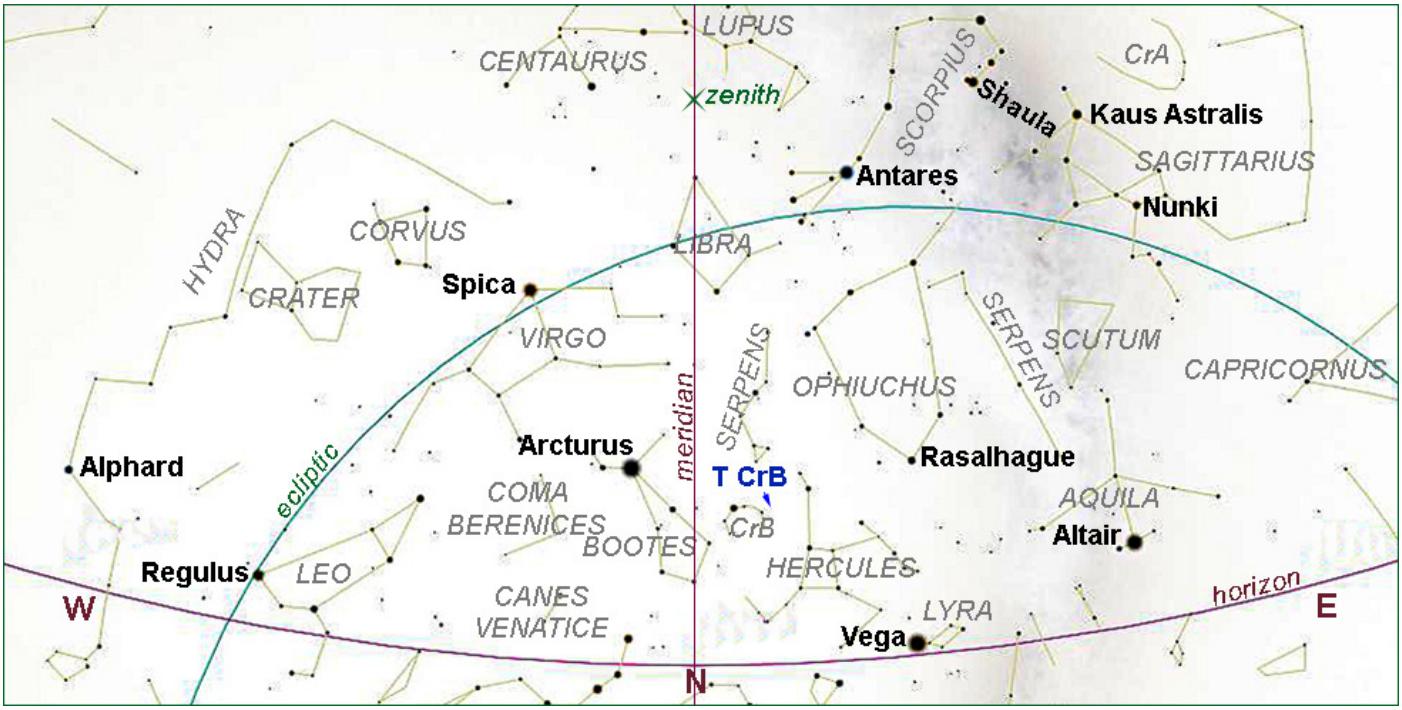
SKYNOTES from Hermanus

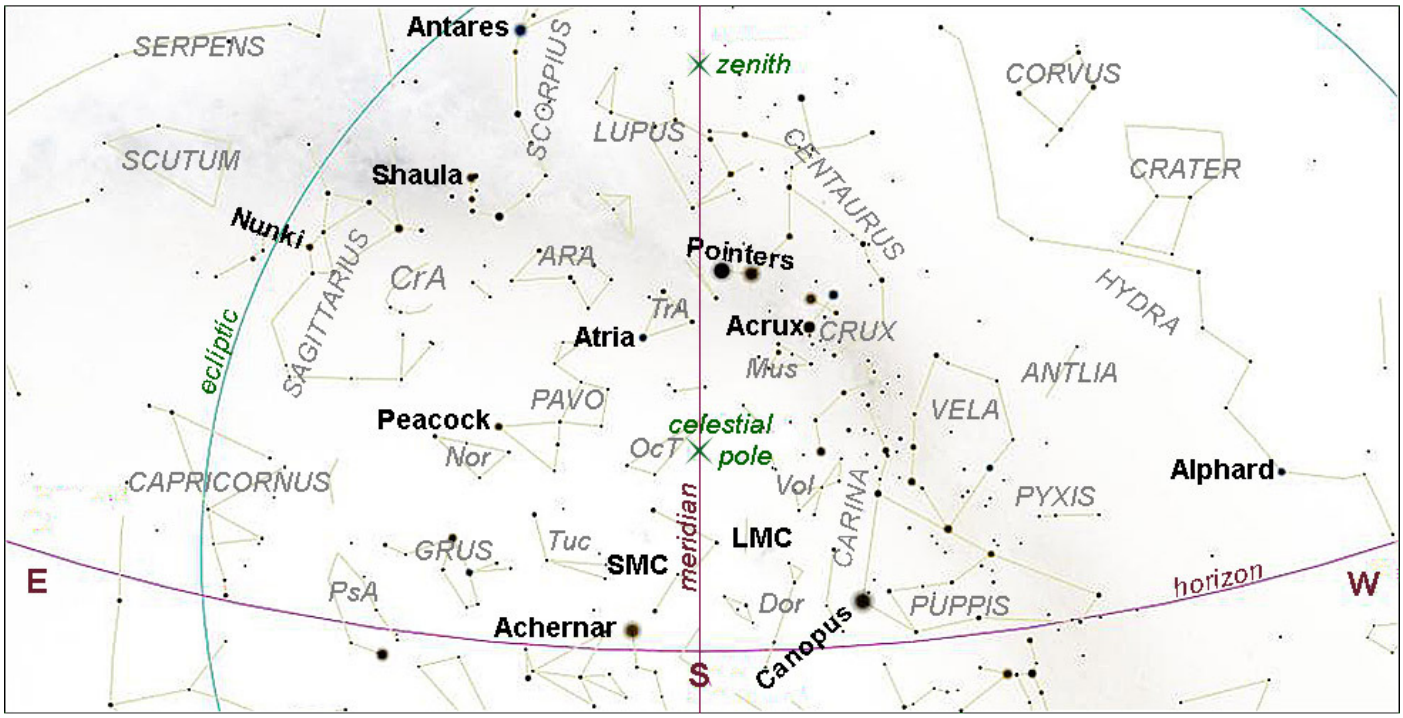
JULY 2024

SKY CHARTS

EVENING SKY JULY 3rd at 21h00 (NORTH DOWN)



EVENING SKY JULY 3rd at 21h00 (SOUTH DOWN)



SUGGESTED EVENING OBSERVATION WINDOWS

(Lunar observations notwithstanding)

Date	*Moon*		*Dusk end*
27th June	*Rises*	**23h45 (61%)**	**19h12**
to **8th July**	*Sets*	**20h16 (4%)**	**19h17**
`26th July	*Rises*	**23h53 (72%)**	**19h26**
to **6th August**	*Sets*	**20h04 (4%)**	**19h32**

THE SOLAR SYSTEM

PLEASE NOTE: allevents are as predicted from **HERMANUS**, Western Cape, South Africa.

JULY HIGHLIGHTS from THE SKY GUIDE 2024

Date	*Time (SAST)*	*Item*
3		**Neptune** stationary
5	02h08	**Moon** northernmost (+28.4º)
	07h06	**Earth** at aphelion (1.0167 au)
		(1) Ceres at opposition (mag. +7.3 1.89 au)
6	00h57	**New Moon** near **Venus** and **Pollux**
9		**Moon** (14%) near **Regulus**
		Venus at **perihelion**
	10h12	**Moon** at apogee (404 363 km)
13	00h27	**Moon** at descending node
14	00h49	**First Quarter Moon** near **Spica**
17	22h54	**Moon** (85%) brushes past **Antares**, having occulted **σ Sco** and **NGC 6144**
19	12h59	**Moon** southernmost (-28.4º)
21	12h17	**Full Moon**
22		**Mercury** at eastern elongation (26.9º)
		Pluto at opposition
24	07h43	**Moon** at perigee (364 914 km)
	21h40	**Moon** (84%) rises 0.7º after **Saturn**
25	20h04	**Mercury** sets 2.1º south of **Regulus** (α Leo)
26	07h33	**Moon** at ascending node
27		**Mercury** at aphelion
28		**Last quarter Moon**
29		**Moon** near **Pleiades** and **Uranus**
30		**Moon** near **Jupiter** and **Mars**

