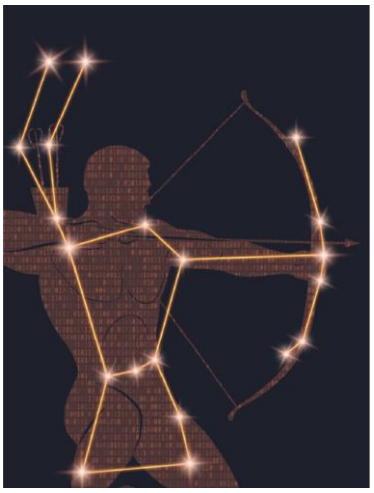
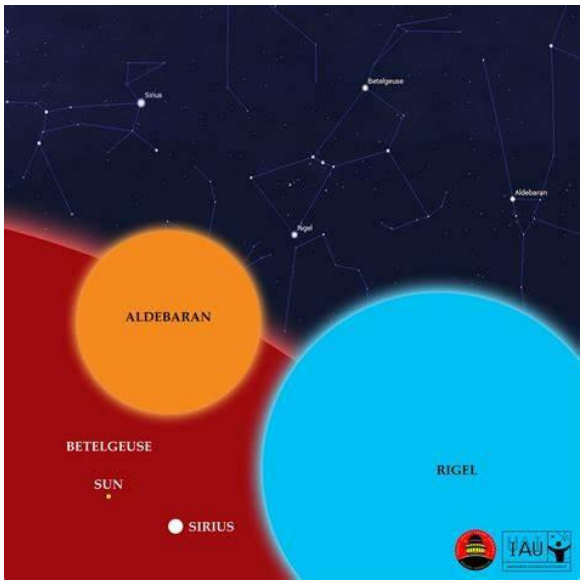
AL JABBAR AND THE TWO GIANTS



Al Jabbar is one of the Arabic names for Orion, "The Hunter", one of winter's most conspicuous constellations. At this time of the year, on a clear night you should be able to see in the southern sky three stars in a row. These mark the hunter's belt. From there it is easy to see the four stars forming his body, and the silvery streak extending down from his belt, marking his sword.

This silvery streak contains the Great Orion Nebula, one of the most conspicuous gas clouds and stellar nurseries in the sky. Orion is having a face-off with Taurus, the Bull, whose head is marked by a V-shaped group of stars to Orion's right, with the red star Aldebaran marking the bull's angry, red eye.

Orion is being assisted by two dogs, Canis Major, the principal dog, lower and behind Orion, marked by its brightest star, Sirius. This is the brightest star visible in our night skies. Higher up is a less bright star, Procyon, which is the main star in Canis Minor, the not-so-senior dog. Note that both dogs are making sure they have Orion between them and the bull. Running under his feet is Lepus, the Hare, which is probably not a participant.



The two giants riding along with Orion are Rigel, a blue-white supergiant star marking his right knee, and Betelgeuse, a red supergiant marking his left shoulder. The colours are clearly visible. To see them even more clearly, use a pair of binoculars that are thrown out of focus. This spreads the intense dots of light into dimmer, coloured discs.

Rigel lies some 860 light years away. It has about 20 times the mass of the sun and is some 120,000 times brighter. It is far bigger than the sun. If it were put at the centre of the Solar System, Mercury and Venus would lie inside. However, for us on Earth it would make little difference, because we would be instantly fried anyway. With a mass 21 times that of the sun but shining 120,000 times brighter means it is burning its fuel at a ferocious rate. This star is going from birth to death in a supernova explosion in maybe ten million years. The lifetime of the sun is expected to be around 8 billion years.

Rigel's large size means its gravitational hold over its outer layers is comparatively weak, making it easy for its ferocious energy output to blast the star's material off into space. Over its lifetime it has blown off around three solar masses of material.

Betelgeuse is spectacularly different from Rigel. It is conspicuously red, with a surface temperature of around 3,000 degrees Celsius rather than Rigel's 12,000. Our sun has a surface temperature of around 6,000 degrees. This star's name is often pronounced as "beetle juice", but Beteljurze (betel as in petal) Is probably closer to the original Arabic (bat al-jauza). Betelgeuse has a mass of 16.5 times that of the sun, shines with the brightness of 14,000 suns, and lies very roughly 500 light years away. As in the case of Rigel, Betelgeuse is gulping through its fuel supply at a huge rate, so it too measures its life in millions of years rather than billions. Although only around ten million years old, Betelgeuse is now running out of fuel and is in an even more precarious energy situation than Rigel. Observations made thousands of years ago describe this star as being yellow. If this is the case, the onset of old age has been very rapid. Ageing stars swell up. Betelgeuse is now so large that if it replaced the sun at the centre of the Solar System, Mercury, Venus, Earth and Mars would all be inside it. However, being so swollen, the density of the star's outer layers is very low, so its gravitational hold on them is even precarious than Rigel's, and its radiation is blasting material off into space. That ejected material has blown a hole in the interstellar clouds some four light years across.

Both Rigel and Betelgeuse will end their lives in supernova explosions and end up as either neutron stars or black holes. Betelgeuse can go any time: tomorrow or in the next million years.

Saturn lies low in southwest, low in the after-sunset glow. Scanning left from Saturn we find Venus, then Jupiter, and finally, Mars. This is the build up to late February's lineup of the planets. The Moon will be New on the 29th

Ken Tapping, 28th January, 2025

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