12	8.7	N (1) g (1) h	8.4	—			f (1) N (2) g	8.30	—
13	8.3	f (1) N (2 <sup>1</sup> / <sub>2</sub> ) h	8.36	—	30	8.6	f (1) N (1) h	8.55	—
		N (4) g (3) h	8.3	—			f (2) N (1) g	8.50	—
					Mai 7	9.0	N 1 g, N 5 h	8.6	—

Wien, 1902 Mai 10.

J. Holetschek.

### Auffindung von (433) Eros.

Information has been received from Professor H. A. Howe of the Chamberlin Observatory, Denver, that the planet (433) Eros was found on the morning of August 2, 1902, at 3<sup>h</sup>15<sup>m</sup> local time. An ephemeris had been computed by Miss Mary Cl. Traylor, and the planet was found about 15 or 20 seconds preceding its computed place. Haze and daylight prevented accurate observations.

Harvard College Observatory, 1902 Aug. 5.

Edward C. Pickering.

### On the accuracy of Markree double star observations.

By W. Doberck.

The following tables show the probable errors of the double star measures which I have published in A. N. 2196, 2199, 2242, 2989 and 3023. They are arranged according to definition (good, middling or bad), steadiness, magnifying

power and distance. The number of observations available was in some cases very limited, in consequence of which some of the figures are only approximately correct.

#### Accidental errors in angle.

Definition	0".7	1".5	4"	8"	30"	Steadiness	0".7	1".5	4"	8"	30"	Power	0".7	1".5	4"	8"	30"
g	1°.1	0°.5	0°.3	0°.2	0°.1	g	0°.9	0°.6	0°.4	0°.4	0°.2	600	1°.0	0°.5	0°.4	0°.3	0°.2
m	1.2	0.6	0.4	0.3	0.2	m	1.1	0.7	0.4	0.3	0.2	400	1.2	0.6	0.4	0.3	0.2
b	1.7	0.8	0.5	0.3	0.2	b	2.0	0.8	0.4	0.4	0.2	200	1.8	0.8	0.4	0.3	0.2

#### Constant errors in angle.

g	2°.5	1°.2	0°.8	0°.5	0°.2	g	1°.9	1°.3	0°.9	0°.4	0°.2	600	2°.1	1°.3	0°.8	0°.5	0°.0
m	2.8	1.4	0.9	0.5	0.1	m	3.1	1.5	0.9	0.5	0.1	400	3.5	1.5	0.9	0.6	0.2
b	4.4	1.7	0.9	0.8	0.3	b	4.7	1.9	0.9	0.9	0.1	200	5.0	1.3	1.0	0.6	0.3

#### Total errors in angle.

g	2°.7	1°.3	0°.9	0°.5	0°.3	g	2°.1	1°.4	1°.0	0°.6	0°.3	600	2°.3	1°.4	0°.9	0°.6	0°.2
m	3.0	1.5	1.0	0.6	0.2	m	3.3	1.6	1.0	0.6	0.2	400	3.7	1.6	1.0	0.7	0.3
b	4.7	1.9	1.0	0.9	0.3	b	5.1	2.0	1.0	0.9	0.2	200	5.3	1.6	1.0	0.7	0.3

#### Total errors in distance.

g	0".04	0".10	0".12	0".11	—	g	0".05	0".09	0".12	0".12	—	600	0".08	0".09	0".13	0".16	0".19
m	0.08	0.12	0.14	0.17	0".18	m	0.08	0.12	0.13	0.15	0".17	400	0.10	0.13	0.14	0.14	0.17
b	0.15	0.17	0.15	0.16	0.28	b	0.21	0.13	0.21	0.20	0.30	200	—	0.15	0.15	0.16	0.17

The accidental ( $a$ ), total ( $t$ ) and constant ( $c$ ) probable error of a single night's measures as depending upon the distance ( $\rho$ ) are shown in the following table, which applies to average definition and steadiness with a magnifying power of 400:

$\rho$	Angle						Distance
	$a$	$t$	$c$	$a$	$t$	$c$	
	(in degrees)			(in arc)			
0".7	1.3	3.6	3.3	0".016	0".044	0".041	0".09
1.5	0.6	1.6	1.4	0.017	0.042	0.038	0.12
4.0	0.4	1.0	0.9	0.028	0.068	0.062	0.14
8.0	0.3	0.7	0.6	0.046	0.095	0.082	0.15
30.0	0.2	0.2	0.2	0.089	0.129	0.089	0.17

