

Nova Sagittarii. Field 5'±.

The star 1 has not appeared as sharply defined sometimes as the other stars.

The Nova at present very strongly resembles several of the abnormal stars in the cluster M 13 Herculis (see *Astroph. J.* Vol. XII p. 176). It especially resembles No. 234 (Scheiner) of that cluster in its haziness and general want of definition.

In examining the Nova on 1906 July 24 the star 4 of my sketch was missing. Though it was very carefully looked for no trace of it could be seen. This object was seen only on 1906 July 17. Several sketches have at different times been made of this field but 4 is not present on them. It was estimated, on July 17 at 11<sup>h</sup> 20<sup>m</sup> Central Standard Time — the date of the sketch — to be 15<sup>th</sup> magnitude. At that time I thought it strange I had not noticed the star before. The object (No. 4) is therefore either a variable star, or, which is more probable, an asteroid.

W<sub>1</sub> 18<sup>h</sup> 1368 (corrected)  
 Harvard M. C.  
 M<sub>1</sub> 18417  
 From comparison with M<sub>1</sub> 18346

As will be seen, the right ascensions agree very well but the declinations are discordant. Hartwig's proper motion of +0".13 in declination (*A. N.* 3603 p. 46) for this star is shown by the observations not to exist.

Yerkes Observatory, 1906 Aug. 9.

*E. E. Barnard.*

\*) Der Stern kommt noch in Sant<sub>4</sub> unter Nr. 1698 vor (1900): 18<sup>h</sup> 56<sup>m</sup> 35<sup>s</sup>.24 — 13° 23' 46". *Kr.*

### Groups of small nebulae.

By *E. E. Barnard.*

On Dec. 5 1888 I swept up a field of very small nebulae with the 12 inch of the Lick Observatory. The enclosed drawing (sketch B) is from the sketch carefully made at the time.

Later. I have found some observations of —13° 51' 97" and —13° 52' 00" in the *Neue Annalen der k. Sternwarte in Bogenhausen bei München*, Vol. I.

They are:

No. 18442	1880.0	18 <sup>h</sup> 55 <sup>m</sup> 52 <sup>s</sup> .48	—13° 19' 56".4
18462	»	18 56 7.77	—13 20 9.4

The epochs of observation are 1845.68 und 1846.18.

They are both called 10 mag.

Reduced to 1906.0 these positions are:

18 <sup>h</sup> 57 <sup>m</sup> 20 <sup>s</sup> .33	—13° 17' 49".0
18 57 35.62	—13 18 1.4

from which the place of the Nova is:

1906.0	18 <sup>h</sup> 56 <sup>m</sup> 32 <sup>s</sup> .85	—13° 17' 42".1
	18 56 32.95	—13 17 39.8

or 1900.0 18 56 12.58 —13 18 11.4

It does not look as if there were any motion in the declination of —13° 52' 00".

The reduced Munich observations give Δδ 0' 12".4

Harvard » » 0 16.7

Micrometer » » 0 14.9

The star BD. —13° 51' 94" used by Hartwig, is M<sub>1</sub> 18417, the place of which for 1880.0 is:

18<sup>h</sup> 55<sup>m</sup> 27<sup>s</sup>.71 —13° 25' 22".0

or for 1900.0

18<sup>h</sup> 56<sup>m</sup> 35<sup>s</sup>.35 —13° 23' 44".9.

To see if there is any motion in this star, I have compared it (1906 July 24) with No. 18346 of the same catalogue. The following differences were obtained

Δα +0<sup>m</sup> 59<sup>s</sup>.88 (8) Δδ +3' 57".0 (5).

