

# THE NIGHT SKY

APRIL 2010

**S**ome of the brightest stars in the whole sky can be seen during these crisp autumn evenings. As red Betelgeuse and blue Rigel set with Orion, the Hunter in the west; fiery red Antares rises in the east. For me, I don't think there are any other constellations in the sky that herald the coming of the seasons so well as these two do. Orion in the east, signals summer is around the corner, whilst Scorpius in the east, brings the chill winds of winter with it.

Over in the northeast another star shines. This is Arcturus, in the constellation Bootes, the herdsman. It's an orange-giant star, and it's unusually old as naked-eye stars go: about 10 billion years — roughly twice the age of the Sun, Earth, and solar system. **Arcturus may thus be the oldest object you've ever seen.**

Arcturus is the third-brightest star in Earth's night sky. It appears so bright for a couple of reasons. First, Arcturus really is a bright star; it produces more visible light than most stars. If you placed Arcturus side by side with our own star, the Sun, it would appear more than a hundred times brighter. And second, Arcturus is fairly close to us, at a distance of just 37 light-years.

This nearness has another effect on how we see Arcturus: It moves across the sky faster than almost any other star. All stars are in constant motion as they orbit the centre of our Milky Way galaxy. But they're so far away that their motion is imperceptible on human timescales. Astronomers must use sensitive instruments to measure this motion.

Arcturus is moving toward the constellation Virgo, which is higher in the sky above Arcturus, at about half a degree every millennium — a distance equal to the width of the full Moon. Arcturus will move out of Bootes and into Virgo in about 20,000 years.

And in the constellation Virgo, there's another autumn star, Spica. It shines at first magnitude on the astronomer's scale of brightness, while Arcturus outshines it at magnitude zero. Compare their colours, too: Arcturus is pale orange-yellow, while hotter Spica is blue-white.

You can find Saturn, the second largest planet in the solar system, in Virgo also. It's one of the greatest attractions at any star party; however Saturn's famous rings are seen at a very narrow angle from Earth at the moment. Next year will provide a much nicer view.

From Saturn, turn your gaze further to the north. There, the constellation of Leo, the lion is quite prominent. Many different cultures have seen a lion in this pattern of stars. But others have seen a sickle, which forms the lion's head and shoulders, and a small triangle, which forms its hindquarters.

The brightest star in the sickle is Regulus; the heart of the lion. The brightest star in the triangle is Denebola, "the lion's tail", also known as Beta Leonis because it's Leo's second-brightest star. It's about half as bright as Regulus.

It is in that apparently vacant part of sky between Leo and Virgo, that we find the Virgo Cluster of Galaxies. A telescope will reveal dozens of galaxies. Each one is home to anywhere from a few million to hundreds of billions of stars. Using data obtained with the Hubble Space Telescope, astronomers now estimate that the distance between Earth and the centre of the Virgo Cluster is some 48 million light years. That means that the light left the galaxies 48 million years ago, travelling at a speed of 300,000 kilometres per second!

High in the southern sky, we find Crux, the Southern Cross. It's the smallest of the 88 constellations, but one of the most distinctive. This part of the sky is rich in stars, and I would encourage you to grab a pair of binoculars and scan along the Milky Way. Take a look to the right and slightly above of the Southern Cross, about two binocular fields, and locate a glowing cloud of gas known as the Eta Carinae Nebula. It's marked as "3372" on the map.

This enormous gas cloud contains one of the most remarkable star systems in the Milky Way galaxy. It's just a pinpoint of light that's barely visible to the unaided eye, but a century and a half ago it shone almost as bright as the brightest star in the night sky. And it surrounded itself with a cocoon of hot gas that looks like an hourglass.

The system, which also gives its name to the gas cloud, is called Eta Carinae. It's about 7500 light-years away in the constellation Carina. It's several million times brighter than the Sun, and tens of thousands of degrees hotter. Because of its cocoon, astronomers can't see whether the system consists of one or two stars. But even if it's two stars, they'd both be among the heaviest in the galaxy.

The system is no more than three million years old; a mere babe compared to most stars; but it is aging fast. Such heavy stars are extremely hot, so they "burn" the nuclear fuel in their cores at a staggering rate. They're also unstable. In the 1840's, Eta Carinae erupted, blasting out two big blobs of gas.

