

POSITIONS OF NEBULÆ. Series I.

By C. H. F. PETERS.

The positions here presented are derived graphically from my manuscript charts, which have about the scale of Chacornac's. The accuracy thus attained, relatively to direct measurements, increases with the difficulty of the objects. The fainter nebulae, those of Herschel's Cl. III., can be drawn by allineation between the small neighbouring stars with greater accuracy, than the determination of their places by instrumental measurements seems to permit, except when many times repeated. Since the co-ordinates, by using a subdivided scale, can be read off with ease to one or two-tenths of a minute, I estimate for *faint* nebulae the probable error to be not much greater than $\pm \frac{1}{3}'$, so that the place lies certainly within the little area subtended by them. For nebulae of greater brightness and covering a larger area, the graphical method on the contrary loses in comparative advantage, and for those that have a nucleus or condensed centre of light, the micrometrical measurement of course is always superior.

But the manner in which they are obtained, gives positions of this kind a special value, in that they are naturally free from all such accidental mistakes, as are found in the catalogues and originate either in observation or in reduction. Considering especially the imperfect mounting of the Herschelian reflectors for accurate measures, there always remains a certain uncertainty in regard to the position, or to the existence on the indicated place of nebulae observed only once, so that any check of them is welcome. About half the number in the following list are of this sort.

I have called a nebula *nova*, when not found in Sir John Herschel's "General Catalogue," nor in Mr. Dreyer's Supplement. The epoch is the same as of that catalogue (1860.0), and where the notes have no remark, the difference in position is but slight. It will be remembered that, according to D'Arrest's investigation, the probable error of an observation by Sir John is 15'' in \mathcal{R} (for the northern catalogue; for the Cape-catalogue a little smaller, only 12''.7), and 19'' in declination. The places of Sir W. Herschel for the years before 1785, in which by far the greater portion of his observations were made, have an error of $\pm 2'.5$ in \mathcal{R} , and of $\pm 1'.5$ in declination.

No. of Gen. Cat.	1860.0.		Notes.
	\mathcal{R} .	Decl.	
391 211	1 ^h 0 ^m 11 ^s	+ 0° 10'.6	\mathcal{R} in G. C. 7' too small (Marth 35).
396 5150	1 0 56	+ 3 46.6	
425 238	1 5 46	+ 0 14.0	Marth 37.
435 5159	1 7 40	+ 1 10.8	
455 5161	1 8 43	+ 4 26.3	Marth 39.
465 5162	1 11 1	+ 3 28.6	\mathcal{R} in G. C. 6' too small (Marth 40).
467 263	1 11 54	+ 2 35.0	

No. of Gen. Cat.		1800-0.		Decl.		Notes.
		R.				
469	5164	1 ^h 12 ^m 8 ^s		+ 14°	9.8	Decl. in G. C. about 2' too small (Marth 41).
470	264	1 12 32		+ 2	39.8	The place in the G. C. had already been corrected by Dreyer from Schultz and D'Arrest.
471	5165	1 12 36		+ 14	4.1	Marth 42.
475	5166	1 12 53		+ 14	8.4	R in G. C. about 15' too small (Marth 43). <i>WASP. N475 = IC 97. Marth. RA corrected</i>
476	269	1 12 55		+ 2	40.1	This agrees with Dreyer's correction.
479	5168	1 14 6		+ 3	7.4	R in G. C. 7' too small (Marth 45).
481	276	1 14 32		+ 4	31.5	
483	281	1 14 56		+ 0	13.5	
500	290	1 15 24		+ 4	39.5	
511	5174	1 16 10		+ 10	33.7	Stephan VIII.
514	298	1 16 42		+ 12	11.0	
520	303	1 17 22		+ 3	4.7	
521	304	1 17 22		+ 0	58.2	
523	315	1 18 18		+ 1	2.2	
533	326	1 19 32		+ 1	17.0	
550	366	1 28 52		- 0	3.2	
622	372	1 29 14		+ 15	3.0	Messier 74.
628	375	1 29 56		+ 5	8.0	
632	375	1 29 56		+ 5	8.0	
645	5192	1 32 52		+ 5	0.8	Marth 51.
644	393	1 36 29		+ 3	31.0	
3121	2010	9 59 16		+ 15	2.8	
3130	2015	10 0 43		+ 10	40.7	
3153	2026	10 5 22		+ 13	22.2	R in G. Cat. differs about 15', as h. 677; but H. III. 53 agrees better.
3230	2091	10 16 16		+ 13	16.4	
3274	2147	10 28 58		+ 13	26.6	
3300	2148	10 29 11		+ 14	53.6	
3326	Nova	10 32 33		+ 10	2.0	A very faint nebula, and distinct from the following. Both were seen 1880, Mar. 27 and 28.
3332	2170	10 33 11		+ 9	54.6	Schönfeld and Vogel, see Dreyer's Suppl., p. 392.
3338	2175	10 34 43		+ 14	27.7	
3342	2177	10 35 21		+ 10	11.0	
3345	2179	10 36 9		+ 12	43.5	Repeatedly examined; I see two very faint stars, perhaps surrounded by nebula, (? an ellipse with stellar foci). Comp. what Dreyer says in Suppl., p. 392.
3351	2184	10 36 31		+ 12	26.2	Messier 95.
3367	2193	10 39 9		+ 14	29.1	
3368	2194	10 39 23		+ 12	33.6	Messier 96.
3371	2196	10 39 36		+ 14	31.7	= h 751. Dreyer says: "h 751 and 753 not seen in Birr, Copenhagen, Upsala, and Leipzig (Vogel)." 2196 was distinctly seen by me 1880, Mar. 2; but 2198, the third of the "triple nebula," could not be found.
3377	2201	10 40 17		+ 14	43.6	
3379	2203	10 40 25		+ 13	18.5	Méchain.
3384	2207	10 40 34		+ 13	21.8	
3387	2211	10 41 6		+ 13	15.6	
3412	2220	10 43 31		+ 14	8.5	
3433	2240	10 44 42		+ 10	53.6	
3446	2261	10 48 59		+ 10	30.1	
3467	2262	10 49 34		+ 10	30.2	
3476	2276	10 52 54		+ 14	39.0	
3496	2277	10 53 17		+ 12	55.4	
3506	2289	10 55 52		+ 11	49.0	
3524	2303	10 59 12		+ 12	7.9	
3662	2403	11 16 37		- 0	21.3	
3679	2417	11 18 55		- 5	5.0	

