FURTHER MYTHOLOGICAL EVIDENCE FOR ANCIENT KNOWLEDGE OF VARIABLE STARS

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Abstract

I suggest that the variability of Betelgeuse (alpha Orionis) was known in pre-classical Greece, and that this knowledge is reflected in the myths associated with Orion and other figures in Greek mythology. There is corroboration in parallel myths from other cultures.

1. Introduction

Although the acknowledged history of variable stars begins with the discovery of Mira's variation at the start of the seventeenth century, it has often been suggested that knowledge of variable stars extends much farther back in time (Herschel1849; Hoffleit 1997). My own article appearing in this journal (Wilk 1996) proposed several features of the myth of Perseus and Medusa that appear to show knowledge of the variability of Algol, Mira, delta Cephei, and gamma Cassiopeia (see also Wilk 1999). I suggested that the same constellations also figured in the myths of Hercules and Hesione, and of Bellerophon and the Chimaera.

The present paper suggests that there was also ancient knowledge of the variability of Betelgeuse, which was likewise reflected in the associated mythology.

2. The myth of Orion

Although Orion is one of the most prominent constellations of the winter sky, and arguably one of the most readily identifiable by the layman, the myth of Orion is not particularly well-known. There is, in fact, little mythology associated with the figure, and the little that exists is somewhat contradictory. He is certainly a very old figure in mythology, appearing in the oldest of Greek poetry—the Iliad, the Odyssey, and Hesiod's Theogony. As with the myth of Perseus, Apollodorus has the most complete version of the myth (Frazer 1921). A useful volume of sources is Gantz (Gantz 1993).

Orion was a giant hunter, said to have hunted the Great Bear (not Taurus the Bull, oddly enough, which his constellation borders). He was very handsome, and able to walk on water. He pursued the Pleiades, but was said to be married to Eos, the Dawn. The astronomical meaning of this is clear enough, and was acknowledged by classical authors. Hesiod (circa 700 B.C.E.) noted the significance of his pursuit of the Pleiades.

There is more, related by Apollodorus, Hyginus (Condos 1997), Pseudo-Eratosthenes (Condos 1997), and others. According to these, Orion was killed by a great Scorpion, usually identified with the constellation Scorpio. Most ancient authors note that Orion sets as Scorpio rises (Ganz 1993). The astronomical knowledge needed to make such statements could have been gleaned in a single night's observations. I suggest that there is embedded in the Greek myths a deeper knowledge of astronomy than this.

3. Betelgeuse

The star alpha Orionis is not only the brightest star in the constellation of Orion, it is also one of the brightest in the northern sky. The star, a class M supergiant, has a distinct reddish cast. Its Arabic name Betelgeuse is usually and plausibly interpreted as

"The shoulder (or the armpit) of the giant," but there are some surprising suggestions about the interpretation of this name (Allen 1899; Chartrand 1991; Davis 1955).

What is even more surprising is that Betelgeuse is a variable star. It came as a considerable shock in 1840 when Sir John Herschel reported the fact at the January 10 meeting of the Royal Astronomical Society. The resulting paper was printed in the Society's *Monthly Notices* (Herschel 1840). Herschel himself first observed the variability while he was observing southern skies at the Cape of Good Hope in 1836. Uncharacteristically, he forgot entirely about the fact upon his return to England. He rediscovered the variability in November 1839 and was shocked to find his earlier notes on its variability. In his *Outlines of Astronomy*, Herschel places the range of variability as 1 to 1.2, and the period as irregular (Herschel 1849). Over the years Betelgeuse's period has been variously estimated at 196 days to 5.7 years to 8 years, probably with shorter period fluctuations. M. Karovska of the Harvard-Smithsonian Center for Astrophysics performed a Fourier analysis on data from 1919 to 1982 provided by AAVSO. She found five statistically significant peaks in the frequency spectrum at 1.05 years, 5.7 years, 6.5 years, 8.8 years, and 20.5 years (Karovska 1986), indicating multiple periods. The AAVSO's own data for the period 1913–1998 show a maximum magnitude of 0.4 and a minimum magnitude of 1.3 (Mattei 1999). In the nineteenth century the range was almost certainly greater. Herschel himself reports Betelgeuse being as intense as Rigel on November 13, 1836, and even brighter than Rigel on October 24, 1837, and November 26, 1839. W. H. Allen (Allen 1899) noted that on December 5, 1852, it was reported to be "the largest (brightest, presumably) star in the northern hemisphere". Today alpha Orionis is classified as a type SRc (semiregular) variable star (Petit and Maffei 1987).

