Reflections

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Betelgeuse, We Hardly Knew Ye

The word from the Astronomy Department is that we may be losing dear old Betelgeuse soon. It's likely to go supernova in—say—one hundred thousand years, which is only an eyeblink in galactic terms. Or perhaps it will blow its top next Tuesday.

Which would be a shame. Betelgeuse is one of everybody's favorite stars. It's easy to find, at least in the northern hemisphere, because it's an important part of the extremely conspicuous constellation Orion, and Orion was known as far back as Pharaonic Egypt and the kingdom of Sumer and Akkad, and to ancient Hindu and Hebrew and Chinese astronomers as well, and probably much further back than all of those. It's one of the brightest stars in the sky, with a magnitude of—well, I'll get to that in a moment—and can be found near one of Orion's arms. Betelgeuse is a red supergiant sun, the second brightest star in Orion, the brightest being its celebrated blue-white neighbor, Rigel, elsewhere in Orion's torso. (I'll get back to that, too.)

When I was a small boy, some time back, small boys trying to be clever called Betelgeuse "Beetle-juice." For all I know, they still do. I don't recall any small girls talking about Betelgeuse back then, and these days I have no idea what small girls say when they're trying to be clever, but in all probability, given the unchanging nature of childish amusements and the current trends toward gender parity in scientific education, children of both sorts still call it "Beetle-juice." For a long time it was believed that its name was a corruption of the Arabic *Ibt al Jauza,* meaning "the Armpit of the Central One," which over time turned into *Beit Algueze, Bet El-Geuze,* and finally *Betelgeuse.* (As I said, "near one of Orion's arms." The armpit is as close to the arm as one can get.) The current etymological theory is that *Ibt* is an incorrect medieval transliteration of the Arabic, and the word was actually *Yad,* meaning "hand," or, possibly, *Bat,* wrongly translated as "armpit." The "-elgeuse" part of the name comes from the Arabic *al-Jauza,* the Arabic name of the constellation Orion, whose meaning itself is uncertain.) Scientists who would rather not be bothered with medieval Arabic terminology and the corruptions thereof call it *Alpha Orionis,* meaning the brightest star in Orion, and, since it actually is not, that brings me back to the problem of Betelgeuse's magnitude, to which I promised to return just one paragraph back.

The great British astronomer, Sir John Herschel, studying Betelgeuse in 1836, observed that its magnitude—its apparent brightness—was highly variable, and further observations in the ensuing four years led him to declare that "its variations were most marked and striking." In October 1837 and November 1839, Betelgeuse outshone its neighbor Rigel, normally the brightest star in Orion, which led to its getting the anomalous Alpha designation and relegating Rigel to *Beta Orionis.* Betelgeuse then was quiescent for a decade but began acting up again in 1849, and on December 5, 1852, Herschel announced, "It was actually the brightest star in the northern hemisphere."

Since Herschel's time Betelgeuse has been very variable indeed, with peaks of brightness in 1933 and 1942, and significant dimming recorded in 1927 and 1941. In 2009 it underwent a 15 percent contraction in size, setting off a spate of rumors that it had begun the process of shrinkage that leads to the kind of violent stellar explosion that produces a supernova. This immediately stirred up some doomsday predictions, with excitable journalists suggesting that x-rays, ultraviolet radiation, or other detritus from an exploding Betelgeuse would fry our Solar System when the nasty moment came.

Well, no. One does not want to be close to a supernova when it's supernovafying, but

we won't be. Betelgeuse is a really big star. Its mass has been calculated as between ten and twenty times the size of our Sun. If it were placed at the center of our Solar System, its surface would reach out beyond the orbits of Mercury, Venus, Earth, and Mars, and come close to that of Jupiter. Having a star that big explode in our vicinity could be quite troublesome. Betelgeuse, though, is seven hundred light-years away, quite a considerable distance, and although Betelgeuse as a supernova would be as bright in our sky as the full moon, nothing from it is going to reach us except its brilliant light.

As it turned out, the 2009 contraction seems to have been nothing more than a temporary shrinking of the star's outer atmosphere. It was back to normal soon enough; but then, a decade later, it offered us another episode of dimming, once again causing another spate of supernova fears. And so it has gone. A dimming spell that began in January 2020 took Betelgeuse's luminosity to the lowest level on record, lowering its brightness by more than half and dropping it from the seventh brightest star in the sky to the twenty-first, after which, within a matter of days, it began to brighten again. It is, apparently, in the nature of aging stars like Betelgeuse to fluctuate. Such elderly stars tend to be moody and cranky.

