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II.

Observations and measures of double stars.

By E. D. Roe, Jr.

The following observations and measures of double stars have been made at odd times with a $6\frac{1}{2}$ -inch Clark refractor in my observatory. I owe more than I can express to the help, encouragement, and inspiration given me by Professor Burnham in this work. I have also to thank my colleague Professor H. A. Peck, Director of the Holden Observatory of Syracuse University, for his cordial stimulus and for his courtesy in loaning me the Clark micrometer, with which these measures were made.

The observatory was erected in the spring of 1906, in July the $6\frac{1}{2}$ -in. was set up and from that time to the later part of 1907, some 250 double stars (generally under 10" distance) were found independently and later on identified by the help of Professor Burnham, or in the later observations from his General Catalogue. Some of the pairs found are not yet identified. A few of the estimates of the more difficult pairs found independently will be published elsewhere.

The value of one turn of the screw of the university micrometer, for the $6\frac{1}{2}$ -in., was found to be 25".30 by 15 observations of transits of Sirius across the parallel wires, placed at 10, 20, and 25 turns apart. I hoped to have an illuminating apparatus prepared in one of the university laboratories, but after much delay, I prepared one myself and on the 30th of October it was ready for work. My measures have been made with it.

The pairs are designated by their numbers in Professor Burnham's General Catalogue, together with their ordinary designation. It is proper to note that most of the observations were made in searching for new pairs rather than in the execution of a predetermined and systematic observing list. A letter i opposite a pair signifies that it was found independently, a letter e opposite position angle or distance that it was estimated with the eye. Sometimes both, estimates and measures, are given.

Measures made with the $6\frac{1}{2}$ -in. Clark Refractor.

No. Gen. C.	Name	Date	P.-A.	Dist.	Nr. obs.
2	H 1000 i	1907.94	210° e	5".62	1
105	Σ 19 i	1907.97	—	2.25	1
117	Σ 21 rej. i	1907.94	231° 17	7.5	1
426	η Cassiopeiae	1907.97	239.75	5.49	4
519	Σ 80 i	1907.94	320° e	—	—
			321	20.75	1

No. Gen. C.	Name	Date	P.-A.	Dist.	Nr. obs.
707	Σ 113 i	1907.94	355° e	1" e	—
			357° 5	1".25	1
713	Polaris	1907.88	217° 50'	18.63	—
		1908.02	213 10	17.63	—
		1907.95	215° 5	18.13	2
813	Σ 136 i	1907.94	79° 17	15.25	1
2591	Σ 653 A & C i	1908.28	224.84	14.42	1
2605	Rigel A & BC	1908.06	200.84	9.75	1
2610	Σ 666 i	1908.28	73.50	2.915	1
2705	Σ 701 i	1908.12	140° e	5" e	—
			141° 5	5".5	1
2706	Wn 2 A & BC i	1908.06	170° e	3" e	—
			—	2".1	1
2712	η Orionis	1908.88	—	1.19	1
2766	Da 6 i	1908.12	80° e	0.4 e	1)
2821	λ Orionis	1908.27	44° 34	4.56	1
3467	β 194 i	1908.01	270° e	0".8 or 0".9 e	—
			277° 0	0".94	1
3517	AG 117 i	1908.01	120° e	8" e	—
			117° 34	8".56	1
4122	Castor	1907.92	222° 10'	5.75	—
		1908.06	220 10	5.69	—
		1908.07	222 0	5.75	—
		1908.12	222 20	5.31	—
		1908.25	222 30	5.31	2)
		1908.26	222 10	5.43	—
4130	OΣ 175	1908.11	221° 89	5.54	6
5103	ω Leonis	1908.25	331.34	0.84	1
		1908.14	118°	0.875	—
		1908.19	120 20'	0.92	—
		1908.22	121 20	1.00	—
		1908.22	120 10	0.937	—
5388	γ Leonis	1908.19	119° 96	0.93	4
		1907.46	116° 50'	3.63	2)
		1908.19	117 40	3.62	—
		1907.82	117° 25	3.62	2
5484	Σ 1450 i	1908.27	150° e	2.5 e	—
			155° 34	2.37	1
5659	Σ 1504 i	1908.27	280° e	1.0 e	—

1) Conditions poor, discs run together, giving the appearance of a 0".4 pair.

2) Measured in Sun light.

No. Gen. C.	Name	Date	P.-A.	Dist.	Nr. obs.
5734	ξ Ursae maj.	1908.18	130°2	2"298	5
5735	ν Ursae maj. i	1908.25	145.84	7.13	1
5765	ι Leonis	1908.11	51.4	2.49	4
6243	γ Virginis	1907.45	330.7	6.31 ¹⁾	1
6312	$O\Sigma$ 256 i	1908.27	—	0.7 e	—
		"	78.67	0.75	1
6955	ζ Bootis	1908.27	144.5	0.75	1
6993	ε Bootis	1907.45	334°	3.06	1 ²⁾
7717	ζ Herculis	1907.89	172°1	1.43	3
8003	ρ Herculis	1907.85	309.17	3.99	2
8684	Σ 2351 i	1907.88	341.17	5.06	1
8692	α Lyrae A & B	1907.81	165° 30'	52.81	—
		1907.82	163	53.12	—
		1907.84	165 30	52.44	—
		1907.82	164°67	52.79	3

¹⁾ Measured without light.²⁾ Measured in Sun light.