SOLAR SYSTEM VISIBILITY

2024 JULY 3rd				*When visible?*
Sun Length of day	Gemini 9 hours 55 minutes	Rise: Transit: Set:	07h50 12h47 17h45	**Never look at the sun without *SUITABLE EYE PROTECTION!***
Mercury Magnitude Phase Diameter	Cancer -0.4 74% 6”	Rise: Transit: Set:	09h11 14h12 19h14	Low in the west after sunset
Venus Magnitude Phase Diameter	Gemini -3.9 99% 10”	Rise: Transit: Set:	08h26 13h22 18h18	Too close to the Sun
Mars Magnitude Phase Diameter	Aries +1.0 90% 5”	Rise: Transit: Set:	03h41 08h58 14h14	Morning
Jupiter Magnitude Diameter	Taurus -2.0 34”	Rise: Transit: Set:	05h23 10h24 15h25	Morning
Saturn Magnitude Diameter	Aquarius +1.0 18”	Rise: Transit: Set:	22h58 05h21 11h39	Morning
Uranus Magnitude Diameter	Taurus +5.8 3”	Rises: Transit: Set:	04h22 09h30 14h38	Morning
Neptune Magnitude Diameter	Pisces +7.9 2”	Rise: Transit: Set:	23h49 05h58 12h03	Morning
Pluto Magnitude	Capricornus +14.4	Rise: Transit: Set:	19h01 02h14 09h24	All night

Phase: In a telescope, the inner planets (Mercury, Venus and Mars) appear to us in phases depending on the angle of the Sun’s illumination, as does the Moon. The observed **angular diameter** is given in arc seconds.

Transit: When an object crosses the **local meridian,** it is said to ‘transit’. The local meridian is an imaginary line from the horizon directly north passing overhead through the *zenith* to the horizon directly south.

Magnitude: we are accustomed to hearing stars described in terms of ‘magnitude’. For example, the planet Jupiter at magnitude -1.8 is considerably brighter than the star Antares (in Scorpius) at +1.05. The scale is ‘inverse’; the brighter the object, the lower the value. A ‘good’ human eye on a clear night can see down to a magnitude of about +6.

THE MOON

"It is a most beautiful and delightful site to behold the body of the Moon" - Galileo Galilei (1564 to 1642).

ORIENTATION

East and west on Moon maps match the directions used for Earth rather than those usually used for the sky. This convention was chosen by the International Astronomical Union (IAU) which agreed with NASA's astronauts that for people on the Moon, the Sun should rise in the east and set in the west. You may sometimes see slightly more or less of the Moon than our maps show because the tilted elliptical orbit of the Moon causes "librations", giving us occasional glimpses of extra territory around its rim edges.

IS THE MOON ACTIVE?

Searches for activity on the Moon began with Galileo almost 400 years ago and have continued ever since. Observers claimed to have seen mists obscuring craterlets on Plato's floor, a glow on the central peak of Alphonsus and the disappearance of the Linné crater to name but a few. Are these transient lunar phenomena (TLP's) the results of meteorite strikes or gaseous escapes from the moons interior? Or are they merely tricks of the light and an over eager imagination?

BOMBARDMENT

If Rocky asteroids and meteorites can hit the moon so can comets, but a comet would have a very different effect from an asteroid because comets are extremely rich in water. The impact of a large comet would create a big crater but would also give the moon a tenuous and temporary atmosphere loaded with water vapour. Any water vapour that drifted near the lunar Poles might condense into ice, especially in those parts that remain untouched by sunlight. The craters in these regions could retain ice for millions of years. Recently, scientists, using several spacecraft, suggested they may have found evidence for ice just under the surface near the Moon's South Pole. However, in 1999, the Lunar Prospector spacecraft deliberately crashed into a North Pole crater, hoping to create a plume of water vapour. Nothing was seen in that experiment.

