

DOES S1910 VARY?

DORRIT HOFFLEIT  
Yale University Observatory  
New Haven, CT 06511

Abstract

A star suspected of variability by A. J. Cannon in 1899, S1910, at  $\alpha = 12^{\text{h}} 36^{\text{m}}.2$ ,  $\delta = -59^{\circ} 08'$  (1900), and still unconfirmed, has been examined on about 1000 Harvard patrol plates. It appears to vary from magnitude 4.9 to about magnitude 5.7.

\* \* \* \* \*

E. C. Pickering in Harvard Circular No. 44, 1899, pointed out the availability of the Harvard Observatory plate collection for the confirmation of otherwise too sparsely observed variable stars. He noted, however, that

"Confirmation is not always obtained. A striking instance of this kind is furnished by a photograph, X7524, taken at Arequipa with the 13 inch Boyden telescope on May 22, 1896 at  $14^{\text{h}} 20^{\text{m}}$  G.M.T. Miss A. J. Cannon found that this plate shows the spectra of A.G.C. 17312, 17407, and 17453, magns. 7.0, 7.2 and 7.5 respectively, but fails to show the spectrum of the brighter star A.G.C. 17270, magn. 6.0. Apparently this is an Algol star observed at one minimum only. On 153 other plates the star appears at its normal brightness."

This star was subsequently assigned the number 1910 in the first General Catalogue of Suspected Variable Stars (Kukarkin et al. 1951), where its range is given as  $5.0^{\text{m}} - (7.5)^{\text{p}}$ .

I have re-examined the critical spectrum plate on which the star is missing, and compared it with other spectrum plates that were available to Miss Cannon in 1899. Table I lists, after the suspected variable, the stars visible on the crucial plate, in some cases too weakly for classification. It is possible that the images may have faded slightly since 1899, for two stars noted by Miss Cannon, AGC 17312 and 17407, now appear to be missing. Table I gives the magnitudes from Gould's Argentine General Catalogue (AGC) of 1886, later photographic determinations from the Henry Draper Catalogue (HD), and modern photoelectric determinations and spectral classes. Clearly much fainter stars than S1910 are present on X7524. Miss Cannon herself, in a note on the plate jacket, suggested that the star may have been artificially occulted. The 66 minute exposure straddled the meridian, and the altitude of the star at the time would have been about  $47^{\circ}$ . The possibility remains that part of the field was not within the slit opening of the dome, but there is no variation of sky background perceptible across the plate to substantiate this suggestion. Unfortunately no other bright stars exist in the preceding half of the star field.

In her original record books Miss Cannon commented that the star is overexposed on the chart plates she examined (taken with the 8-inch Bache refractor). However, if the star had varied as much as the lacking spectrum implied, such a minimum would nevertheless have been apparent.

Evidently no further work relative to the variability of S1910 has ever been reported. I have therefore examined it on approximately

1000 Harvard patrol plates taken between 1900 and 1954 (about 700 of the AM series, 1.5-inch lens, plate scale 600"/mm; and 300 of the BI series, 1.25-inch, scale 1200"/mm). Again, S1910 is generally greatly overexposed. Compared with lambda and iota Crucis, the star does appear to vary from magnitude 4.9 to about magnitude 5.7, assuming that the B scale applies, with the faintest magnitudes about equal to iota Crucis occurring in May 1912. These estimates are, however, subject to considerable uncertainty both because the star is so bright and the plates are not of uniform quality. If the star had dropped as faint as AGC 17453, such a change would have been unmistakable, but no such diminution was found, as no image was definitely fainter than iota Crucis.

TABLE I

S1910 and the Spectra Visible on X7524

<u>AGC</u>	<u>HD</u>	<u>HR</u>	<u>AGC</u> $m_v$	<u>HD</u> $m_{pg}$	<u>V</u>	<u>B</u>	<u>Sp</u>	<u>Comment</u>
<u>17270</u>	110335	4823	6.0	4.97	4.93	4.89	B6IVe	Invisible on X7524, S1910
17312	110532	4835	7	7.9	6.40	7.49	K0III	Dubious visibility
17366	110829	4842	5.7	6.9	4.69	5.74	K0III	iota Crucis
17407	111105	-	7	7.5	7.25	7.45	A2	Dubious visibility
17411	111123	4853	1.7	1.28	1.25	1.02	B0.5III	beta Crucis
17453	111463	4868	7	6.8	6.75	7.10	A3II	Weak but definitely present
17472	111613	4876	6.6	6.0	5.72	6.10	A2Iabe	
17504	111904	4887	6.3	5.5	5.76	6.09	B9Ia	
17518	111973	4890	6.7	8.5	5.90	6.10	B5Ia	kappa Crucis
17540	112078	4897	5.6	4.67	4.62	4.47	B4Vne	lambda Crucis