No. of Gen. Cat.		1860 0.		Notes.
		R.	Decl.	
3705	2434	11 ^b 22 ^m 54'	+ 10 ^o 1' 6"	R in G. C. from 15' to 20' too small, and also the declination differs rather much. The nebula is vL, and not eS, as H. III. 113 has it.
3714	2580	11 43 21	+ 7 20.4	
3915	2577	11 43 23	- 4 22.2	
3952	2607	11 46 32	- 3 13.3	The NPD in G. C. would be improved by rejecting the first observation of h. 1055, which was only "a rough estimate."
3976	2626	11 48 45	+ 7 31.6	
4006	2647	11 50 55	- 1 20.3	
4043	2673	11 55 12	+ 5 6.6	R and NPD in G. C. not good.
4079	2703	11 57 37	- 1 36.8	
4116	2728	12 0 28	+ 3 27.8	
4123	2733	12 1 2	+ 3 39.7	D'Arrest's Decl. is over 1' larger, but he calls the nebula "visu difficilis."
4140	5623	12 2 30	+ 2 32.7	
4179	2776	12 5 43	+ 2 4.2	
4180	2777	12 5 56	+ 7 48.8	Very small. Seen with a higher power the nebula perhaps may turn out to be only a group of a few very faint stars. R in G. C. 5' smaller, (- star's place for h. 1130?).
4182	Nova	12 6 11	+ 4 49.0	
4191	2785	12 6 45	+ 7 58.5	
4205	2805	12 8 44	+ 7 10.4	Marth 234. Marth 235. S, pm bM.
4224	2813	12 9 26	+ 8 13.6	
4233	2823	12 9 57	+ 8 24.1	
4235	2821	12 9 58	+ 7 57.8	R in G. C. 5', and Decl. 2' 7" smaller. The only observation, h. 1178, has NPD for 1830, thus: 83° 43' ±, and the apparent accuracy to tenths of seconds of arc in G. C. is but the result of reduction.
4254	2822	12 9 59	+ 4 27.4	
4241	2829	12 10 16	+ 7 27.3	
4249	5629	12 10 48	+ 6 22.7	Schönfeld and D'Arrest. Schönfeld and D'Arrest.
4252	5630	12 11 03	+ 6 21.5	
4255	Nova	12 11 46	+ 5 33.5	
4257	2840	12 11 57	+ 6 30.0	Schultz; see Dreyer's Suppl., p. 393. A very faint nebula indeed. pF, pL.
4260	2843	12 12 13	+ 6 52.5	
4261	2842	12 12 15	+ 6 36.4	
4259	2844	12 12 18	+ 6 9.7	Decl. in G. C. 2' too great (Marth 237). Marth 238.
4264	2817	12 12 28	+ 6 37.7	
4268	5632	12 12 39	+ 6 3.9	
4270	5070	12 12 42	+ 6 14.8	Messier 61. pL, not vF.
4269	2849	12 12 43	+ 6 47.4	
4273	2852	12 12 47	+ 6 7.2	
4277	2865	12 12 56	+ 6 7.4	Decl. in G. C. 2' too great (Marth 237). Marth 238.
4276	Nova	12 12 59	+ 8 27.4	
4281	2857	12 13 13	+ 6 9.7	
4282	5633	12 13 13	+ 6 20.7	Messier 61. pL, not vF.
4281	5634	12 13 40	+ 6 24.4	
4292	2870	12 14 7	+ 5 22.3	
4296-4297	2872-3	12 14 20	+ 7 25.6	Messier 61. pL, not vF.
4300	2876	12 14 30	+ 6 9.1	
4303	2878	12 14 45	+ 5 15.2	
4307	Nova	12 14 56	+ 9 49.5	Decl. in G. C. 2' too great (Marth 237). Marth 238.
4324	2892	12 15 58	+ 6 2.4	
4326	2893	12 16 5	+ 6 51.1	
4333	2899	12 16 15	+ 6 49.6	Messier 61. pL, not vF.
4359	2904	12 16 28	+ 6 51.2	
4341-4342	2905-6	12 16 29	+ 7 44.5	