MARE SERENITATIS

The Sea of Serenity is a sheet of lava 610 km across in the north-eastern quadrant, best seen towards the First Quarter. The distinct tints in the lava suggest several flooding episodes. In the mare's east lies **Serpentine Ridge**, a superb wrinkle ridge that formed when the basin subsided and squeezed the lava. On the north-eastern shore, we see the crater **Posidonius**, 95 km across. The bright streak through the centre is a ray from Tycho, some 2 200 km away near the south pole.

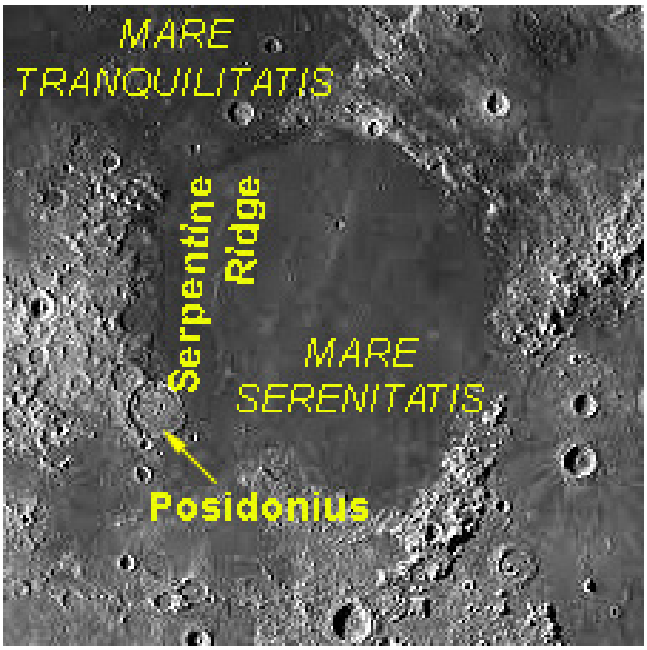


Image north down

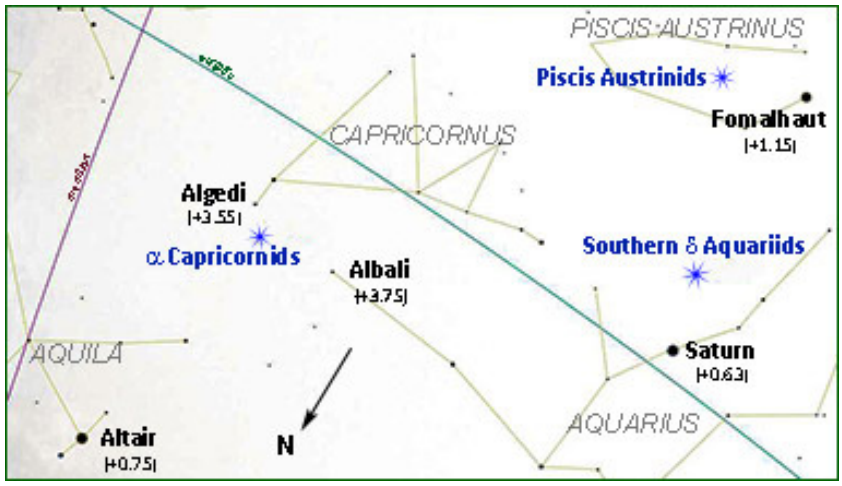
No eclipses, lunar or solar, will be visible from southern Africa in July 2024

METEOR ACTIVITY

From SGSA 2024	*Maximum Date/Time*	*Moon on max Date/Time*	*Duration*	*Radiant*	*ZHR**	*Velocity Km/sec*
Piscis Austrinids	*July 28 21h30-05h00*	*Last quarter sets 11h53*	*July 15 – August 10*	*See chart below*	*5*	*35*
Southern δ Aquariids	*July 31 22h00-05h00*	*Waning crescent rises 04h28*	*July 12 – August 23*		*25*	*42*
α Capricornids	*July 31 20h00-04h00*	*Waning crescent rises 04h28*	*July 3 – August 15*		*5*	*25*

* A word of caution regarding predicted Zenithal Hourly Rates:

ZHR is an ideal value. It is by definition the number of meteors a single observer could possibly see during a shower's peak with the radiant directly overhead on a clear, dark night. Most observers, however, will not see as many meteors as the ZHR suggests. Also, the presence of a bright moon, atmospheric conditions and the shower's proximity to the horizon can seriously diminish the observation of meteor activity.



