

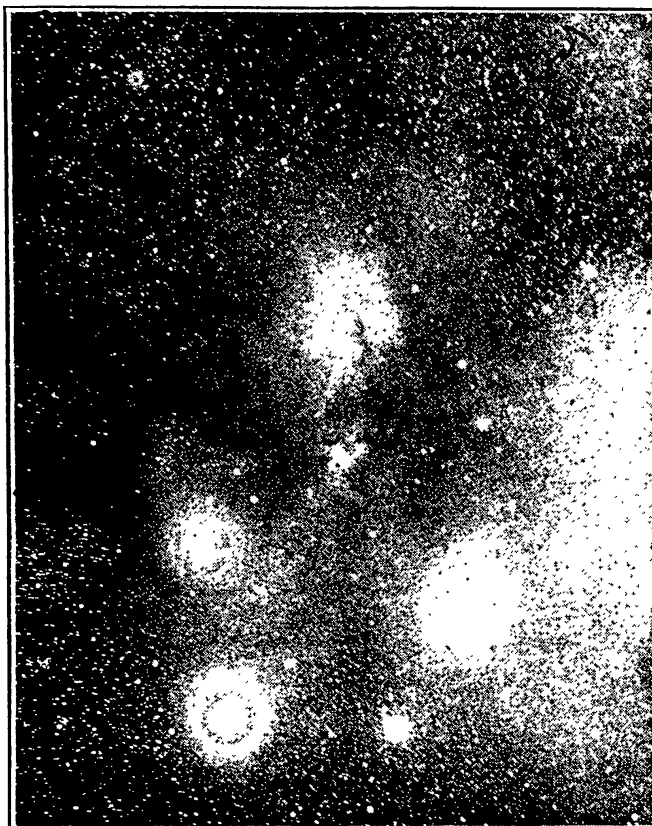
On a Great Photographic Nebula in Scorpio, near Antares.
By E. E. Barnard, M.A., D.Sc.

For many years I have known of a vast but vague nebulosity in the region of *Antares*. This has been encountered in my comet seeking. It was so indefinite, however, that it could not be definitely located. With a large field, on a small telescope, the entire sky in that region seemed to be covered with a very feeble nebulosity. A portion of this I had located about α *Scorpii* and at other points.

I have recently photographed this region. The resulting pictures have shown that a magnificent nebula occupies a large portion of this region of the sky. The brightest portion of it condenses about the stars.

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|---|---|-----|----|----|----|-----|------|
| ρ <i>Ophiuchi</i> , α <i>Scorpii</i> , and two small stars in (1875'0) | { | m | h | m | s | ° | ' |
| | | 9.6 | 16 | 17 | 47 | -24 | 9.3 |
| | | 8.0 | 16 | 17 | 52 | -24 | 10.3 |

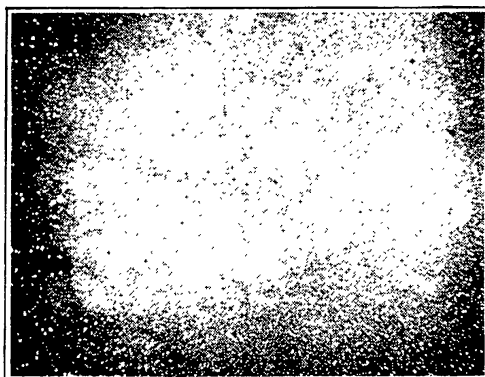
This great nebula occupies a remarkably vacant region. It seems to fill in a great hole among the stars. From this vacancy



Great Nebula near *Antares*, 1895 April 19. Lick
Observatory, 6 in. Willard portrait lens.

there are several vacant lanes that run easterly from it for many degrees, and which are entirely devoid of stars. Even though there were no nebula here, the wonderful appearance of the sky itself would be sufficiently remarkable to attract attention at once.

This great nebula is very intricate and complicated in form. Especially is this shown where it condenses about the above-mentioned stars. It is directly connected with σ *Scorpii* by a stream of nebulosity that widens and intensifies where it involves σ . I have made four photographs of the nebula with the Willard lens, and three with the "lantern lens." Because of its great southern declination it is not possible to give as long an exposure as I should wish.



Great Nebula near *Antares*. 1895 March 30. Exposure 2h. 8m.
Lick Observatory, $1\frac{1}{2}$ in. lantern lens.

I send a glass positive of one of these negatives with the Willard lens on 1895 April 19. I would call attention to the fact that the stars on this picture are very imperfect. The low altitude of the object placed the telescope in an awkward and unusual position, which caused an unexpected strain to be brought to bear on the instrument. This, however, has but little effect on the nebula, except, perhaps, to slightly mar some of the more delicate details. I have been waiting for another opportunity to give a longer and better exposure, but bad weather has prevented.

