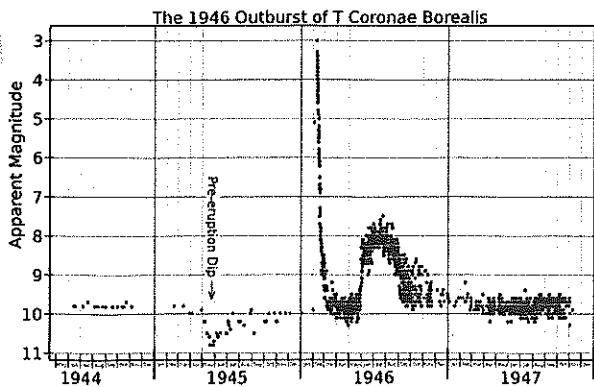


# SSSP Challenge Object – Catch a Recurrent Nova

(Text adapted from Wikipedia and updated by Rick Huziak)



T Coronae Borealis (T CrB), the Blaze Star, is a recurrent nova in the Corona Borealis. It was first discovered in outburst in 1866 by John Birmingham, though it had been observed earlier as a 10th magnitude star. It may have been observed in 1217 and in 1787 as well. It is expected to undergo an outburst again very soon; it could erupt again as soon as August or September 2024. If you miss this, you will have to wait another 79 years to see the next outburst. It is located at 15h59'30.16" +25°55'12.6".

T CrB normally has a magnitude of about 10, near the limit of binoculars. Well documented outbursts have been seen twice, reaching magnitude 2.0 on May 12, 1866 and magnitude 3.0 on February 9, 1946. This means that for a just few nights, sometime soon, Corona Borealis will have another star in the

pattern about as bright as alpha CrB! The graph at left shows the light curve of T Coronae Borealis during the 1946 eruption, plotted from AAVSO data. Each dot is an observation from a dedicated observer ... like you!

T CrB is a binary system containing a large cool red giant that transfers material to a smaller hot 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 a dim 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 rapidly, and the luminosity of the system increases. The two components complete a circular orbit every 228 days. The stars are separated by 0.54 astronomical units (AU) or just a bit more than the Mercury-Sun distance.

Recently, something a bit unusual has been happening with T CrB. A sustained brightening began in 2015 by a half magnitude (indication the disc was filling more rapidly) but now a fading is taking place. A similar event was reported before the 1946 outburst. However, outbursts are impossible to accurately predict, so the best way to catch this very rare outburst is to **look at the field every clear night**, even if just with binoculars.

Three charts from the AAVSO chart plotter ([www.aavso.org/vsp/](http://www.aavso.org/vsp/)) have been provided (and annotated a bit.) X37361FZ (15-degree field for binoculars and as a finder chart), X37361FS (2-degree for Newtonians) and X37361FT (2-degree for Cassegrain users.) Large binocular users can flip the Newtonian chart upside down once the field is found. T CrB is at the centre of each chart.

For fun, education and science, find the field and make an estimate of the brightness of T CrB. You can do that by interpolating the brightness of T CrB compared to a nearby labeled star that is slightly brighter and another that is slightly dimmer, and you do your best at deciding that "in between" brightness. Comparison stars on the charts are given in 10ths of a magnitude (with the decimal point removed as not to confuse the dot with a star.) Thus, a star marked 98 is 9.8 magnitude and a 106 star is 10.6 magnitude. If T CrB is halfway between those stars, then it is 10.3 magnitude. If it is a third of the way, it is 10.1 magnitude. It's that simple ... after a bit of practice.

To record a useful record of the brightness, write down the following information for every time you look at the star: date, time to the minute, star you are measuring, estimated magnitude, which two comparison stars used, what instrument you used and which chart you used. In a recent observation I recorded my observation as:

July 13, 1:58 AM CST, T CrB, 10.6, (102, 107), 10" Newt., X36498ED

If you are lucky enough to catch the eruption, then keep watching the star nightly, as you can see from the 1946 light curve, the star will likely rise and fade quickly, then probably "hump" again before it settles down for another 7 decades. Your observations could be dots on the 2024 – 5 light curve, and you kids or grandkids can repeat the observations at SSSP 2103!

While you are in the area, you might as well also look at R CrB, which is red giant carbon star that spews out carbon dust at irregular intervals that causes it to fade from 6<sup>th</sup> magnitude to 14<sup>th</sup> magnitude irregularly in a period of months or years between fadings. Right now, it is at maximum light of around 6.2 magnitude, now recovered from a 150-day long fade to and from 10<sup>th</sup> magnitude about 400 days ago. But it can and will fading again - anytime. It is a good binocular variable within the bowl of Corona Borealis. Use chart X37361FZ to start. Look at this star and report it, too.