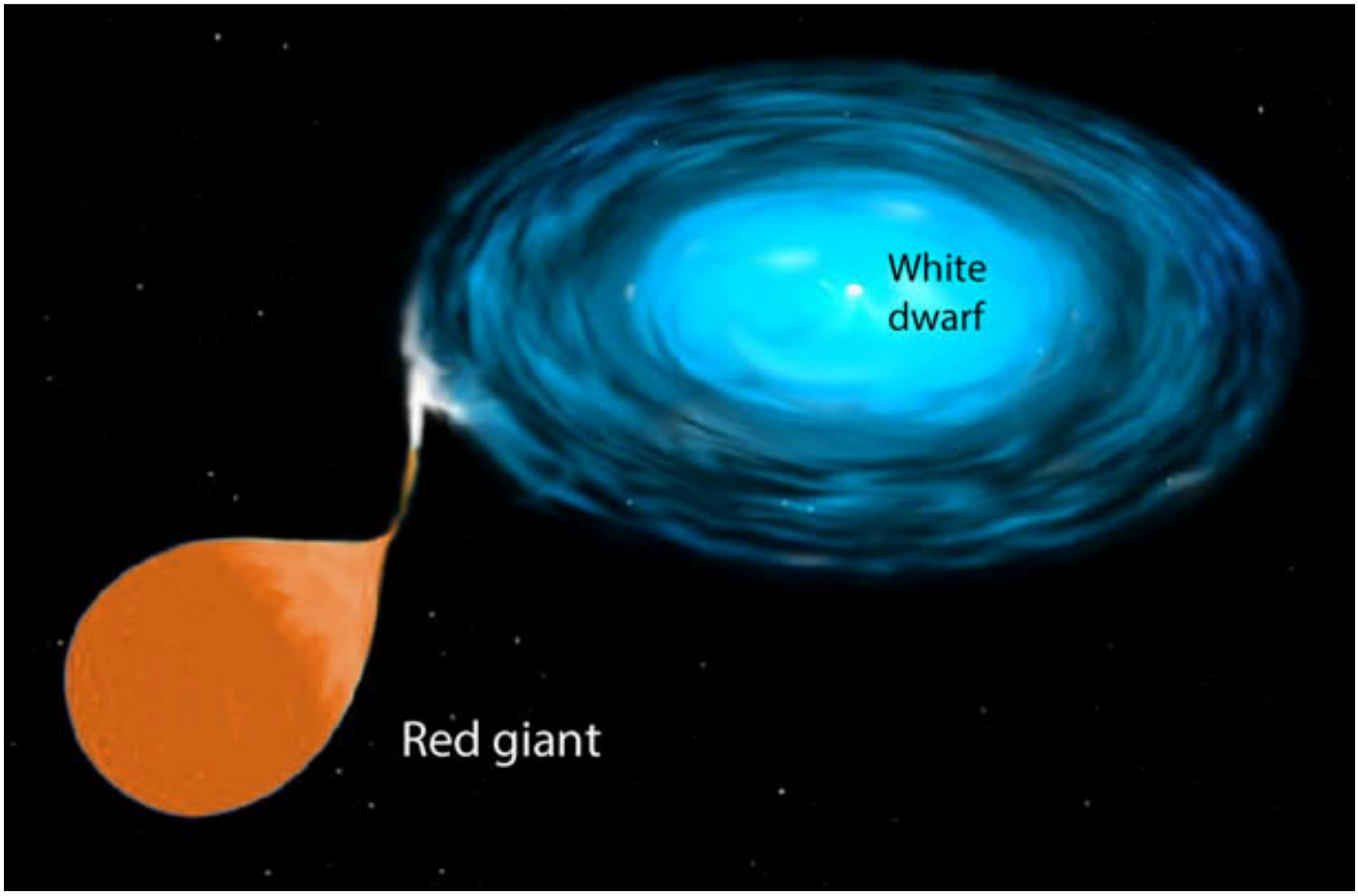


Image courtesy of SKY AND TELESCOPE magazine

T Coronae Borealis
"The Blaze Star"

