

mediate answers to one or two crucial questions are, accordingly, already within reach. It should, for instance, no longer be difficult to determine the extent to which rapid recession prevails among the stars under consideration. It would also be interesting to ascertain how far gradations of velocity, if present, correspond to variations of distance from the trapezium, where, so far as we yet know, it altogether ceases. Dr. Huggins's photograph of February 5, 1888, showed (as might have been expected) a total absence of *relative* radial movement between  $\theta$  Orionis and the surrounding gaseous substance; but the spectrum of this remarkable star needs a much more thorough examination than it has yet received before it can be admitted to include, in the displacement of its bright or dark lines, no evidence of *absolute* approach to, or recession from, the Earth. The light-collecting powers of many of the great telescopes now existing in various parts of the world ought to be adequate to this task.

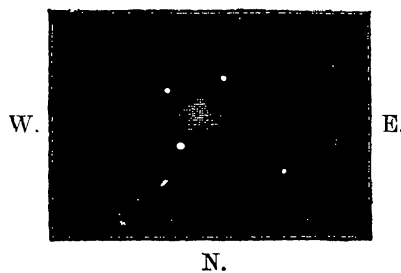
A. M. CLERKE.

#### Four New Nebulæ.

I. ON Aug. 26, 1889, while comet-seeking with a power of 32 on my 10-inch reflector, I picked up a nebulous object in Camelopardus in the same field as the star Piazzini IV. 112 (mag. 6), and about  $\frac{1}{2}^{\circ}$  S.S.W. Its position was estimated as R.A.  $4^{\text{h}} 28^{\text{m}}$ , N.P.D.  $15^{\circ} 20'$ . On reference to Herschel-Dreyer's New General Catalogue, I found that Tempel had seen a pretty bright, large nebula (No. 1530) at R.A.  $4^{\text{h}} 5^{\text{m}} 42^{\text{s}}$ , N.P.D.  $15^{\circ} 3'$  (1860), and this I assumed to be identical with the one I had seen in Camelopardus, with perhaps a slight error in the place. On May 23,

Fig. 1.

S.



Stars near new nebula I.; power 145.

1890, I again alighted on this object, and a more careful comparison proved that Tempel's nebula could not be the same, as the places differed considerably. This was rendered certain on Aug. 16, 1890, for I accidentally found the latter, and in the position

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assigned to it by its discoverer. The nebula near *Piazzi IV.* 112 is therefore new. With a power of 145 it is pretty faint, rather small, and there is a star of the 12th mag. on its N.W. border. Two or three other extremely minute stars closely outlie the object, but they are near the limits of my aperture. M. Charlois, of the Nice Observatory, has very kindly determined the exact place of the new nebula as follows:—

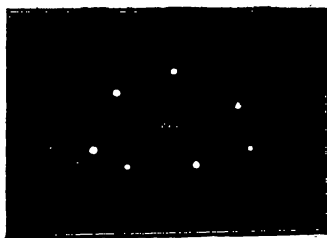
	R.A. app.			N.P.D. app.					
	h	m	s	°	'	"			
1890 Aug. 26	13	43	....	4	29	58.79	14	34	47.7

II. On Aug. 23, 1890, when sweeping with a power of 40, I came upon a faintish, round nebulosity in about R.A.  $8^h 26^m$ , N.P.D.  $3^\circ 59'$ , which I failed to identify. It was in the same field as the star Radcliffe 2189 (R.A.  $8^h 36^m.9$ , N.P.D.  $3^\circ 54'$  [1860]). The nebula preceded the star about 10 min. in R.A., and was 4' S. of it. When I found it was not mentioned in H.-D.'s catalogue, I thought it probable it might be a comet, but I reobserved it several times on the morning of Aug. 24 without detecting motion, and so concluded it to be a new nebula. With power 145 it is very distinct, round, and a little brighter in the middle. There is a triangle of rather bright telescopic stars on the E. side of it.