If you are interested in reporting your observations to the AAVSO (which helps scientists and student astronomers), contact me separately ([rickhuziak@shaw.ca](mailto:rickhuziak@shaw.ca)), and I can give you much better instructions on how to get AAVSO observer initials and how to report observations properly. You do NOT have to be a member of the AAVSO to download charts or to report observations.

T CrB

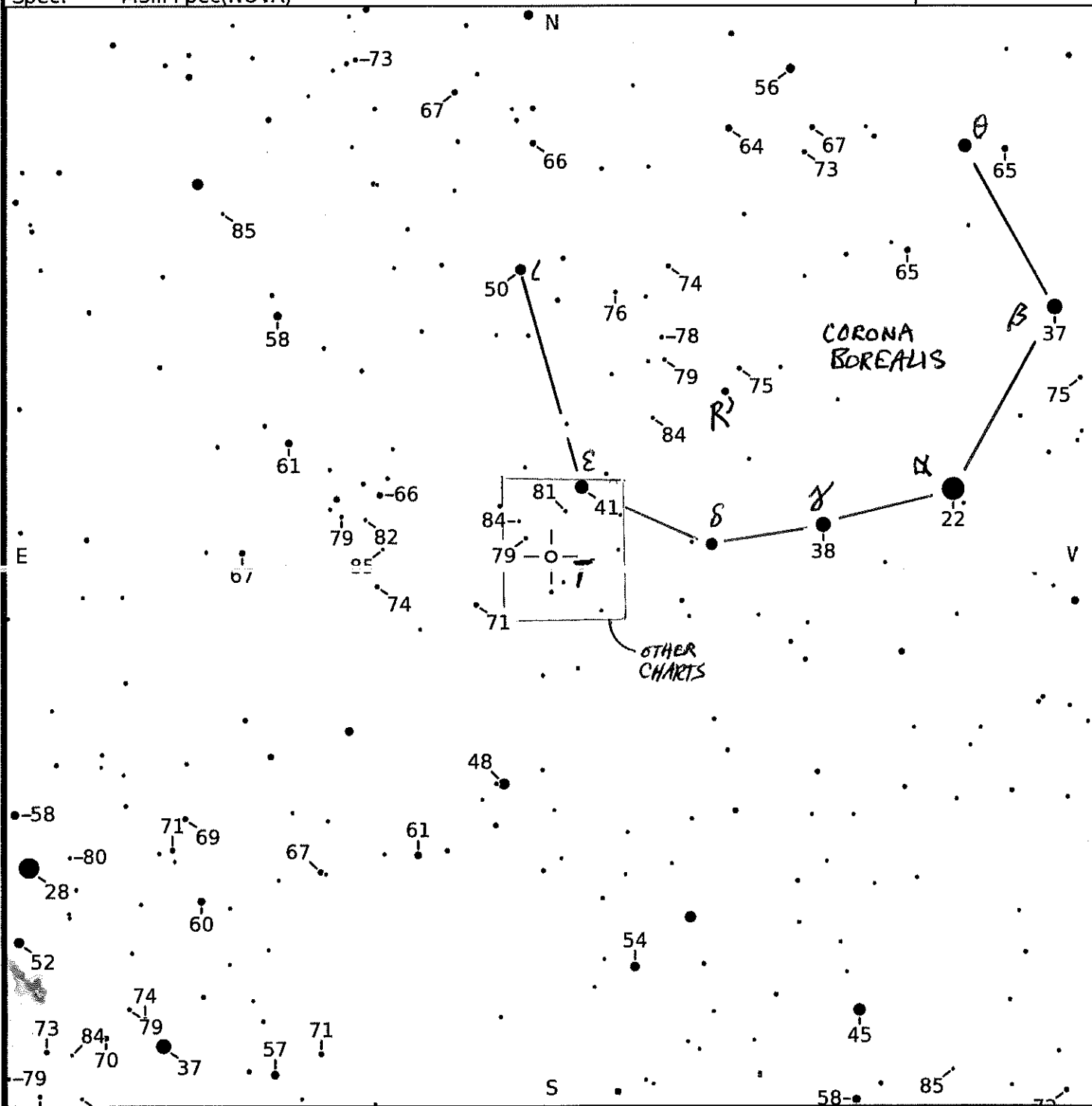
T CrB

AAVSO  
Chart

Max mag: 2.0 V  
Min mag: 10.8 V  
Period: 227.55  
Type: NR+ELL  
Spec: M3III+pec(NOVA)

(J2000) 15:59:30.16 +25:55:12.6  
Stars in the chart are drawn at J2015.5

X37361FZ



FOV = 15.0°, Magnitude limit = 8.50

Please use the photometry table for CCD observations.