Description	Variable double, recurring nova
Constellation	Coronae Borealis
Distance	2 700 ly, 830 pc
Brightness Period	79 years
Magnitude	Current 10.14
Magnitude range	+2.0 / +10.8
Actual size	1.11 sol
J2000 Dec/RA	25°55'13" / 15h59m30s
Alt/Az	28°23'27" / 13°57'53"

Visibility on July 3rd 2024

Rises	*Transits*	*Sets*
17h09	21h54	02h43

Naked Eye	Currently no
Binoculars	With difficulty
Telescopes	Yes

DISCOVERY and HISTORY

It may have been observed in 1217 and in 1787. Two major outbursts have been observed and recorded: the first was John Birmingham's observation in 1866 when it rose rapidly to magnitude +2 (subsequently devalued to about +2.5) and in 1946 (see below) rising to +3 and easily seen by the naked eye before slowly resuming its quiescent magnitude of +10.8 and only visible with some difficulty through binoculars. Other, smaller increases in brightness have been recorded at ultraviolet wavelengths.

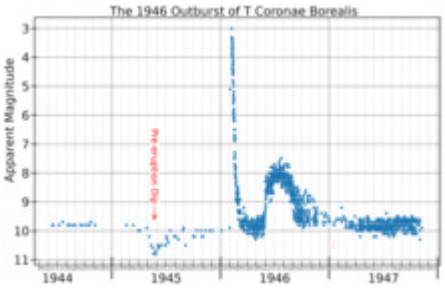
PROPERTIES

T CrB is a recurring nova in the constellation Corona Borealis, informally named the Blaze Star.

The star is a spectroscopic binary, consisting of an M3 III red giant primary and a blue dwarf companion. Matter from the red giant accretes onto the surface of the dwarf until sufficient material has accumulated to trigger a thermonuclear explosion which blasts the material off into space and produces the visible eruption.

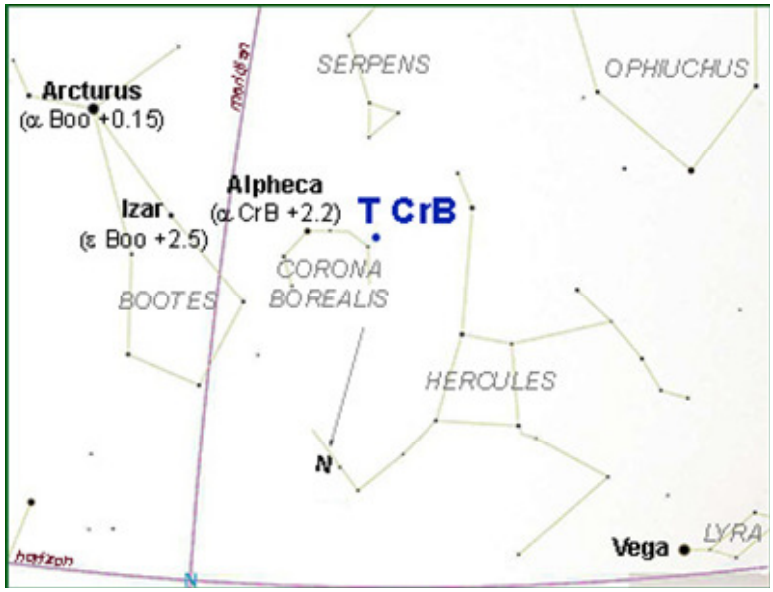
T CrB has long been regarded as an anomaly among cataclysmic variables. Whereas none of the other 30-odd such systems with known binary periods have orbital periods longer than 16 hour 25 minutes, T CrB revolves in 227.5 days. All of the other systems contain low-luminosity main sequence stars, probably not much more massive than about 1 solar mass at most; while T CrB is a red giant of about 2.6 solar masses and a luminosity of more than 1000 suns. All of the other well-known cataclysmic binaries apparently contain white dwarf companions, but the mass of the blue companion star in T CrB apparently contains at least 1.9 solar mass - well above the theoretical upper limit (1.4 solar masses) for a white dwarf.

