ASTRONOMISCHE NACHRICHTEN.

№ 2683.

Catalogue No. 1 of Nebulae discovered at the Warner Observatory.

On July 9th 1883, soon after the mounting of the 16 inch. refractor of this observatory, I, without an assistant, began a systematic search for new nebulae, devoting however, as heretofore, about one half of my time to comet-seeking with my $4^1/_2$ inch. telescope.

The places given are for 1885.0 and though only approximate, the nebulae will, I think, be found very near the positions assigned.

Only a few are as bright as H. Class II. Many are as much fainter than the faintest of his Class III as it is possible to conceive, the clearest nights and the largest telescopes being required to deal intelligently with them, or, in fact, to see them at all.

Catalogue No. 2, containing another hundred will be ready for publication a few weeks hence. About a dozen — embraced in both catalogues — were discovered by my son, a lad of thirteen years. They are marked »Edward«.

The eye-piece used is a periscopic positive, made especially for the work by Gundlach of this city. It gives a power of 132, and the astonishingly large field of 33′.

No.	Date of discov.	α 1885.0	δ 1885.0	Descriptions and remarks
1	1884 Aug. 3	$0^h\ 4^m32^s$	+28° 21′ 5″	v v F; v S; E; B * nr.
2	1884 Oct. 9	2 2 35	+ 7 25 0	v F; p S; v v E; spindle; cannot be G. C. 493, is not »am st«, nearest * is 5′ distant. Did not see 493, but saw 5223.
3	1884 Nov. 9	2 27 22	+ 9 13 46	v F; c E. H. description must apply to some other nebula.
4	» » 9	2 45 2	— 2 13 6	F; v E.
5	1884 Oct. 18	3 1 31	+40 27 0	S; R; v v F. Right angled with 2 st. In field with Algol.
6	» » 14	3 1 32	+38 11 20	v v F; l E; v diff.; F * close n.
7	1883 Nov. 24	6 26 36	+10 23 15	Nebulous *; v diff.; B * exactly in center of L e F nebulosity; f. 1425 28^s and is 10′ n. Resembles 4634 in Cepheus, but is fainter.
8	1885 May 11	9 23 20	+68 7 45	p F; p S; R; l b M.
9	1883 Aug. 24	10 49 5	+18 13 30	p B; R; no * nr.
10	» » 24	11 4 25	+22 21 30	e e F; v S; R; diff; s. of 2.
11	» » 24	11 4 35	+22 22 0	v F; R; n. of 2.
12	1883 April 26	11 8 4	+21 1 0	c S; v F; f. δ Leonis 4^s. Easily overlooked.
13	1885 April 13	11 38 40	+20 8 42	v F; v S; R; B * 12^s f; np. of 2.
14	» » 13	11 38 45	+20 3 42	e e F; R; p S; B * nf; sf. of 2.
15	» » 13	11 39 10	+20 0 27	v F; S; l E; 8 mag. * in field.
16	» » 13	11 39 10	+20 12 37	v F; p S; R.
17	» » 10	11 43 45	+12 42 43	F; v S; R; m b M.
18	» » 16	11 50 15	+56 1 40	e F; p L; p E; v diff.; D neb. nr.
19	» » 6	11 54 40	+20 2 35	p F; p L; R; n. of 2 st. which form with it a right angle triangle.
20	1884 June 18	11 59 1	+65 5 40	S; F; v E; D * nr; p. nearest B * east 20^s.
21	1885 April 6	12 5 0	+19 39 35	v v F; v S.
22	1884 Mar. 16	12 28 32	+51 26 54	e e F; S; R; nearly bet. 2 st.
23	1885 June 14	13 13 45	+40 12 20	p F; R; p L; DM. +40°2644-5 point to it.
24	1885 April 6	13 34 30	—23 18 9	e F; p L; p. by 6^s the middle * in a line n. and s.
25	» » 10	13 43 10	—29 58 56	v v F; p S; l E; v F * f; p diff.
26	1884 June 16	13 53 3	+46 53 9	F; v S; to nu. * v close.
27	» » 16	13 57 0	+49 0 28	v v F; S; l E; B * 4′ n; 2 coarse D * in field.
28	1883 July 9	13 57 38	+46 52 26	v F; p L; c E; bet. 2 st. forming with 2 others a trap., the nf. being a fine D * of 2″.5. First neb. discovered at this Observatory. I have not been able to see this object well since its discovery, at which time I called it p B with p sharp outlines, but since the appearance of the red sunsets it has been ill defined and difficult to see except as a hazy spot. This remark applies to all v F nebulae.*) The D * is new.