From these the following independent position of —13° 51' 94" is derived:

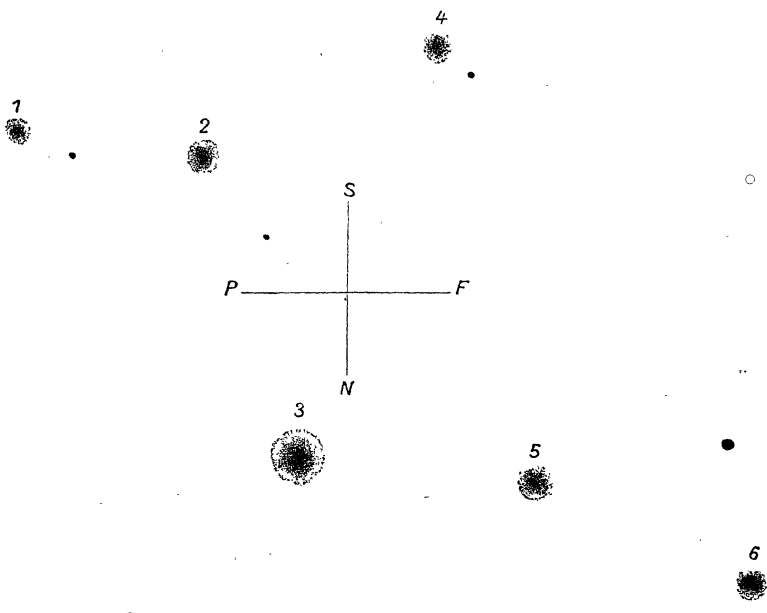
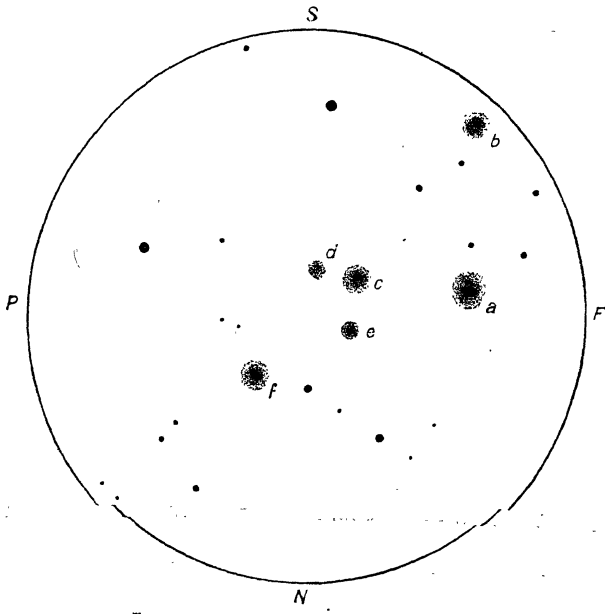
1900.0 18<sup>h</sup> 56<sup>m</sup> 35<sup>s</sup>.28 —13° 23' 47".0.

Appended is a list of positions of this star\*)

α 1900.0	δ 1900.0
18 <sup>h</sup> 56 <sup>m</sup> 35 <sup>s</sup> .36	—13° 23' 47".3
18 56 35.40	—13 23 48.8
18 56 35.35	—13 23 44.9
18 56 35.28	—13 23 47.0

Sketch B (field 16' di.)

Sketch A



7240 »e F; e S; \* att n, p of 2«  
 7242 »v F; S; 1b M; f of 2«.

The descriptions do not entirely agree with the objects seen by me. The one which I have marked *a* is doubtless one of Stephan's; *f* would perhaps be the other, but NGC. makes the preceding nebula south while *f* is north of *a*. Four of these objects are new.

In my notes I have recorded: »Order of brightness *a, f, c, d, e, b*; the one marked *a* being the brightest. Order of size *a, f, b, c, d, e*; *a* being the largest.«

A pointing on *a* gave

1888.0  $\alpha = 22^h 10^m 36^s \quad \delta = +36^\circ 44'$ .

These were all well seen. There were a number of others suspected in this field.

