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Measures of Barnard's new Merope nebula

with the 36 inch Equatorial.

By *S. W. Burnham.*

In November, 1890, Mr. *Barnard* discovered a new nebula in the Pleiades (A. N. 3018) which had escaped detection by all previous observers from the fact that it is so close to the bright star, Merope, that it is buried in the brilliant light of that star and completely hidden in ordinary observations. I have lately made a set of measures of this singular object from Merope with the 36 inch Equatorial. The nebula is readily seen with that instrument when one is aware of its existence, and it can probably be seen now with a somewhat smaller aperture; at the same time, its discovery with any instrument is little less than remarkable, from the difficulty of seeing it at all except when the bright star is placed outside of the field, and of course there is only one position which is favorable for this purpose. The distance between the two is so small, that the nebula even then is in the extreme margin of the field, and easily overlooked without careful attention.

Merope and new nebula.

1891.689	167°.1	37″.72
692	167.0	35.79
728	164.2	36.00
731	167.0	34.89

Mr. *Barnard*, with the same instrument, measured the difference of Right Ascension and Declination between the two objects, and obtained:

Diff. R.A. = 9ˢ.04
Diff. Decl. = 35″.72

The position angle and distance deduced from these observations, and the mean result of the foregoing direct measures are as follows:

1890.92	165°.8	36″.85	*B* 2n
1891.71	166.3	36.10	*β* 4n

These independent results are certainly remarkably accordant, when the character of the new nebula is considered. If it were a star, or had a well-defined central point, there would be no difficulty; but in this case a faint disc of light, at least ten or twelve seconds in diameter, has to be bisected by the wire in the extreme margin of the field, and there is necessarily under the circumstances a good deal of uncertainty in doing this as compared with the bisection of a star, however faint, or difficult to see.

A rough setting of the wires to include the more readily visible diameter of the nebula in the direction of Merope gave 12″.8; but this must not be taken as a measure, even approximately, of its extreme dimensions. In the paper referred to Mr. *Barnard* estimated it as about 30″ in diameter, and I have no reason for changing this value. The drawing given in A. N. 3018 is a faithful representation of the nebula, and its position with reference to Merope.

This is not only far more interesting than any of the nebulae heretofore discovered in the Pleiades by visual and photographic method, but, judging from its situation and appearance, is one of the most singular objects in the heavens. With respect to its nearness to a bright naked-eye star it is unique. There may be other examples, but certainly no other has ever been discovered, and this close association of a faint nebula and one of the prominent stars of the Pleiades is an interesting fact whether such association is accidental or otherwise. No star bright enough to be visible to the naked-eye is known to have a small, definite nebula even within several times the distance of this nebula from Merope. Of course there are many examples of large stars involved in widely diffused and extended nebulous masses, of which *Tempel*'s nebula about the star in question is an illustration, but these nebulous objects appear to be of an entirely different character from the circular, condensed forms so often found among the small detached nebulae. It may be that a careful examination of the bright stars by cutting off their light from the surrounding field would reveal other examples of companion nebulae.

These measures were made with a power of about 500 in order to give the best separation, and get rid of the objectionable light of the star as far as possible. Of course with such a power nothing would be seen of the nebulous background discovered by *Tempel*. These measures may be of more interest in the future when it will be possible by careful re-measurement to ascertain whether the new nebula is drifting in space with Merope and the other stars of this famous group.

Mt. Hamilton, 1891 Oct. 10. *S. W. Burnham.*