[Adapted from STARS by Jim Kaler, Professor Emeritus of Astronomy, University of Illinois]



The light curve of T Coronae Borealis during the time surrounding its 1946 eruption, plotted from AAVSO data

T CrB is a binary system containing a large cool component and a smaller hot component. The cool component is a red giant that transfers material to the hot component. The hot component is a white dwarf surrounded by an accretion disc, all hidden inside a dense cloud of material from the red giant. When the system is quiescent, the red giant dominates the visible light output and the system appears as an M3 giant. The hot component contributes some emission and dominates the ultraviolet output. During outbursts, the transfer of material to the hot component increases greatly, the hot component expands, and the luminosity of the system increases.



PREDICTED VISIBILITY

It is expected to undergo an outburst again very soon, possibly in 2024, 2025 or almost certainly before the end of 2026.

Ian Ridpath's

Star Tales

Corona Borealis

The northern crown

Genitive:Coronae Borealis
Abbreviation:CrB
Size ranking:73rd
Origin:One of the 48 Greek constellations listed by Ptolemy in the Almagest
Greek name: Στέφανος (Stephanos)

A semicircle of stars between Boötes and Hercules marks the golden crown worn by Princess Ariadne of Crete when she married the god Dionysus (known to the Romans as Bacchus). The crown is said to have been made by Hephaestus, the god of fire, and was studded with jewels from India.

Ariadne, daughter of King Minos of Crete, is famous in mythology for her part in helping Theseus to slay the Minotaur, the gruesome creature with the head of a bull on a human body. Ariadne was actually half-sister to the Minotaur, for her mother Pasiphae had given birth to the creature after copulating with a bull owned by King Minos. To hide the family's shame, Minos imprisoned the Minotaur in a labyrinth designed by the master craftsman Daedalus. So complex was the maze of the labyrinth that neither the Minotaur nor anyone else who ventured in could ever find their way out.

One day the hero Theseus, son of King Aegeus of Athens, came to Crete. Theseus was a strong, handsome man with many of the qualities of Heracles and was unsurpassed as a wrestler. Ariadne fell in love with him on sight. When Theseus offered to kill the Minotaur she consulted Daedalus, who gave her a ball of thread and advised Theseus to tie one end to the door of the labyrinth and pay out the thread as he went along. After killing the Minotaur with his bare hands, Theseus emerged by following the trail of thread back to the door.

He sailed off with Ariadne, but no sooner had they reached the island of Naxos than he abandoned her. As she sat there, cursing Theseus for his ingratitude, she was seen by Dionysus. The god's heart melted at the sight of the forlorn girl and he married her on the spot.

Accounts differ about where Ariadne's crown came from. One story says that it was given to her by Aphrodite as a wedding present. Others say that Theseus obtained it from the sea nymph Thetis, and that its sparkling light helped Theseus find his way through the labyrinth. Whatever the case, after their wedding Dionysus joyfully tossed the crown into the sky where its jewels transformed into stars. The scene was imagined in a famous painting by the 16th-century Venetian artist Titian titled Bacchus and Ariadne, although Titian's depiction of the starry crown is not astronomically accurate.

The Greeks knew Corona as Στέφανος (Stephanos), meaning 'crown' or 'wreath'. In the Almagest, Ptolemy listed eight stars in the arc of the crown from the modern Pi (π) to Iota (ι) CrB. Its brightest star, second-magnitude Alpha, is officially called Alphecca from the Arabic name for the constellation, al-fakka, although it was once also known as Gemma, the Latin for 'jewel'.

Chinese associations

Corona Borealis is one of the few constellations that ancient Chinese astronomers drew in much the same way as we do, namely as an arc or loop. Hence it is relatively easy to pick out on Chinese star charts. Chinese astronomers charted nine stars in the loop, from Pi to Rho Coronae Borealis, which they called

Guansuo, the prison for working-class miscreants; the prison for the upper classes, Tianlao, was more auspiciously placed further north in Ursa Major.

Xi Coronae Borealis was one end of the constellation Tianji, which extended over the border from neighbouring Hercules.

Please keep in touch...

Have a look at our excellent website, edited by Derek Duckitt.
http://www.hermanusastronomy.co.za/

Contact ASSA - Get in touch with officers of the Society - we're real people with a passion for astronomy, **so contact us and let's talk!**

With Grateful thanks to the following:

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