	1885.0	
6	$0^h 8^m 45^s +47^\circ 36' 30''$	ee F; p L; R; e diff. 1 <sup>st</sup> of 3
7	$0^h 8^m 55^s +47^\circ 37' 0''$	eee F; S; R; middle one of three in line. 2 <sup>nd</sup> of 3
8	$0^h 9^m 5^s +47^\circ 36' 45''$	p F; p S; R; B M. 3 <sup>rd</sup> of 3

They were discovered by Swift Sept. 7, 1885.

At the time of the observation of the nebulae shown on the sketch the micrometer of the 12 inch could not be used; the positions of the nebulae were therefore estimated, with the aid of a wire in the field of view, with reference to the stars AG. Bonn Zones nos. 90 and 93.

The following positions resulted from these estimates.

	1888.0	
1	$0^h 7^m 53^s \cdot 2 +47^\circ 31' \cdot 5$	S; p B; Diffic.; close s.p. $10^m$ *
2	$0^h 8^m 5 \cdot 5 +47^\circ 31' \cdot 9$	v F; S
3	$0^h 8^m 12 +47^\circ 37' \cdot 1$	p L; F; R; v g b M
4	$0^h 8^m 26 \cdot 4 +47^\circ 29' \cdot 8$	v S; p B; close s.p. $10^m$ *. 2's. of 2
5	$0^h 8^m 33 +47^\circ 37' \cdot 3$	S; F; R
6	$0^h 8^m 46 +47^\circ 38' \cdot 2$	S; p B; m b M; n.f. $10^m$ * 2' $\pm$

»Nos. 1 and 2 are about the 12<sup>th</sup> mag. and remar-

This is a good illustration of the clustering of these nebulae — they are frequently associated in isolated clusters.

In sweeping with the 12 inch of the Lick Observatory 1888 July 6, I came across a group of six small nebulae. Three of these must be new and the other three were perhaps found by Swift some three years earlier. The enclosed drawing sketch A, carefully made from my sketch at the time, shows the appearance of this group. Those marked 3, 5, 6 are doubtless 48, 49, 51 of Dreyer's New General Catalogue, and were originally discovered by Dr. Lewis Swift.

Referring to Swift's original observations, I find, in his 2<sup>nd</sup> catalogue of 100 new nebulae, three, numbered 6, 7 and 8 that are in this region. The following positions etc. are from his catalogue.

kably small. They are not round; probably both are elongated north and south. Several other nebulae suspected — especially one just north of 3. It will be well to examine this field again with better seeing.«

The positions of 1, 2 and 4 will be quite close. The others may be in error a second in right ascension and a minute in declination.

Bringing the places of Swift's objects up to 1888.0 it will be seen that they do not agree with any of these nebulae. I think however, there is no question of their identity with 3, 5 and 6 of my list.

Nebulae brought up from Swift's Catalogue No. 2.

1888.0	$0^h 8^m 54^s +47^\circ 37' 30''$
	$0^h 9^m 4 +47^\circ 38' 0''$
	$0^h 9^m 14 +47^\circ 37' 45''$

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This grouping or clustering together of this class of nebulae is very remarkable and suggestive.

There are quite a number of such clusters the most remarkable of these being one composed of very small

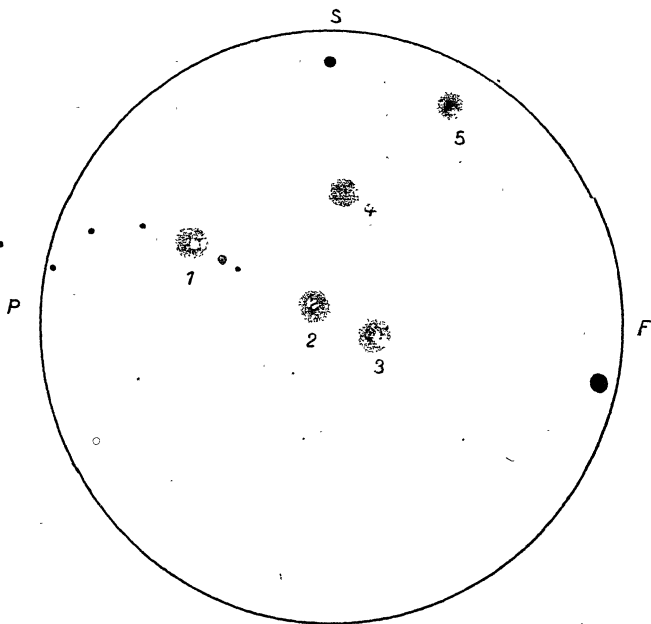
nebulae found by Mr. Burnham with the 36 inch and described in A. N. 2998, where no less than eighteen nebulae are crowded into a space  $5'5 \times 16'$ . There can be no question but the components of such a group are physically connected.