*) Eine ähnliche Bemerkung macht Prof. Gyldén im Jahresbericht für 1883 (vergl. V. J. S. der A. G. 19. Jahrg. S. 156). *Kr.*

No.	Date of discov.	α 1885.0	δ 1885.0	Descriptions and remarks
29	1885 May 9	14h 6m 5s	+60° 59′ 15″	e e e F; p S; R; e e diff.; bet. 2 st. one a wide double. Edward.
30	» » 11	14 6 12	+60 56 45	e e e F; v S; R; e e dif.; forms with 2 st. a right angle triangle.
31	» » 11	14 13 50	+59 16 50	v v F; p S; R; F * nr. west.
32	1884 June 14	14 14 0	+ 7 34 4	S; v v F; l E; 2 F st. point to it; 2 others nr.; v diff.; np. of 2.
33	» » 14	14 14 31	+ 7 33 4	S; v v F; sf. of 2; v diff.; a * midway bet. them.
34	» » 14	14 14 31	+ 7 32 34	S; v v F; R; v diff.
35	1884 May 22	14 15 30	+ 6 44 5	v S; l E; v F; m b M. to nu.
36	1885 June 22	14 33 35	+52 3 54	B; p S; R; p. DM. +52°1816 31s. Found in presence of a half moon. First found 7 years ago with 4½ inch. Comet seeker and recorded as »can find no record of it«.
37	1885 May 14	14 45 50	+47 51 40	v v F; p S; R; * nr.; saw another nr. as I supposed, but could not refind it.
38	1885 June 9	14 49 0	+56 23 20	v F; p S; l E; l B M; p B * nr.
39	» » 9	14 56 30	+55 57 20	v F; E; p L; * nr.; 4058 in field.
40	» » 11	15 3 0	+56 2 20	e F; p S; R; v diff.; 3 st. in a line point to it; 4058 nr.
41	» » 11	15 3 30	+55 55 20	e e F; p S; l E; v v diff.; p. a B * 7s; 4058 in field.
42	» » 11	15 4 35	+55 11 45	v F; p L; R; in center of a L equilateral triangle of 3 B st.
43	» » 11	15 6 10	+54 57 0	F; S; m b M; R.
44	1884 June 15	15 18 30	+13 8 15	F; v S; forms a right angle triangle with 2 st.
45	1883 July 11	15 24 0	+69 8 13	p B; l E; p S.
46	1884 May 21	16 25 0	+20 25 27	e e F; v E; F * at p. end; v diff.
47	1884 Aug. 2	16 39 5	+66 15 51	v F; S; R; coarse D * in field north.
48	1884 June 28	16 44 8	+70 50 28	p F; p L; l E. 1st of 4.
49	» » 28	16 45 9	+70 58 58	F; p L; B * nr. 2nd of 4.
50	» » 28	16 45 10	+70 50 28	v v F; E; S. 3rd of 4.
51	» » 28	16 46 30	+71 0 28	v F; p L; R. 4th of 4.
52	1884 Aug. 19	16 58 0	+68 37 54	v v F; v S; R; v F * nr.; sp. of 2. Edward.
53	» » 19	16 58 30	+68 40 0	e F; e E; p L; 2 B st. nr. n; nf. of 2. Edward.
54	1884 Oct. 14	17 5 0	+68 30 25	v v F; c E; p L; nearly bet. 2 st.
55	1883 June 2	17 8 14	+63 2 30	e e F; S; R; F * nr.; sp. of 2.
56	1885 May 14	17 8 20	+63 6 45	v S; v F; R; l b M; nf. of 2.
57	1885 April 19	17 21 20	+57 4 50	v S; v F; R; B * nr. n.
58	1885 June 13	17 22 30	+59 6 10	e e e F; p L; v v diff.; forms a right angle triangle with 2 st., p. * in same parallel 30s distant.
59	1885 July 7	17 25 45	+60 6 2	v F; p L; E; DM. +60°1754 much interferes with visibility.
60	1883 June 2	17 25 59	+56 57 20	p F; p S; R; * near.
61	» » 8	17 26 29	+52 48 20	v F; p S; R; bet. 2 st.
62	1885 July 7	17 26 50	+60 17 5	e e e F; c E; e e diff.; one of my minima visible.
63	1884 Sept. 18	17 28 30	+71 10 43	v F; p L; l E; D * n; 2 st. nr. point to it. Edward.
64	1885 July 7	17 28 45	+59 43 32	v v F; p S; R; 2 B st. nr. n; s of 2.
65	» » 7	17 28 45	+59 47 3	v v F; p S; R; 2 st. point to it, the nearer is D; the other and the neb. are equally distant from D *; n of 2.
66	» » 7	17 30 10	+59 41 17	v v F; v S; R.
67	1885 June 18	17 33 20	+50 50 8	v F; S; R.
68	1885 May 4	17 36 38	+58 47 45	e F; p S; R; forms a right angle triangle with 2 st., one m b. Edward.
69	1885 April 19	17 41 50	+56 51 20	v F; p S; R; B M.
70	» » 19	17 42 30	+55 45 20	v F; p S; R; l b M.
71	1885 June 8	17 42 45	+66 31 30	F; v S; R; B M.
72	1885 April 19	17 43 40	+55 49 22	e F; v v S; R; v v diff.; stellar. May be a few e F st.
73	1885 June 5	17 43 58	+61 58 0	F; v v S; R; planetary.
74	1884 Sept. 18	17 44 30	+60 57 30	e e e F; R; p S; e e diff.; s of 4 st. in form of a square.
75	» » 18	17 45 0	+51 25 38	e F; v S; R; bet. 2 st. which with 2 others forms a cross like cross in Cygnus. Neb. placed as is γ Cygni.
76	1885 April 20	17 46 5	+54 11 40	p S; e F; R; 3 st. n. point to it, the n one the brighter.
77	1885 June 5	17 48 5	+60 6 10	e e e F; p L; l E; bet. 2 st.; e e diff.; coarse D * s.
78	» » 13	17 48 40	+61 33 40	v v S; p F; v F * in or just in contact with it; np. of 2.

