Variable Star of the Year: T Cassiopeiae

Just 2.5 degrees preceding alpha Cas lies one of the most popular telescopic Mira type variable stars T Cas. T Cas often exceeds magnitude 8 at maximum which is well within binocular range but it normally requires a telescope to fully separate it from a nearby eight magnitude star. The General Catalogue of Variable Stars lists T Cas with a range of 6.9-13.0V, period 444.83 days and a spectrum of M6e-M9.0e.

T Cas was announced to be a variable star by Adalbert Krueger at Helsinki Observatory in December 1870. T Cas was originally recorded as a 9th magnitude star in 1842 in the Bonner Durchmusterung (BD) and Krueger noted a discrepancy between the BD magnitudes for BD +54 48 (T Cas) and the nearby star BD +54 49 (later catalogued as HD1873) with his own observations in October 1870. It soon became apparent that BD +54 48 (a distinctly red star) was variable. Baxendell was the first person in the UK to observe T Cas when he recorded a maximum of magnitude 7.8 on 16th October 1885 and BAA VSS monitoring commenced in 1892 with early contributions from Corder, Grover, Peek & Pereira.

According to BAA VSS data the extreme range of variation has been in excess of 6 magnitudes between 6.8 (April 1932) to 13.0 (July 1981) but it can reduce to below 3 magnitudes at times. The faintest maximum observed was magnitude 8.9 (August 2002) and the brightest minimum seen was magnitude 10.8 (May 2015). Since 2000 the range has not exceeded 3 magnitudes and in 2015 it further reduced to 2.5 magnitudes.

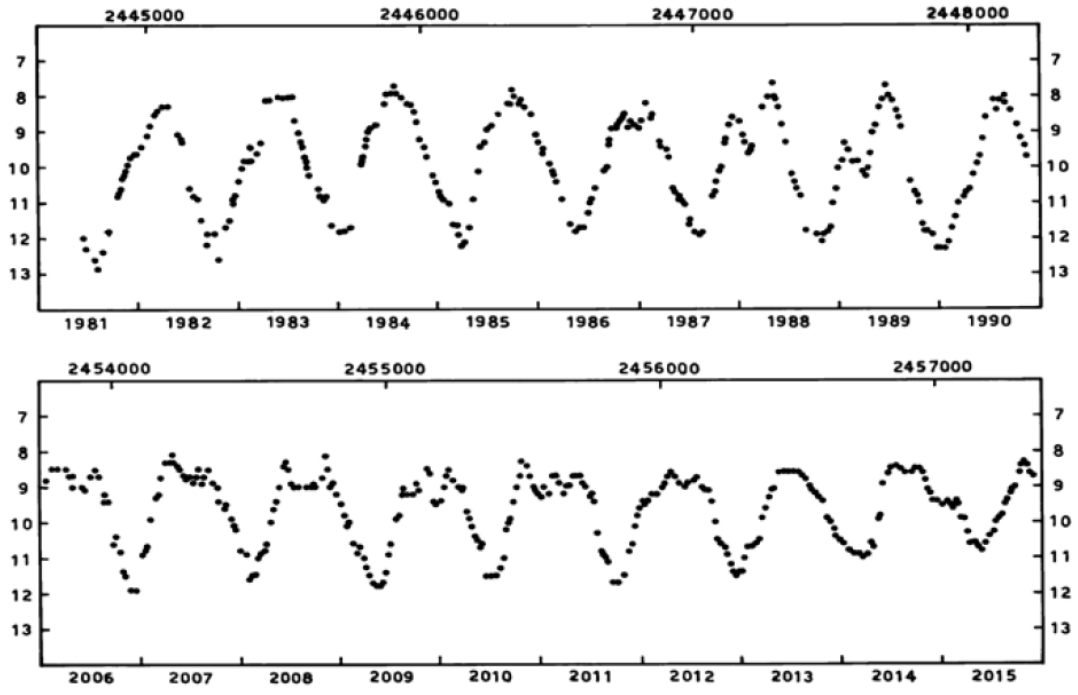
The mean period is 444.57 days derived from BAA VSS data over 100 cycles from 1893 to 2015. The period has changed from 446 days in 1893-1921 to 448 days in 1921-1940, 445 days in 1940-1985 and 440 days in 1985-2015. Therefore there has been a slight shortening trend within the past 95 years.