Yerkes Observatory, Williams Bay, Wisc., 1897 June 1.

*E. E. Barnard.*

Note 1906 Aug. 30. These were put in an envelope and addressed to the A. N. nine years ago, but for some unknown reason were never put in the mails.

### Group of small nebulae.



On 1890 Aug. 20 I swept up with the 12 inch of the Lick Observatory a group of small nebulae in approximately for the date

$$\alpha = 15^h 34^m \quad \delta = +44^\circ 0'$$

from a pointing.

The enclosed sketch (field  $43'$  di.) was made. Following are descriptions

- 1 Pretty bright. Small round. Much brighter in middle
- 2 Faintish. R g b M
- 3 " " " "
- 4 Faint " " "
- 5 Not faint " " "

The star in the following edge of field was estimated 7.5 mag. and is supposed to be BD.  $+44^\circ 2493 6^m 8$  whose place for 1855.0 is  $15^h 33^m 29^s 4 +44^\circ 5' 0$ . A note says another star  $7^m 5$  p. this  $40'$  and is  $25'$  south (BD.  $+43^\circ 2560$ ).

The smaller nebula close following 1 is marked with a question as to whether it was a faint star.

Yerkes Observatory, Williams Bay, Wisc., 1906 Sept. 1.

*E. E. Barnard.*

### On a group of small nebulae

observed near Brooks comet (1889 V) Oct. 28, 1889.

By *E. E. Barnard.*

On 1889 Oct. 28 while observing Brooks comet (1889 V) with the 36 inch of the Lick Observatory I found a group of small nebulae some  $15'$  following the comet. Several of these were measured with the great telescope.

They were referred to a  $9\frac{1}{2}$  mag. star.

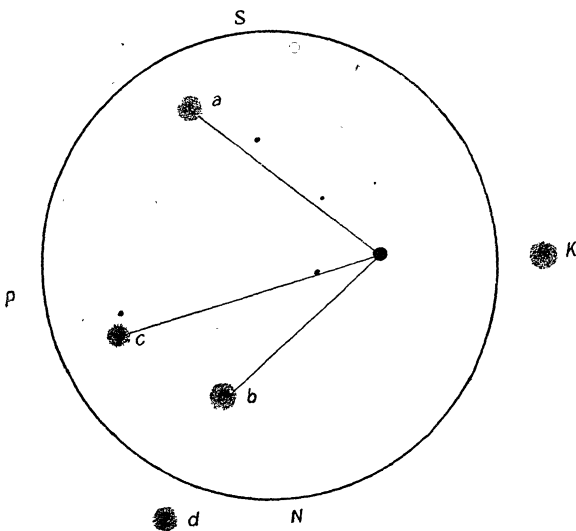
	Pos	Angle	Distance
a	226.7	(4)	145.1 (3)
c	281.2	(2)	181.2 (2)
b	306.1	(5)	144.2 (4)

«c is  $5'' \pm$  n. p. a  $10^m$  star.»

Following are descriptions of these nebulae — the letters referring to the enclosed sketch (size of field  $6' \pm$ ):

a	R.	not F.	m b M
b	p B.	R.	m b M
c	v S.	c F.	b M
d	p S.	p F.	g b M
K	p S.	F.	g b M

There are probably a number more nebulae here.