Syracuse University, Syracuse, N. Y., 1908 April 15.

No. Gen. C.	Name	Date	P.-A.	Dist.	Nr. obs.
8783	ε^1 Lyrae	1907.86	9°96	3"19	2, 4
8785	ε^2 Lyrae	1907.86	126.66	2.38	1, 4
9012	Σ 2448 i	1907.86	190°	2.69	1
9305	Σ 2522 i	1907.86	340°42	4.69	1
10509	γ Delphini	1907.94	270° e	10" e	—
		"	270°34	10"12	1
10699	H IV 113 i } A & B }	1907.88	300° e	—	—
		"	300°34	17.37	1
10732	61 Cygni	1907.85	127.84	23.31	1
10883	Σ 2785 i	1907.88	240.84	2.56	1
11743	ζ Aquarii	1907.86	316.16	3.19	1
12552	Σ 3039 i	1907.97	32.67	32.37	1
12625	Σ 3045 i	1907.93	270° e	1.5 e	—
12666	σ Cassiopeiae	1907.98	326°84	3.31	2

E. D. Roe, Jr.

Sur quelques étoiles variables nouvelles.

Par M. M. Luizet, astronome-adjoint à l'observatoire de Lyon.

Ces étoiles ont été observées à l'équatorial coudé (0.32 m) par la méthode d'Argelander.

136.1907 Andromedae.

Entre le 16 décembre 1907 et le 12 février 1908, je n'ai pas eu l'occasion de voir cette étoile du type Algol avec un éclat inférieur à son éclat maximum constant. Je lui ai constamment trouvé un éclat inférieur de 0^m_2 à l'étoile BD +42°24 et inférieur de 0^m_3 à 0^m_4 à l'étoile BD +42°20. Voici d'ailleurs les dates de mes observations qui pourront peut-être être utilisées dans une discussion relative à la durée de période de cette étoile:

1907 déc. 16.4, 17.4, 19.4, 20.4, 23.25 à 23.4.

1908 janv. 4.4, 8.4, 11.3 à 11.4, 13.4, 14.25 à 14.4, 15.3, 16.4, 17.3, 18.3, févr. 10.4, 11.4, 12.4.

142.1907 Cassiopeiae.

J'ai fait entre le 16 décembre 1907 et le 17 mars 1908, 23 comparaisons de cette étoile aux étoiles suivantes:

	Z
$a =$ BD +53° 7	22.40
$f =$ " +54 10	20.4
$b =$ " +54 11	17.3
$c =$ " +54 13	12.9
$d =$ " +53 10	6.0
$e =$ " +53 15	0.0

Ces observations sont les suivantes:

	T. m. Paris	Z	Δt
1907 Déc. 16	9 ^h 21 ^m	13.9	16.07
" 17	9 23	10.2	17.07
" 19	9 11	14.1	19.06

	T. m. Paris	Z	Δt
1907 Déc. 20	9 ^h 20 ^m	15.3	20.07
" 23	6 25	18.8	22.95
" 23	9 0	18.3	23.06
1908 Janv. 4	9 59	12.2	35.10
" 11	6 16	16.1	5.38
" 11	8 58	17.3	5.49
" 13	9 47	17.1	7.53
" 14	6 18	14.8	8.38
" 14	8 52	14.9	8.49
" 15	6 5	16.8	9.37
" 15	9 3	15.9	9.50
" 16	9 29	15.9	10.51
" 17	6 9	16.2	11.38
" 18	6 33	17.3	12.39
Févr. 10	9 27	8.8	35.51
" 11	9 14	4.5	36.50
" 12	9 0	7.5	0.93
Mars 12	9 26	15.8	29.95
" 14	8 20	13.9	31.91
" 17	8 37	11.2 :	34.92

Les intervalles de temps Δt sont rapportés aux minima calculés avec les éléments de M. Enebo (A. N. 4241).

Mes observations indiquent un minimum d'éclat ($Z = 4.5$) à la date février 11.4, qui concorde parfaitement avec les éléments de M. Enebo. Mais, tandis que M. Enebo admet que l'étoile 142.1907 Cassiopeiae est du type Algol, il semble au contraire, d'après mes observations, qu'elle appartienne au type β Lyrae, ainsi que le montre la courbe ci-jointe obtenue avec les observations ci-dessus. Cette courbe indique en effet un minimum secondaire, basé sur les trois observations des 16, 17 et 19 décembre, au milieu