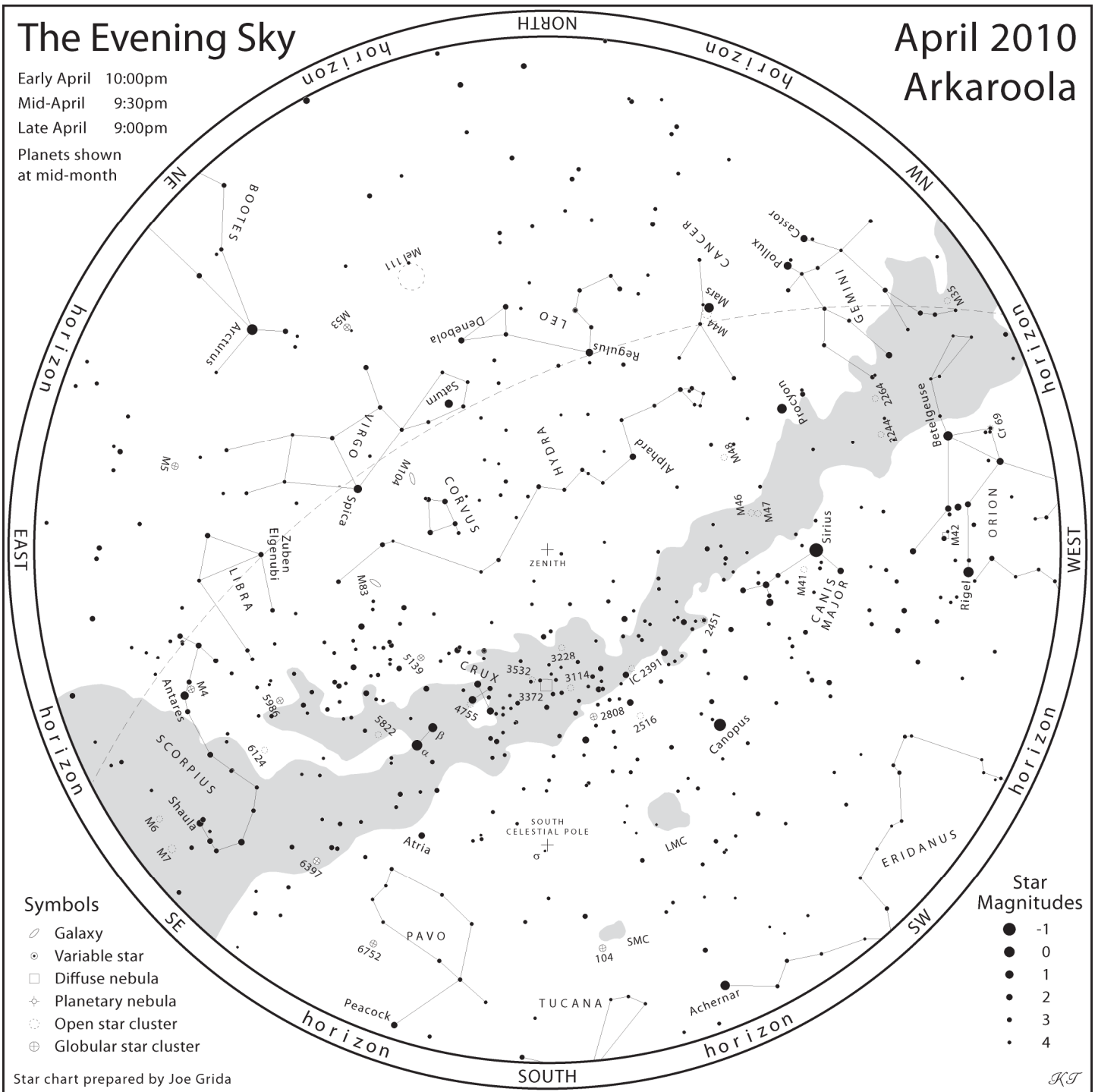
An even bigger eruption may lie ahead. Fairly soon, possibly within the next million years or so, it may blast itself to bits as a supernova. For a few weeks, it'll outshine all the other stars in the night sky.

The Moon is Full on the 30<sup>th</sup> of March, at Last Quarter on the 6<sup>th</sup> April, New on the 14<sup>th</sup>, at First Quarter on the 22<sup>nd</sup>, and Full on the 28<sup>th</sup>.

# The Evening Sky

April 2010  
Arkaroola

Early April 10:00pm  
Mid-April 9:30pm  
Late April 9:00pm  
Planets shown  
at mid-month



## M104 - The Sombrero Galaxy

Distance: 31 Million Light Years

M104 is truly a remarkable sight with its prominent glowing bulge transected by a thick dusty disk. In the realm of galaxies its haunting form is nearly an icon. M104 is a luminous and truly massive galaxy with an equivalent total mass of 800 billion suns. Its edge-on view has provided astronomers with insight into the organization of matter within spiral galaxies.

M104 is one of a growing list of galaxies known to possess a super massive black hole within its nucleus. M104's black hole contains a monstrous one billion solar masses. Super massive black holes of that size are usually found in very luminous galaxies possessing an active galactic nucleus (AGN). An accretion disk feeds matter to the black hole provoking the release of prodigious amounts of energy in the form of light, radiation, and jets of superheated gas which are characteristic of AGN's.