III. This is in the same field as II., and about 22' W.N.W. of it. It was first seen on Sept. 8, 1890, and its estimated position was R.A.  $8^h 10^m$ , N.P.D.  $3^\circ 47'$ . It is pretty faint, small, and much brighter in the middle. There is a telescopic star just on its N. side, and an exceedingly faint star is involved with the nebula, which lies in an irregular widely scattered group. It bears magnifying well, and is relatively much brighter than II.

IV. On Sept. 14, 1890, I found a nebula in the field with No. 2300 of H.-D.'s catalogue, and about 40' S.E. of it. The position was about R.A.  $7^h 12^m$ , N.P.D.  $4^\circ 24'$ . This object lies central within a very curious semicircle of small stars, so:—

Fig. 2.



Stars near new nebula IV.; power 60.

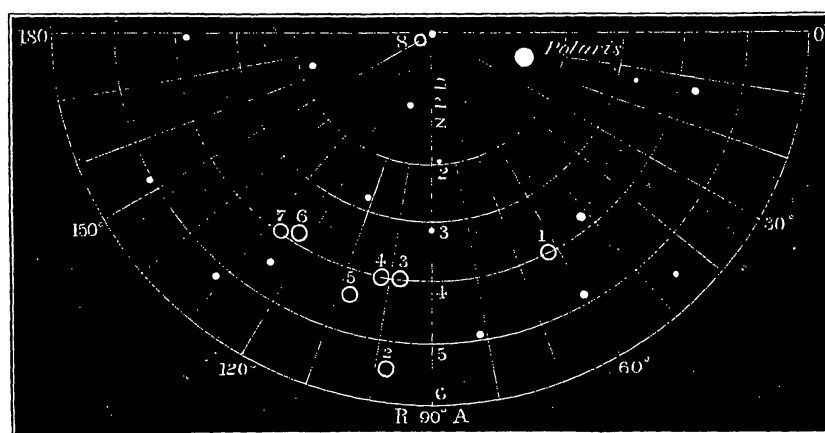
It is faint, pretty large, extended, and a little brighter in the middle. It is singular this nebula was missed by Tempel, Winnecke, and Borrelly, who discovered three conspicuous ones very

near, viz. Nos. 2268, 2276, and 2300 of the catalogue already referred to. The two latter may both be seen in the same field as the new object if the eyepiece includes a space of 50' of arc.

It may appear surprising that nebulæ sufficiently obvious to be picked up with the low powers used in comet-seeking should hitherto have escaped detection in a part of the sky so favourably and continuously visible in northern latitudes. But Sir W. Herschel did not thoroughly sweep the polar region, and we find that many prominent nebulæ have been detected by Tempel, Winnecke, Borrelly, Tuttle, and Swift while comet-seeking in this part of the heavens. It is perhaps curious that the new objects I have described eluded their vigilance, though they are by no means readily seen, and might easily pass unnoticed during the process of rapid sweeping.

It may be interesting to give a diagram and the positions of such nebulæ as are known within 6° of the pole and between 0<sup>h</sup> and 12<sup>h</sup> of R.A. There are no known nebulæ near the pole between 12<sup>h</sup> and 24<sup>h</sup> of R.A.

Fig. 3.



List of Nebulæ near North Pole (positions for 1860).

No.	H.-D.'s number.	Discoverer.	R.A. h m s	N.P.D. ° ' "	Description.
1.....	1544	Tempel.	4 10 10	4 3'3"	v. F., v. S.
2.....	2268	Borrelly.	6 36 0	5 25'3"	p. F., p. L., l. E.
3.....	2276	{ Tempel, Winnecke. }	6 38 1	4 2	F., 60'', l. b. M.
4.....	2300	{ Winnecke, Borrelly. }	6 44 29	4 3'3"	p. B., p. L., l. E., b. M.
5.....	Nova IV.	Denning.	7 12	4 24	F., p. L., E., b. M.
6.....	Nova III.	Denning.	8 10	3 47	p. F., S., m. b. M.
7.....	Nova II.	Denning.	8 26	3 59	F., S., R., l. b. M.
8.....	3172	J. Herschel.	10 8	0 6'8"	v. F., R., g. b. M.

The positions of my three Novæ are rough approximations, and it is important these objects should be re-observed for place.

Bristol, 1890, Sept. 15.

W. F. DENNING.