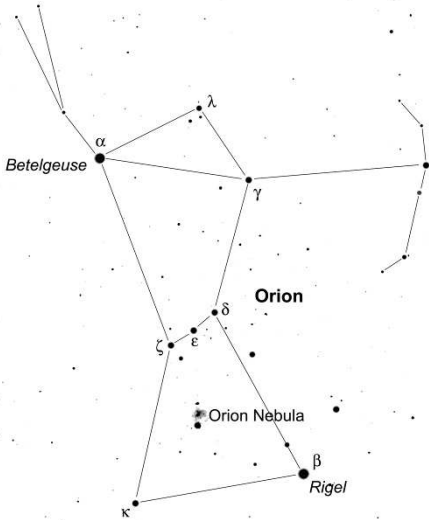




## THE WINTER SKY OVER BOSHAM

In the southeast sky in the early evening is the hourglass shape of Orion, the hunter, one of the most recognisable constellations in the night sky. Unlike most constellations, which are mostly random groupings of stars that happen to appear together in the sky, the stars of Orion are almost all related, outlining one of the closest star-forming regions to Earth. The



constellation contains two of the brightest stars in the sky, with Betelgeuse marking the top left 'shoulder' and Rigel the lower right 'foot'—the name itself is derived from the Arabic word 'rijl'. Both are about ten million years old and near the end of their lives, but can you see a difference in colour? Rigel is a blue/white star roughly twice as hot as the Sun, whereas Betelgeuse is orange-red, showing it to be much cooler. Both stars are of titanic proportions. Rigel is seventy times larger than the Sun, but it is dwarfed by Betelgeuse which is fifteen times larger still—at well over a thousand times the diameter of the Sun it would extend out almost to the orbit of Jupiter. The right 'shoulder' of Orion is marked by the star Bellatrix, the warrior woman (and a name familiar to any Harry Potter reader), at four times the temperature of the Sun one of the hottest stars visible to the naked eye, while the

left 'foot' is marked by Saif, the sword. The body is completed by the three stars of the belt, all hot, blue stars that are much younger than Rigel and Betelgeuse. At the left of the belt are the star Alnitak and the Horsehead nebula—see the photograph on page 27.

As your eyes become accustomed to the dark, more details will emerge. Hanging down from the belt is Orion's sword, marked by three stars. However, the central 'star' is no star at all, but the great Orion nebula, a giant cloud of interstellar gas, lit up by a quartet of newborn stars. Although detail is only visible with the naked eye under exceptionally dark skies, the nebula is clearly visible through binoculars, while a small telescope will show the 'trapezium' shape of the stars powering the nebula. The tip of the sword is marked by Na'iral Saif, Arabic for the 'bright one of the sword'. A small telescope will show a fainter companion star (it is actually a quadruple star, but the third and fourth components require a large telescope) while next to it is a binary star, Struve 747, which is easily seen with a pair of binoculars. Looking back to Betelgeuse and Bellatrix, can you now see the head of Orion, made up of a trio of fainter stars? Orion's arm extends upwards from Betelgeuse, while an arc of stars to the west of Bellatrix mark his bow, which has just unleashed an arrow at Cygnus, the swan, who is escaping over the horizon to the west. If the details are hard to see, then try looking slightly off to one side, as in darkness the eye is more sensitive with slightly averted vision.

At Orion's feet cowers Lepus, the Hare, and the head of the great river Eridanus; both

extend downwards to the horizon and contain few bright stars, making them hard to view. Following at Orion's heels are his hunting dogs, the constellations Canis Major and Canis Minor. The larger of the dogs is dominated by the brilliant star Sirius, the 'dog star' which rises an hour or two after Orion and can be found by following the line of the three stars of the belt towards the horizon. While Sirius is the brightest star in the night sky, comfortably outshining both Betelgeuse and Rigel, it actually far smaller and less luminous, with its relative brightness reflecting the fact that it is one of the Sun's closest neighbours. In ancient Egypt the appearance of Sirius in the morning sky coincided with the flooding of the Nile and the start of the new year, and the stars of Canis Minor, located above Canis Major, reflect its importance; the brightest star, Procyon, is named for the Greek 'pro' (before) and 'kyon' (dog), while the second brightest star in Canis Minor, Murzim, is derived from its Arabic name 'al Murzim', the Herald. The two stars rise earlier than Sirius, and their presence in the dawn sky marked the impending rise of the Nile.

Together Procyon, Sirius and Betelgeuse form the equilateral 'winter triangle', one of the most recognisable patterns in the winter sky. East of the triangle are Castor and Pollux, the twins of the constellation Gemini. Castor is a remarkable system that comprises no fewer than six stars bound together by gravity—a small telescope will show the brightest two—while Pollux is one of the few naked eye stars known to have a planet orbiting it, with an object roughly twice the size of Jupiter orbiting every 19 months. Within the winter triangle lies the constellation Monoceros, the Unicorn. The constellation is not easy to see with the naked eye, and your eyes will need to be well adapted to the dark—can you see the unicorn's horn between Orion's belt and Sirius? Amongst astronomers, the constellation is famous for the Rosette nebula—*pictured on the front cover of this magazine*—a large circular nebula with a cluster of stars at its centre, but unlike the great Orion nebula it is much too faint to see without a large telescope.

Finally, if you turn to the south-western sky you will see the planet Jupiter, the only object apart from the Moon that currently outshines Sirius in the night sky. Having dominated the southern sky all winter, Jupiter is now setting in the West by mid-evening. Binoculars will show the four moons seen by Galileo, while a small telescope will show the cloud bands and 'great red spot' on the surface. Uranus lies nearby, but its faintness and small size makes it a challenging target to find. With perseverance, binoculars and a star chart will find it, with its distinctive greenish colour making it stand out from the surrounding stars.

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