No. of Gen. Cat.	1860-0.		Decl.	Notes.
	\mathcal{R} .			
4347	Nova	12 ^h 16 ^m 42 ^s	— 2° 27' 7"	This hardly can be G. C. 2911 (h. 1226 = II. 625): 12 ^h 16 ^m 43 ^s ; — 2° 40' 3" from 2 obs. of h., with which H. also agrees nearly; but upon my chart I find no nebula drawn in this place.
4355	Nova	12 16 58	+ 8 35.2	
4365	2921	12 17 20	+ 8 5.0	
4370	2926	12 17 47	+ 8 14.3	
4372	2915	12 18 11	+ 5 41.6	The \mathcal{R} in G. C. ought to be corrected by + 1 ^m , as indicated also by the note to h. 1228 (in Ph. Tr. 1833), which, however, should read: "nisi \mathcal{R} = 12 ^h 16 ^m 37 ^s 5," instead of 25.4, probably by mistake repeated from the preceding note.
4385	5645	12 18 34	+ 1 20.9	Marth 239.
4407	2970	12 19 13	+ 3 16.6	
4411	Nova	12 19 23	+ 9 38.6	F, pL.
4410	2969	12 19 24	+ 9 47.7	The \mathcal{R} in G. C. is 10 ^s smaller, but the neb. is very large.
4412	2971	12 19 26	+ 4 43.6	
4415	2973	12 19 35	+ 9 12.8	
4416	2975	12 19 38	+ 8 42.4	
4418	2976	12 19 44	— 0 6.4	
4420	2978	12 19 48	+ 3 16.1	
4422	2980	12 20 0	— 5 2.8	
4430	2986	12 20 18	+ 7 2.3	
4434	2989	12 20 30	+ 8 55.7	
5605	3873	14 17 33	— 12 32.3	* 9 ^m att. f.
6797	Nova	19 20 25	— 25 56.6	Very small, but not very faint; nearly south of a star 11 ^m .
7134	Nova	21 41 20	— 13 37.7	In the position of G. C. 6010 (Marth 454): 21 ^h 40 ^m 1 ^s , — 13° 53', I have no nebula drawn upon my chart.
7165	4723	21 51 46	— 17 10.7	
7171	4728	21 53 28	— 13 56.9	
7185	4738	21 54 38	— 19 35.5	
7593	4851	22 44 22	— 6 17.7	
7605	6094	22 46 42	— 7 19.0	Marth 503.
7616	6099	22 48 23	— 6 15.0	Marth 507.
7453	Nova	22 54 9	— 7 6.5	vS, * 11 ^m n, close to it.

RECENT MEASURES OF DOUBLE STARS.

By C. E. BURTON.

The measures here given were obtained with a filar micrometer attached to a 12ⁱⁿ-reflector, equatorially mounted and provided with a Right Ascension movement of sufficient smoothness and steadiness to permit of sharp photographs of the Moon being taken with exposures amounting to 30 seconds.

(1) Sirius A & B 1874, Oct. 26, 6^h 30^m to 7^h local sid. time at Rodriguez.
P = 57° 5' mean of 4 measures, Epoch 1874.83.

Though the preceding result depends on a single set of measures (1 night) the circumstances were exceptionally favourable, the stars being nearly in the zenith, and the companion so brilliant that the measures were made and the micrometer