<https://www.aavso.org/vsp>

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T CrB

T CrB FOR NEWTONIANS

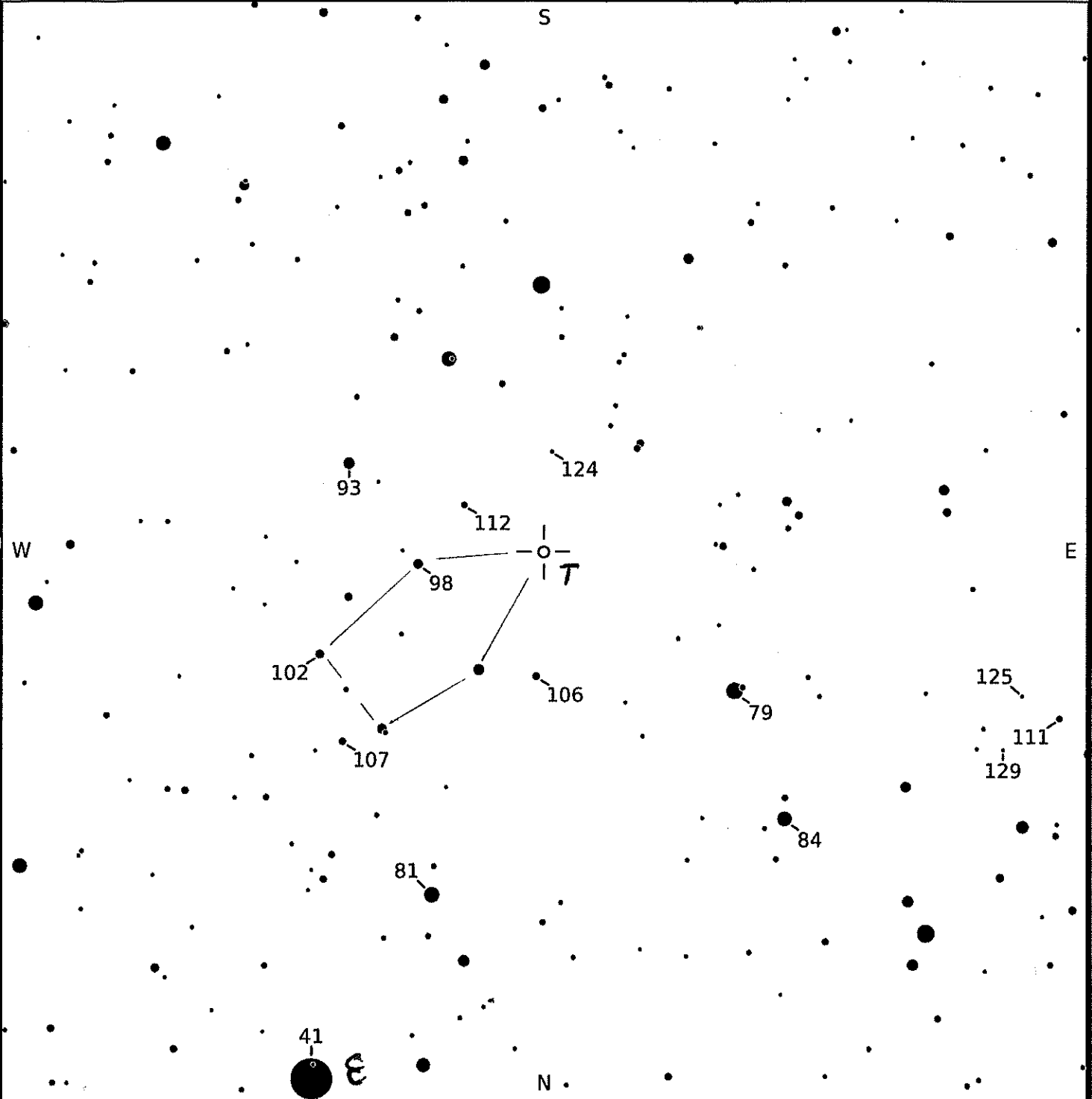
AAVSO  
Chart

Max mag: 2.0 V  
Min mag: 10.8 V  
Period: 227.55  
Type: NR+ELL  
Spec: M3III+pec(NOVA)

(J2000) 15:59:30.16 +25:55:12.6  
Stars in the chart are drawn at J2015.5

X37361FS

TURN UPSIDE DOWN FOR LARGE BINS



FOV = 2.0°, Magnitude limit = 13.00

Please use the photometry table for CCD observations.

