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S4831, A PROBABLE RV TAURI TYPE

Using the data taken from the Maria Mitchell Observatory plate collection on Nantucket Island, Massachusetts, the light curve of the suspected variable star in Cygnus, S4831, clearly exhibits characteristics of the RV Tauri class of intrinsic variables. The light curve of S4831 shows alternating shallow and deep minima, including several irregularities. Occasionally, two deep minima occur in succession, the duration of each being roughly half the period of the periodic portions of the light curve.

Irregular cycles

Julian Dates	Duration
26875-26995	120 dy
28345-28490	145 dy
29390-29550	160 dy

The star was visible on photographic plates as far back as 1916, but the best data sequences, producing nearly complete light curve, occurred within the period from July 1930 to December 1940, (JD 26000-30000). There seems to be a series of irregular variations from May 1968 to May 1971 (JD 40000-41000) in which there are intervals of as much as 200 days when the star did not vary at all. However, it is these irregularities which identify S4831 as an RV Tauri type star rather than some periodic star, say Beta Lyrae, or a long period variable as portions of its curve would indicate.

The magnitude of S4831 varies from a minimum of +15.0 to a maximum of 13.2, ( $\Delta m=1.8$ ). The average ( $\sim+14.3$ ) varies with each cycle, due to the varying depths of the minima, (Figure 2). Since RV Tauri stars are usually G to K spectral class supergiants, it would be desirable to have some spectra on this star.

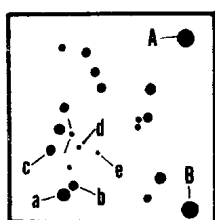
As a matter of interest, a very rough approximation of the distance would put S4831 at 25 kpc. This is the maximum

distance it could be, because the effects of galactic absorption were not taken into consideration. (The average magnitude of +14.3 was used for apparent magnitude and -3.4 was used as an approximation for this type of star's absolute magnitude.)

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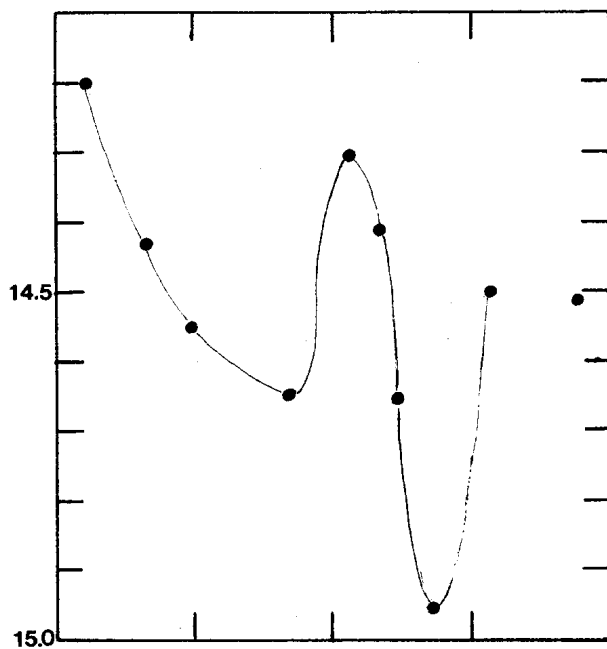
The investigation of the suspected variable S4831 was carried out with the support of a scholarship from EARTHWATCH of Belmont, Massachusetts.

Figure 1



Magnitude of Comparison Stars	Bonner Durchmusterung Catalog Number
a 11.7	A 3468
b 13.1	B 3467
c 13.6	
d 14.8	
e 15.8	

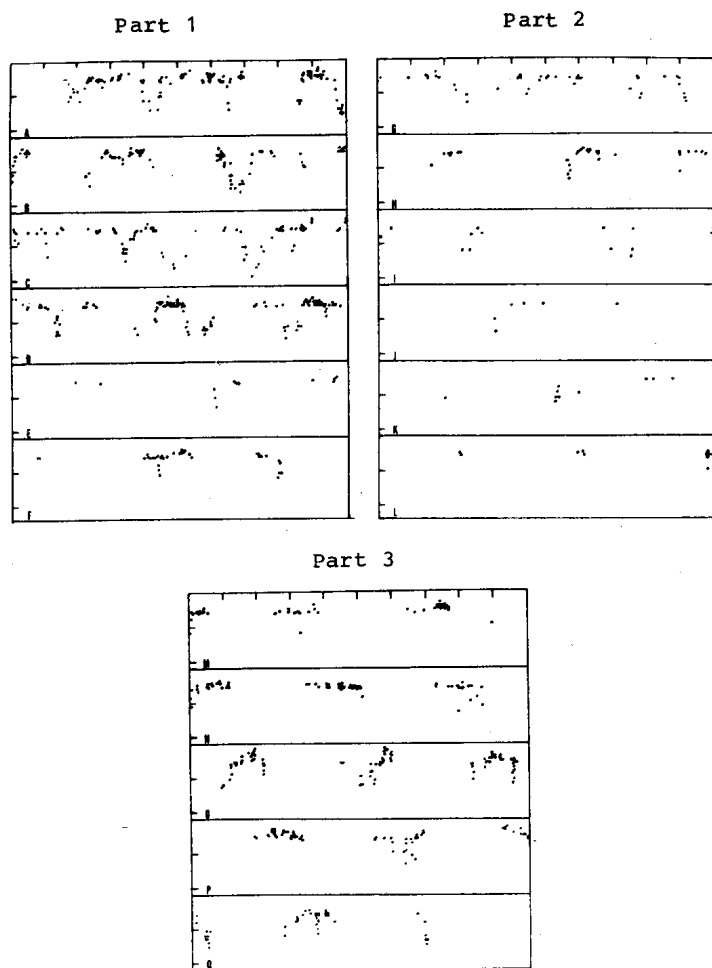
Figure 2



Variation of Minima

Ordinate axis - marked at tenths of magnitudes. Graph covers interval from JD 26000 to JD 30000; marked at each 1000 days.

Figure 3



Ordinate axis - magnitude markers begin at 13, with one magnitude intervals to 15th magnitude. Each strip represents 1000 days, markers placed at 100-day intervals:

Part 1		Part 2	Part 3
A 26000-27000	G 33000-34000	M 3 000-40000	
B 27000-28000	H 34000-35000	N 40000-41000	
C 28000-29000	I 35000-36000	O 41000-42000	
D 29000-30000	J 36000-37000	P 42000-43000	
E 30000-31000	K 37000-38000	Q 43000-44000	
F 32000-33000	L 38000-39000		