Comparison star is BD.  $-3^{\circ}57'04$  ( $9^m.5$ ) whose position is

$$1855.0 \quad 23^h 40^m 5^s.2 \quad -3^{\circ} 7'.6$$

South following it is BD.  $-3^{\circ}57'06$  ( $9^m.2$ ) on the above date, with the 12 inch refractor, I determined the  $\Delta\alpha$  and  $\Delta\delta$  of these two stars  $\Delta\alpha = 0^m 21^s.06$  (12 transits)  $\Delta\delta = 1' 27''.6$  (2 measures).

Yerkes Observatory, 1906 Sept. 1.

E. E. Barnard.

### The nebula NGC. 6302.

$$1860.0 \quad 17^h 4^m 17^s \quad -36^{\circ} 56'.$$

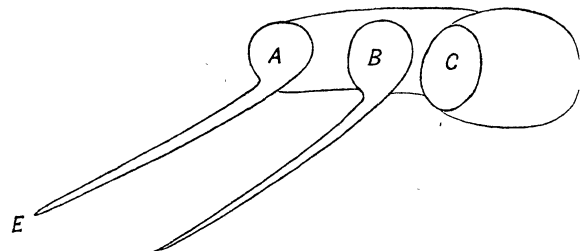
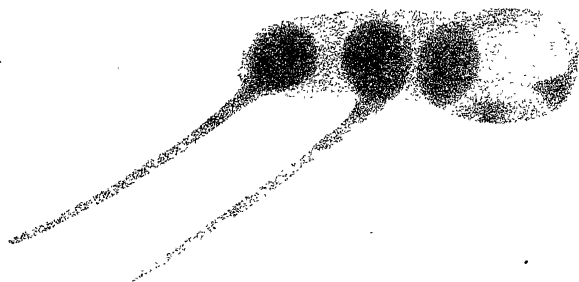
By E. E. Barnard.

This nebula was discovered by me in 1880 at Nashville, Tennessee, while hunting comets with my 5 inch refractor. Subsequently observing it with his 16 inch at Rochester N. Y., Swift found it to be triple.

In 1892 I examined and measured the nebula with the 30 inch of the Lick Observatory and found it to be a very remarkable object. With the great telescope it was seen to consist of three rather bright small nebulae. Two of the nebulae had faint streamers running north preceding, while the third, the following component, had two nebulous

arches springing from it and extending some distance following. The entire nebula, especially the following part, looked like a ghostly bug of some kind; the third mass being the head and antennae. From its singular appearance, I have called it the »Bug Nebula«. The enclosed drawing was made from three or four nights study of it with the 36 inch, and very fairly represents its remarkable appearance.

Careful measures were made of the nebula, but the drawing is not from these measures. I also send a rough diagram which indicates the portions measured.



● K

North

In the following measures the letters refer to those on the diagram.

		CA.	
		Pos. Angle	Distance
1892	July 29	261°5 (2)	38".2 (2)
		CK.	
1892	July 29	294°1 (3)	152".66 (3)
	Aug. 5	294.0 (4)	151.85 (5)
	» 12	294.0 (3)	152.78 (3)
		294°0	152".43

K is a  $13\frac{1}{2}$  magnitude star n. p.

		CB.
1892	July 29	Dist. 11".55 (2)

		CP.
1892	July 29	Dist. 28".31 (2)

Yerkes Observatory, 1906 Aug. 30.

The figures in parenthesis represent the number of settings.

The E and W diameter of the brightest part of C = 8".7, C is somewhat elliptical.

Estimations were made of the relative brightness of the different parts of the nebula.

C is 5 times as bright as B

C is 4 times as bright as A.

Another estimate made B very slightly brighter than A.

The brightest part, C, was estimated to be of 12 mag. The other two portions were about 14 mag.

Too much reliance must not be placed on the exactness of the position of this nebula as given in A. N. 2588 Bd. 108 p. 369.

E. E. Barnard.