Do all these stellar hijinks mean that Betelgeuse really is going to blow up?

Alas, yes. The normal destiny of red supergiant stars like Betelgeuse is to burn all of the hydrogen of which they are made, turning them into helium and then heavier elements, until their core has become solid iron and the star undergoes collapse followed by explosion, leaving behind a black hole. But—unless they are wrong, of course—that isn't going to happen to Betelgeuse for some one hundred thousand years, and the explosion that occurs then is not going to have any serious effect on our Solar System.

Scientists are sometimes known to be wrong. As Dr. J. Craig Wheeler, who studies supernovas at the University of Texas in Austin, puts it, "We all know that nature can sometimes throw mean curveballs." Nevertheless, I urge you all to stay calm. The chances are very good that an imminent blowup of Betelgeuse is not on the cosmic docket.

I would miss Betelgeuse if it does blow up next year. I have set a number of stories on planets of Betelgeuse, such as one published back in 1959, a novel called *The Planet Killers* that takes place on a world called Lurion, "the fourth and only inhabited world of the Betelgeuse system, a smallish planet swinging on a somewhat eccentric orbit half a billion miles from its brilliant sun." Of course we have no way of knowing, at a distance of seven hundred light-years, whether Betelgeuse has planets, let alone inhabited ones. But scads of science fiction stories have been set on some world of Betelgeuse all the same, or at least have mentioned it in passing—think of all those small boys of yesteryear who liked to call it "Beetle-juice" and grew up to be science fiction writers. The absence of Betelgeuse from the sky would force us all to move along to Rigel, or Arcturus, or Deneb, or some other conveniently named and familiar star, for the setting of our epics.

I would miss Earth, too, if the dreaded Betelgeuse supernova spoils our summer vacations next year. But I'm comfortable with the scientific assurance that that is not going to happen, and even if all our astronomers are wrong about that, the explosion is going to happen far from here and is not going to bother us.

Those who like to revel in potential catastrophes, who looked forward with eager anticipation to the breakdown of all computers in the Year 2K disaster or the end of the world itself in 2012 as predicted by the Mayan calendar, can still titillate themselves with a whole host of doomsday stories that we science fiction writers have provided for them. There's Philip Latham's "N Day," in which our own Sun is about to go nova, and the astronomical establishment is very slow to take cognizance of the fact, not that there's anything they can do about it. There is Robert A. Heinlein's "The Year of the

Jackpot," in which much the same thing happens. There's Olaf Stapledon's staggeringly visionary novel *Last and First Men,* in which humanity, after billions of years of extraordinary evolution, is within the coming thirty thousand years going to be snuffed out by a colossal stellar explosion that will wipe out all life within a vast distance of the Solar System. And then there is a particular favorite of mine, obscure though it be—Frank Lillie Pollock's short story "Finis," first published in *Argosy* magazine for June 1906, and reprinted now and then since then, including, I add for the sake of full disclosure, in my own anthology *This Way to the End Times* (where you will also find the Philip Latham story and a lot of other juicy apocalyptic items).

In the Pollock story, scientists have predicted the arrival of a new star in the heavens that will have the brightness of a full moon—presumably the light of a gigantic distant star that just now is reaching our vicinity. It is exciting news, and people on the East Coast stay up late to watch its advent. But though it is a cold February night, the temperature starts rising toward midnight, the snow melts, and the Moon, when it rises, is three times as bright as normal, a brilliant white disk, reflecting something extremely bright that is entering the sky. "Some error had been made in the calculations," Pollock tells us.

Indeed. The night grows warmer and warmer. Icicles melt. A flag atop a nearby building bursts into flame. A window breaks and the glass falls inward. The onlookers leap back "as if a blast furnace had been opened before them."

But it is worse than that. "Something like the Sun, but magnified fifty times in size and hotness, was rising out of the sea." There is no hiding from it. Things get worse and worse . . . and worse. Pollock's protagonists, a young couple, enjoy their first kiss. And then the eloquent final passage:

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"The twilight was gone before they knew it. The sky was blue already, with crimson flakes mounting to the zenith, and the heat was growing once more intense.

"'This is the end, Alice,' said Eastwood, and his voice trembled.

"She looked at him, her eyes shining with an unearthly softness and brilliancy, and turned her face toward the east.

"There, in crimson and orange, flamed the last dawn that human eyes would ever see."

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Very nice—good shivery stuff. Betelgeuse, even if it did go supernova and hurl its rays our way and fry us despite all predictions, would do no worse.