

*A New "Cave-Nebula" in Cepheus.* By Max Wolf, Ph.D.  
(Plate 6.)

I have the pleasure to announce the discovery of a new interesting nebula in the midst of the constellation of Cepheus.

The nebula was found by Dr. Kopff on a plate taken by him with my Bruce-telescope on the night of October 21st, 1908, and I photographed the object as soon as possible with our reflector. It has a very remarkable shape; and, as it forms an important addition to this class of nebulae, I forward the accompanying description.

The nebula involves the star B.D. +69°, 1231:

$$\alpha = 22^{\text{h}} 10^{\text{m}} 1^{\text{s}}, \quad \delta = +69^{\circ} 31' 7'' \quad (1855^{\circ} 0),$$

which is given in the *B.D.* as 8.8 magnitude. This star was observed in three zones of the Christiania A.G. Catalogue where it has the number 3552 and is given as a star of magnitude 8.9, without any remark. The bright star visible south-west of the nebula on the photograph is B.D. +69°, 1228; it is given as 5.5 mag. in the same Catalogue. This nebula is a good example of the singular phenomenon of cave-formation amongst Milky Way stars. In some respects it shows the general characteristics of other cave-nebulæ, but it also offers several new features. It forms the end of a long starless lacuna, directed from south to north, resembling that of the T Cephei nebula. It has a bright condensation seen visually as a star of the ninth magnitude; it shows waves similar to those in the  $\pi_2$  Cygni and T Cephei nebulae, but has dark spaces north of the brighter parts, which seem darker than the sky in the neighbourhood. Round these dark spots extremely faint nebulous material is spread over the lacuna. The lacuna itself is about 1° to 2° long from south to north, and about 7' to 10' broad, but can be traced, with some interruptions, much further north. At about  $22^{\text{h}} 10^{\text{m}}, +70^{\circ} 0'$  a bridge of stars traverses the long lacuna from east to west.

All over the cave lies a network of still darker spots and channels. This raises the hope that we may understand the interesting process more thoroughly at some future time, when we can photograph the region in more detail with greater optical power.

The bright southern edge of the nebula overlaps the region still filled with faint stars. So we find here, as already noted in some other objects, that the stars do not begin to decrease in number at the exact border of the visible nebula, but somewhat within it. The same was the case with the Z Orionis, the  $\psi$  Eridani, and other nebulae. All such nebulae have one border of great intensity, and this border overlaps the stars.

Some fine, complicated, but very small dark channels are visible in the south-western edge, near the stellar nucleus.

The reproduction given here is from a plate taken by me with the 28-inch Waltz-reflector of this observatory, November 16th, 1908, with two and a half hours' exposure through thin clouds.

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