I have selected one of the negatives made with the "lantern lens," and from this I also send a glass positive. This particular picture gives one an admirable idea of the marvellous nature of this part of the sky. It also shows the nebula and its singular relation to the vacancies of that region. The Willard lens had shown feebly that all the bright stars near the nebula were involved in it.

The small picture more clearly shows this. It will be seen that a large diffused portion of it extends all over the region about *Antares* and σ *Scorpii*, and several degrees beyond.

This picture also shows a large irregular long nebula involving the star ν *Scorpii*, which was not previously known.

In looking at the larger of the two photographs, it will be seen that α *Scorpii* lies in a rift of the nebula, between two brightish strips which lie close north and south of it, and which are inclined to each other.

All the details shown are readily made out on all the different negatives—for both lenses.

The different pictures with the Willard lens show several other stars in this region to be nebulous. A list of these has been sent to the *Astronomische Nachrichten*.

The first of the negatives with the Willard lens (March 23), in which the stars are very perfect, shows M 4 to be a very beautiful star cluster, just sufficiently loose to show the individual stars nicely.

A word in reference to the “lantern lens.” I have given an account of some interesting experiments with this lens in *Astronomy and Astro-physics* for December 1894.

This is a small magic lantern lens, from a cheap oil lantern. It is $1\frac{1}{2}$ inch in diameter, and 3 inches focus from the back lens, the equivalent focus being about 5 inches. By averaging the focus it is possible, as will be seen by the picture, to get a fairly flat field over some 20° or 25° . Its action is very rapid, and the prominent cloud forms of the Milky Way are shown in some ten minutes' time. For many purposes it will be extremely valuable, far more so than any larger or more powerful lens. It is so inexpensive, and its results are so wonderful, that every amateur, and every professional observatory, should possess one. I would specially call the attention of the Society to this kind of lens, and would not wish a better specimen to illustrate its capacity than the picture I send with this (made 1895 March 30). On some of the other negatives with this lens (of this region), familiar stars are shown by having the stars in the centre in exact focus, but this hurts the rest of the field, and impairs the usefulness of the lens. It is therefore well to average the focus with a lens of this kind, and thereby extend the flatness of the field.

I am very much pleased to see that Dr. Sheldon has taken up this subject with a similar lens since I called attention to the wonderful results of such. His article on this subject will be found in the *English Mechanic*, 1895 February 15.

Mount Hamilton, California :
1895 May 4.

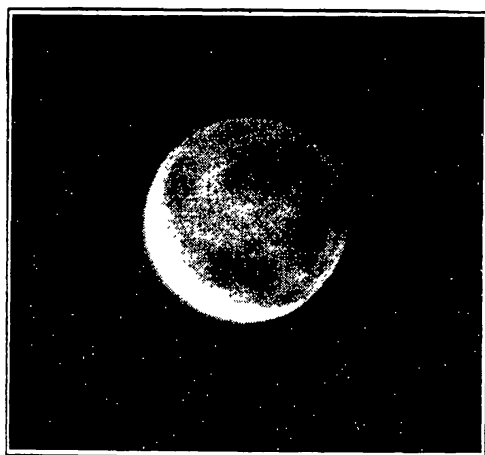
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On a Photographic Study of the Earth-lit Portion of the New Moon. By E. E. Barnard, M.A., D.Sc.

I have recently been making some experiments in photographing the Earth-lit portion of the new Moon with the 6-inch Willard portrait lens. The more prominent details are easily shown in the earlier stages, before the Moon becomes too old.

I have thought it would be interesting to make a series of such photographs, both in the evening and morning phases, for the study of any peculiarities in this illumination.

The first of these pictures was made on 1895 February 26, at about half-past seven. This is a very beautiful picture. The Earth-lit globe stands out beautifully round, encircled by the slender crescent. All the "seas" are conspicuously visible, as are also the other prominent features, especially the region about *Tycho*. *Aristarchus* and *Copernicus* appear as bright specks, and the light streams from *Tycho* are very distinct.



Photograph of New Moon (enlarged), 1895 February 26. 7^h or 8^h.
Exposure 30^s. Lick Observatory, 6 in. Willard portrait lens.

For the inspection of the Society I send two glass positives from this picture; the smaller one is a direct contact positive, and is consequently of the original size, while the other is enlarged a couple of times. The exposure was 30 seconds.

Mount Hamilton, California:
1895 May 4.