No.	Date of discov.	α 1885.0	δ 1885.0	Descriptions and remarks
79	1885 June 5	$17^h 48^m 55^s$	+61° 32′ 20″	F; v v S; R; planetary; F * v nr.; sf. of 2.
80	1884 Sept. 16	17 49 30	+59 31 17	v v F; p S; l E; diff.; close s of middle * of 3 in a line, middle * the fainter; np. of 2.
81	» » 26	17 49 31	+59 30 45	p F; p S; R; B * nr.; F * v nr.; sf. of 2.
82	1884 June 17	17 52 30	+72 1 58	S; v F; forms with 3 st. a square.
83	1884 Oct. 9	17 53 40	+60 49 32	F; p L; B M; 2 nearest of 3 st. in a curve point to it.
84	1884 Aug. 18	17 57 0	+64 55 57	v F; R; p L; 3 st. in form of a triangle nr. Edward.
85	1885 June 8	18 3 8	+56 14 55	F; p S; B M; R; bet. 2 st.
86	» » 14	18 8 25	+61 24 0	v F; v S; R; nearly bet. 2 st. 1st of 8.
87	» » 14	18 8 50	+61 6 45	v S; v F; R; bet. a F and a more distant B * 2nd of 8.
88	1883 Sept. 6	18 9 40	+69 1 45	v v F; p S; R; in vacancy; 3 st. in a curve south.
89	1885 June 14	18 9 50	+61 9 15	v S; R; v F; diff. by proximity to a B * 3rd of 8.
90	1883 Aug. 4	18 10 20	+61 25 15	e F; R; p S; nr. end of a curve of st. 4th of 8.
91	» » 4	18 10 45	+61 18 5	e F; p S; R; v diff. 5th of 8.
92	» » 4	18 11 0	+61 18 15	v v S; R; v F; v F * nr. 6th of 8.
93	» » 4	18 11 5	+61 18 15	v F; l E; p S; F * nr. 7th of 8.
94	1885 June 14	18 12 40	+61 16 45	e e e F; p L; R; e e diff.; in vacancy. 8th of 8.
95	» » 2	18 13 52	+68 19 20	p F; p S; l b M; R; n of 2. Edward.
96	» » 2	18 13 52	+68 19 5	p F; p S; R; l b M; s of 2.
97	1883 Sept. 11	18 26 50	+73 6 15	p B; R; m b M. Looks like a comet.
98	1885 June 8	18 33 25	+67 3 10	p F; p S; R.
99	» » 8	18 33 30	+67 45 30	p F; p S; R.
100	1883 July 11	18 36 0	+59 33 17	e F; p L; R; bet. 2 st., also bet. 2 coarse clusters; np. of 2.