The accidental errors in angle, which are of no consequence if the distance is below 7", depend upon the de-

inition but not upon steadiness or power if the distance exceeds 2". The same may be said about the constant errors to some extent. The measured distances depend upon the steadiness (which is largely dependent upon the more or less smooth running of the clock), and upon definition, but above 2" they do not depend upon the magnifying power. Therefore while it is an advantage to observe pairs closer than 2" under as high a power as possible, it is better to measure wider pairs with a power which is not high enough to injure the definition. A power of 400 can often be used on a pair whose distance is about 3", while a power of 200 appears to be sufficient when the distance exceeds 8". In case of triple stars the use of a high power is an advantage. In taking the mean of several observations weights should be attributed according to the mean of the probable errors corresponding to definition, steadiness and power. Mr. F. G. Figg has kindly assisted me in these calculations.

Hongkong Observatory, 7<sup>th</sup> April 1902.

W. Doberck.

### New Algol-type Variable 13.1902 Lyrae.

$$\alpha = 19^h 10^m 48^s.7, \delta = +32^\circ 10' 1'' (1855).$$

The position of this star from measures of a photograph taken with a 4.4 inch portrait lens is given above. It is easily found, as it is the most following, and normally the brightest, of three stars forming a small triangle south of the 9.1 mag. star BD. +32°3377. The magnitude of the southernmost star ( $d$ ) of the above mentioned triangle<sup>1)</sup> according to my observations is 11.78; and that of a star ( $b$ ) nearly midway between BD. +32°3376 (9.2)<sup>2)</sup> and BD.

+32°3377 (9.1), but a little following a straight line joining the two, is 10.62. Normally the magnitude of the variable, on the scale indicated by the above comparison stars, is 10.98. At minimum the star is only just visible with a 6.5 inch reflector, or about 12.8 magnitude.

The following minima have been more or less fully observed.

Nr.	$E$	Date	Gr. M. T.	J. D.	C—O
1	0	1901 Oct. 7	9 <sup>h</sup> 21 <sup>m</sup>	2415665.3895	— 4 <sup>m</sup> .5
2	67	1902 June 5	11 42	5906.4874	+34.8
3	77	» July 11	12 12	5942.5083	— 11.4
4	79	» » 18	16 57	5949.7061	— 11.4
5	82	» » 29	12 0	5960.5000	— 7.5

Notes. No. 1. The variable is about equal to the star  $d$  on a photograph taken on this date. The time of minimum is based on the assumption that the photographic light curve and the magnitudes of the variable and the star  $d$  are the same as the visual ones, and that the photograph was taken during the increasing phase. If taken during the decreasing phase the time would have been 15<sup>h</sup> 1<sup>m</sup>. — No. 2. Two observations only at an interval of 16<sup>m</sup> between clouds. These observations make the star decreasing in brightness, but actually it must have been increasing in

brightness then, and the time of minimum given above is based on this assumption. If the star had been decreasing in brightness, the time of minimum would have been 14<sup>h</sup> 22<sup>m</sup>.

— No. 3. The observations after minimum were hindered by fog. — No. 4. Only the first portion of the decreasing phase could be observed, and the observations were hindered by moon and increasing daylight. — No. 5. The observations after minimum were hindered by cloud.

The elements of variation derived from the foregoing data are as under.

$$\begin{aligned} \text{Min.} &= 1902 \text{ July } 29, 11^h 52^m 7^s \text{ Gr. M. T. } + 3^d 14^h 22^m 23^s.5 E \\ &= \text{J. D. } 2415960.4948 + 3^d 598883 E \end{aligned}$$

The residuals C—O according to these elements are given in the last column of the foregoing table.<sup>3)</sup> The star remains at normal brightness for about 3<sup>d</sup> 6<sup>h</sup> 22<sup>m</sup>, the increase and decrease each requiring about four hours. There

<sup>1)</sup> The star at the preceding angle of the little triangle has two faint companions.

<sup>2)</sup> The observations made here make this star 0.69 mag. brighter than BD. +32°3377.

<sup>3)</sup> The light equation has not been taken into account.