4. The myth of Pelops

Betelgeuse is thus a very bright, prominent star that undergoes striking changes in intensity, occasionally becoming extremely bright, other times dwindling in intensity, with no clearly discernable period. It represents the shoulder of a large figure. Can this be tied into the myth of Orion in any way? Aside from the possibility of the star representing the boy or dwarf Kedalion (said to have been carried on Orion's shoulder), there does not appear to be any connection. There is, however, another figure in Greek mythology who does fit in with these facts very nicely. That figure is Pelops, son of Tantalus. According to his myth (recounted most notably in Pindar's first Olympian Ode, although referred to several times in ancient literature (Ganz 1993)) Pelops was killed by his father and cut up into a stew served to the gods. The gods immediately knew what the banquet was and refused to eat it, except for one goddess—Demeter, in most sources—who ate what turned out to be his shoulder. Tantalus was cast into Hades to atone perpetually for his crime, and Pelops was restored by being boiled in a cauldron. His missing shoulder was replaced by a piece of ivory.

Pelops later defeated king Oenomaus of Pisa in a chariot race, killing the king in the process and winning his daughter Hippodameia as a wife. He later became ruler of the Pelopponese, which he renamed after himself ("Pelops' Island" = " Pelopponese"), and was esteemed a great ruler, although his line was notably cursed.

I maintain that here we have a myth that fits the observed phenomena well. The noticeably variable star Betelgeuse is the disappearing shoulder. Its reddish-yellowish color is plausibly the color of ivory. Furthermore, the constellation of Auriga is contiguous to Orion. Auriga is the Charioteer. The figure has been identified with various figures in Greek mythology, including Myrtilus, charioteer of Oenomaus (Condos 1997). It is significant that the constellation which can be identified with Pelops is next to the constellation of his rival charioteer. In the course of the night one may see them riding the circuit around the pole star.

5. Parallel myths

I note that there is a Hungarian myth of a warrior whose shoulder is replaced by one of ivory (Frazer 1935), although this is not explicitly connected with a constellation. In Egypt, the constellation of Orion was associated with the god Osiris. It is significant, I think, that Osiris was also said to have been dismembered, then re-assembled and brought back to life. Again, one part was missing and had to be replaced. In the case of Osiris, however the missing part was a penis. Is it possible that the myth has altered through time?

The constellation of Orion is associated with myths of dismemberment elsewhere in the world. Among the Taulipang of Brazil, it is said to represent a man named Zililkawai whose wife hacked off his leg, represented by Betelgeuse (Staal 1988; Werner 1961; Koch-Grünberg 1923). Staal, who recounts this, associates the redness of Betelgeuse with the bloody stump, but I note that the variations in brightness could give the impression of the leg being "hacked off." The Taulipang live in northern Brazil, near or below the equator, where the constellation of Orion appears to be sideways (relative to its orientation in the northern hemisphere) when it rises, and Betelgeuse can plausibly be interpreted as a leg rather than a shoulder. (I must note, in fairness, that the parallel myth among the nearby Warao concerns a man named Nohi-Abassi, who also loses a leg. The Warao say the leg is the "belt" of Orion (Wilbert 1970).

Similarly, among the Lakota of the North American Plains the constellation represents the arm of a Lakota chief which was ripped off as punishment. Again, in this case Betelgeuse is not explicitly even named (the belt is the wrist and thumb, Rigel the index finger) (Goodman 1992a, 1992b).

6. The Scorpion

As a last note I offer the myth of Orion's death by the Scorpion. As has been noted, the astronomical significance of Orion setting while Scorpio rises was known even in the ancient world. One would not have to go far to see why these two are associated: both are striking constellations—Orion with its quadrangle and belt, Scorpio with its J-plus-T shape. Yet one must still ask why those two constellations are associated. There are many pairs of constellations situated so that one rises while the other sets. Why should Orion and Scorpio be the pair associated in myth? The significance grows when we find that the two constellations are thus associated in China as well as in Greece. According to some, the constellations represent Shen and Shang, sons of a sky god and bitter rivals, always out of sight of each other at opposite ends of the sky (Shafer 1977). I note, by the way, that Aratus in his Phaenomena associates Scorpio with Orion without explicitly noting their antagonism at one point (Mair 1960).

I suggest that the association of Scorpio and Orion as antagonists results not only from their positions "at opposite ends of the sky," but also from another peculiarity of these constellations. The brightest star in each is a type M supergiant red star — Betelgeuse in Orion and Antares in Scorpio. In fact, each is a type SRc variable star. They are the only two type SRc variable stars among the twenty brightest stars in the sky, and the only ones whose variability is discernable by the naked eye. Betelgeuse's variations are noted above. Antares—whose name, "the rival (or comparable to) Mars," is clearly inspired by its red color—is said to vary between visual magnitude about 0.9 and 1.2, with a period of roughly 4 to 5 years (Ridpath 1998). One report of rapid and very brief dimming to about magnitude 2.3 is on record (Copeland 1978). Despite Copeland's inability to detect clouds in the area, this remains the most likely explanation for the observed dimming.

7. Conclusion

The existence of so many myths of removed and replaced body parts that can be plausibly connected with the constellation of Orion suggests that knowledge of the variability of alpha Ori was known in several parts of the world.

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