Warner Observatory, Rochester N. Y., 1885 August. *Lewis Swift.*

Proper motion of Lal. 16616.

(Communicated by Commodore *Geo. E. Belknap*, U. S. N., Superintendent.)

The proper motion of this star has been deduced by comparing observations of Lalande, Argelander, Robinson's places of 1000 stars observed at Armagh, and Washington Transit Circle observations in the years 1881 and 1882.

The Catalogue places are:

Equin.	α	δ
1800.0	$8^h 17^m 16^s.11$	+51° 17′ 36″.2
1842.0	8 20 22.27	+51 9 21.8
1870.0	8 22 25.58	+51 2 46.4
1881.0	8 23 14.38	+51 1 32.8
1882.0	8 23 18.76	+51 1 21.4

The observations reduced by precession alone to 1882.0 give

Epoch	Equin.	α	δ
1800.075	1882.0	$8^h 23^m 19^s.44$	+51° 1′ 51″.14
1842.465	»	19.12	36.37
1870.426	»	18.56	25.88
1881.216	»	18.79	21.06
1882.168	»	18.76	21.35
1855.270	1882.0	8 23 18.934	+51 1 31.16

U. S. Naval Observatory Washington, 1885 July 8.

Giving these observations equal weight, forming equations of condition by the method of least squares, and denoting by x and y the annual proper motions in right ascension and declination we obtain

$4836.86\, x = -44^s.49$ whence $x = -0^s.00920 \pm 0^s.0013$
$4836.86\, y = -1750''.64$ $y = -0''.3619 \pm 0''.0048$

Applying these values for proper motion and reducing the observations to 1882.0 we have:

Epoch	Equin.	α	δ
1800.075	1882.0	$8^h 23^m 18^s.69$	+51° 1′ 21″.5
1842.465	»	18.76	22.1
1870.426	»	18.46	21.8
1881.216	»	18.79	20.8
1882.168	»	18.76	21.4
	1882.0	$8^h 23^m 18^s.69$	+51° 1′ 21″.5
		$\pm 0^s.0406$	$\pm 0''.146$

Proper motion in AR. $= -0^s.00920 \pm 0^s.0013$
Proper motion in Decl. $= -0''.3619 \pm 0''.0048$.

Edgar Frisby.