

time. He justifies this identification by stating that the range of brightness is "not great," and he doubts "the Elves were aware that Betelgeuse was variable" (7). In reality, Betelgeuse's range of magnitude is given as 0.0-1.3, meaning Betelgeuse is over three times brighter at its maximum as compared to its minimum. By comparison, Aldebaran is also variable, with a range of magnitudes 0.75—0.95, or only a 20% difference in brightness. In terms of the likelihood of elvish eyes noting a change in brightness, mere human eyes can, with training, detect differences in star brightness of 0.1 magnitudes (Levy 174). Therefore Stone's chain of logic concerning Betelgeuse as a successful candidate for Borgil does not hold up to astronomical scrutiny.

Further evidence which may convincingly decide between Aldebaran and Betelgeuse as Borgil can be found from a careful analysis of the order of events in the quoted passage. From highest in the sky to lowest (i.e. the order of rising into the sky), are Remmirath (the Pleiades), Borgil, and Menelvagor (Orion). Quiñonez and Raggett use this to argue for Betelgeuse, because it is "the first bright star of Orion to appear, 'hauling' the rest of the constellation after it" (8). Stone concurs, with the caveat that "Bellatrix rises first, admittedly; but Betelgeuse is brighter and more distinctive. I would therefore identify Borgil as Betelgeuse...." (7). Bellatrix is Orion's westernmost shoulder, as opposed to Betelgeuse, the easternmost one. At 1.64, it is, indeed, dimmer than Betelgeuse by 1.14 magnitudes, or shining at only 1/3 the brightness. However, Bellatrix is hardly indistinctive. The Arab name of this star, *Al Murzim al Najid*, translates as "the Roaring Conqueror, or, according to Hyde, the Conquering Lion heralding his presence by his roar, as if this star were announcing the immediate rising of the more brilliant Rigel, or of the whole constellation" (Allen 313). Therefore Bellatrix best fits Quiñonez and Raggett's description, but as it is not a red star, it can be immediately disqualified.

A more careful astronomical analysis of Quiñonez and Raggett's claim can be derived by using the computer planetarium software *The Sky* to model the actual motions of the stars in question as seen from Oxford.⁴ Generally speaking, the naked-eye stars of Orion rise in the following morphological order: shield, upraised club, head, Bellatrix, Betelgeuse, belt, Rigel (western foot), sword, and Saiph (eastern foot). The stars which mark his head (the brightest of which is Meissa, magnitude 3.39) rise 7-9 minutes before Bellatrix, which in turn rises 25 minutes before Betelgeuse. Therefore Quiñonez and Raggett's claim that Betelgeuse "hauls" up Orion is clearly unfounded, as a significant portion of the constellation rises before it.

Quiñonez and Raggett also cite evidence from Stone which they believe disqualifies Aldebaran as Borgil, based on their reading of the passage and the appearance of the mist. Stone states that "Borgil would not

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need to rise very high to appear above the mist. But Aldebaran is already halfway up the sky by the time Orion rises. It would be well above the mist." (7). Utilizing *The Sky* software, it can be shown that this statement is flatly false. At the time Betelgeuse rises, the Pleiades are at an altitude above the horizon of approximately 32.5 degrees, or one-third up in the sky from the horizon. Aldebaran is at a much lower 19.25 degrees at that time. As Manning succinctly states, Borgil "was a red star clearly rising ahead of Orion; Aldebaran is the obvious choice" (19). In other words, Borgil must be *separate* from the main figure of Orion, as Tolkien describes it as rising *before* the recognizable shape of the constellation. In light of the evidence provided thus far in this paper, Aldebaran is the only remaining choice.

Although Aldebaran clearly fits the astronomical evidence, further literary analysis may be utilized to bolster the case from another angle. The name of the star derives from the Arabic "al-dabarān, possibly meaning 'the Follower'... thought to refer to this star's following the Pleiades across the sky...." (Kunitzsch and Smart 54). Likewise, its "Persian name *Paha* and the Sogdian title *Bahuru* both seem to mean 'The Follower'" (Burnham III 1807). These are clearly in keeping with Aldebaran as Tolkien's Borgil, following Remmirath into the sky. In addition, although Betelgeuse is perhaps better known among modern readers (not the least reason being the Michael Keaton film *Beetlejuice*), Aldebaran was certainly famous among classic writers with which Tolkien would have been familiar. For example, Edmund Spenser's "The Faerie Queene" (Book 1, Canto 3) contains the following verse:

Now when *Aldeboran* was mounted hie
About the shynie *Cassiopeias* chaire,
And all in deadly sleepe did drowned lie,
One knocked at the dore, and in would fare.
(Spencer 35)

Christopher Marlowe's "Tamburlaine the Great" (Part II, Act IV, Scene III) also mentions the star by name:

If Jove, esteeming me too good for earth,
Raise me, to match the fair Aldeboran,
Above the threefold astracism of heaven,
Before I conquer all the triple world.
(Marlowe 171)

More tantalizing still is a reference by Geoffrey Chaucer in "A Treatise on the Astrolabe" (c.1391), Part 1, section 21:

And understond also that alle the sterres sitting within the zodiak of thin Astrelabie ben clepid sterres of the north, for thei arise by northe the est lyne. And all the remenaunt fixed oute of the zodiak ben clepid sterres of the south. But I seie not that thei arisen alle by southe the est lyne; witesse on Aldeberan and Algomeysa. (Chaucer 667)

It is therefore not surprising that Tolkien would have included Aldebaran among his named stars of Middle-earth, and specifically pointed out its presence in the sky between the Pleiades and Orion.

The case has been successfully made that Aldebaran is the sole astronomical object which truly fits the etymological, astronomical, and literary evidence. However, in the end, one can never know with *absolute* certainty whether Tolkien *meant* for Aldebaran to be Borgil (as astronomical inaccuracies do infrequently appear in his work),⁵ unless further manuscripts are discovered which shed light on his thinking in this matter. This paper, has, however, followed Tolkien's own suggestion in matters of such mysteries:

I feel it is better not to state everything (and indeed it is more realistic, since in chronicles and accounts of 'real' history, many facts that some enquirer would like to know are omitted, and the truth has to be discovered or guessed from such evidence as there is). (*Letters* 354)

NOTES

- 1 See, for example, Quiñonez and Raggett, Larsen (http://www.physics.ccsu.edu/larsen/astronomy_of_middle.htm), and Manning.
- 2 See, for example, Stone, and Quiñonez and Raggett.
- 3 For historical reasons, the astronomical magnitude scale is such that the lower the number, the brighter the star. The relationship between difference in magnitude and difference in apparent brightness is $(2.512)^m$, where m is the difference in magnitudes.
- 4 The author wishes to thank Marty Connors for providing *The Sky* data.
- 5 An example can be found in "Akallabêth: The Downfall of Númenor," where Venus (Eärendil) appears in the west at sunrise as a beacon to Elros and his Edain companions (S 260).

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