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T CrB

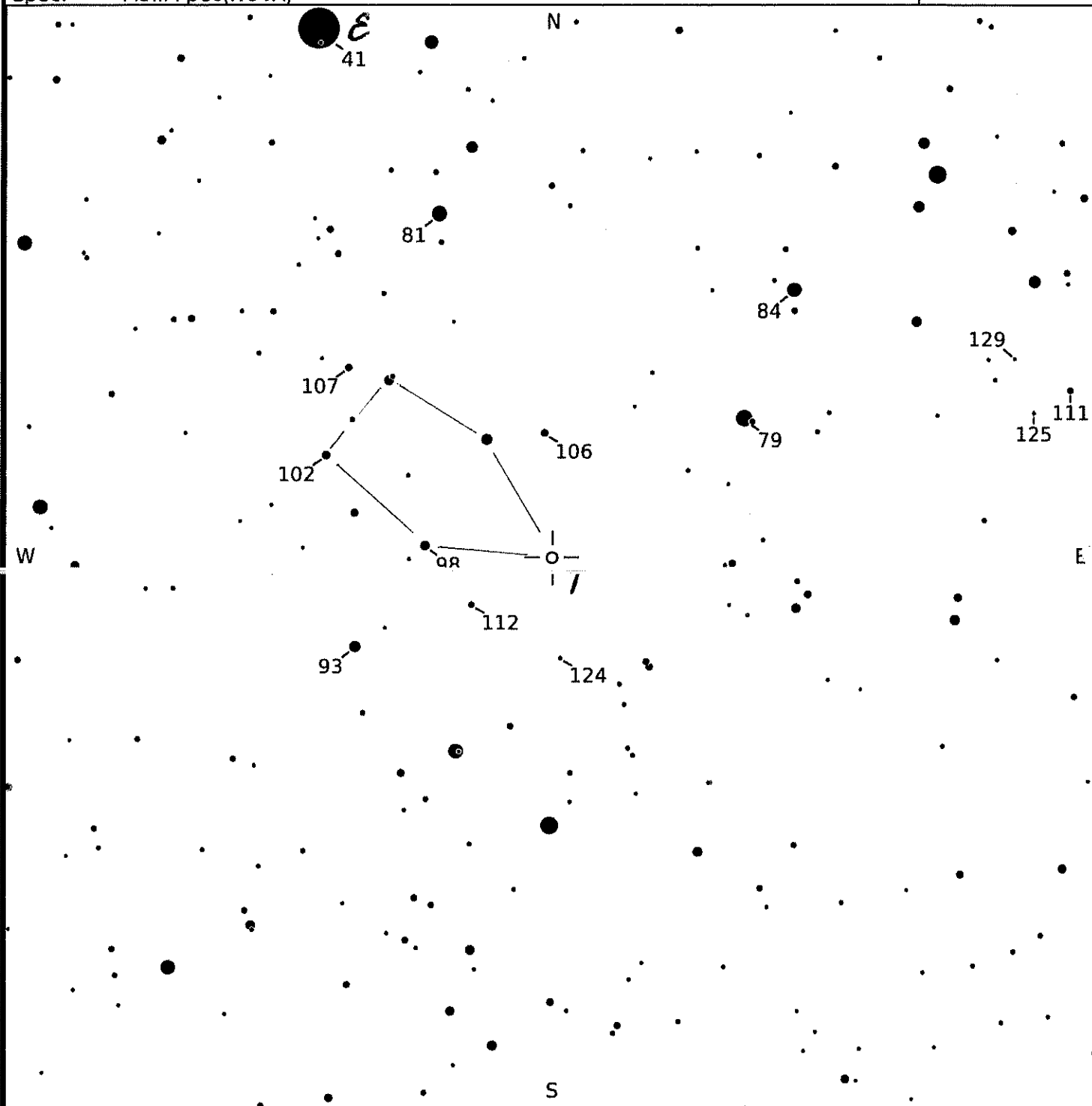
T CrB FOR CASSEGRAINS

AAVSO  
Chart

Max mag: 2.0 V  
Min mag: 10.8 V  
Period: 227.55  
Type: NR+ELL  
Spec: M3III+pec(NOVA)

(J2000) 15:59:30.16 +25:55:12.6  
Stars in the chart are drawn at J2015.5

X37361FT



FOV = 2.0°, Magnitude limit = 13.00

Please use the photometry table for CCD observations.

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