The shape of the light curve is not a typical Mira star where the rise is often more rapid than the fade. T Cas frequently has a hump (rate of rise slowdown) on the rise or a double maxima with the second maxima usually the brighter. In 1981-1985 there was a hump on each rise appearing progressively later and then in 1986-1990 this turned into a double maxima that progressively occurred earlier (refer to light curve). This behaviour indicated a travelling wave action suggesting that there is more than one pulsation mode in action.

As indicated above T Cas has a companion star that is similar in brightness to T Cas when it is near maximum. HD1873 is a magnitude 8.12 blue star which is just 1.5 minutes north-following T Cas. The contrasting colours of these stars in a rich Milky Way field make an interesting sight in small telescopes.

T Cas is circumpolar from the UK so continuous monitoring can be achieved by observers equipped with small to medium sized telescopes. It is a particularly interesting star to follow due to the unpredictability of the form and extent of variation exhibited. The recent reduction in range trend and possible shortening period trend are important features to monitor in the future.

T CASSIOPEIÆ LIGHT CURVE



T CASSIOPEIÆ FINDER CHART

067·02 2° FIELD INVERTED

T CASSIOPEIAE 00h 23m 14·3s +55°47′33″ (2000)

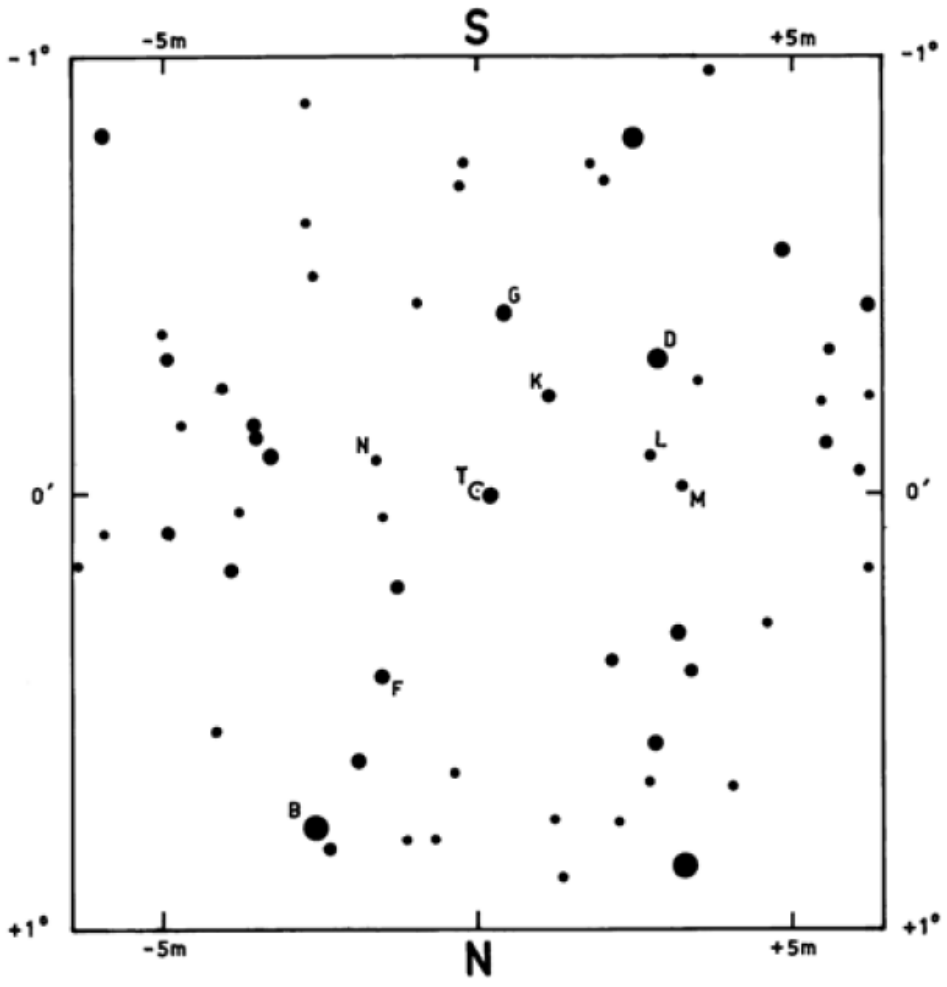


CHART: MILLENNIUM SA	B 6·7	K 8·7	BAA VSS
	D 7·1	L 9·2	EPOCH: 2000
SEQUENCE: TYCHO 2 VJ	F 8·0	M 9·5	DRAWN: JT 24-05-10
	G 8·3	N 9·9	APPROVED: RDP