

auch identisch mit Abettis Stern 10^m. Wir haben also für Stern *a* und 1855.0

BD. Orig.	9.5	9 ^h 30 ^m 32 ^s .5	+17° 34' 0"
Hind	11	39	35
Markr. Cat.	10.5	36	34.9
Abetti	10	35	35

Demgemäß mag Stern *a*, der nach Zone 639 nicht mit +17° 21' 15" identisch ist, in der BD. nachgetragen werden als:

+17° 21' 16" 9.5 9^h 30^m 35^s.0 +17° 35' 0"

Ferner ist +17° 21' 15" mit einem ? zu versehen, bis

aufgeklärt sein wird, ob er trotz der übereinstimmenden zwei Beobachtungen überhaupt nicht am BD.-Ort existiert, oder ob er veränderlich ist, was ich fast für wahrscheinlicher halten möchte.

Die betr. Himmelsgegend ist ferner im Klischee 383 des Bordeauxer fotogr. Himmelskatalogs Tome 1 p. A. 97 enthalten. Der im vorigen erwähnte Stern *a* = +17° 21' 16" kommt dort unter Nr. 67 vor, dagegen fehlt der Abettische Stern 11^m. In der Nähe von +17° 21' 15" steht ein Sternchen 11^m.5 (9^h 30^m 29^s +17° 37' 6" 1855), dessen Identität aber mit dem vermiften Objekt, das 4' nördlicher stehen sollte, sehr zweifelhaft ist.

Kr.

New Algol-type variable 193.1906 Cygni.

RA. = 20^h 19^m 14^s.0 Decl. = +46° 27' 1" (1855) RA. = 20^h 20^m 40^s.3 Decl. = +46° 35' 7" (1900).

By A. Stanley Williams.

The approximate position of this star, from measures of a photograph taken with a 4.4 inch portrait lens, is as stated above. The adjoining little chart, Fig. 1, will assist in the identification of the variable and the comparison stars. Table I gives the approximate positions for 1855 of the comparison stars used, together with their brightness on a scale of steps, and the corresponding stellar magnitudes. The latter have been derived by assuming the star *a* to be 9.5 mag., and the value of a step to be 0.05 mag. The star *a*, it should be mentioned, is BD. +46° 29' 30" (9.5).

Table I. Comparison stars.

*	RA. 1855	Decl. 1855	Scale	Mag.
<i>a</i>	20 ^h 19 ^m 39 ^s .5	+46° 35' 2"	40.2	9.50
<i>e</i>	20 18 59.3	+46 28.9	23.3	10.35
<i>b</i>	20 19 54.5	+46 30.9	20.2	10.50
<i>d</i>	20 20 10.7	+46 30.0	2.7	11.37
<i>c</i>	20 19 17.4	+46 26.5	0.0	11.51

Table II is for the reduction to the sun. The corrections should be applied with the signs given in the table to the geocentric observations in order to reduce them to the sun. I would wish here to express my indebtedness to the tables by Dr. K. Graff recently published in No. 8 of the Mitteilungen der Hamburger Sternwarte.

Table II. For the reduction to the sun.

Date	Corr.	Date	Corr.	Date	Corr.
Jan. 0	-2 ^m .6	June 19	+1 ^m .9	Sept. 27	+3 ^m .2
10	-3.0	29	+2.5	Oct. 7	+2.7
20	-3.3	July 9	+2.9	17	+2.2
30	-3.6	19	+3.3	27	+1.6
Febr. 9	-3.8	29	+3.6	Nov. 6	+1.0
19	-3.7	Aug. 8	+3.8	16	+0.3
May 10	-0.6	18	+3.9	26	-0.3
20	0.0	28	+3.9	Dec. 6	-1.0
30	+0.7	Sept. 7	+3.7	16	-1.6
June 9	+1.3	17	+3.5	26	-2.2

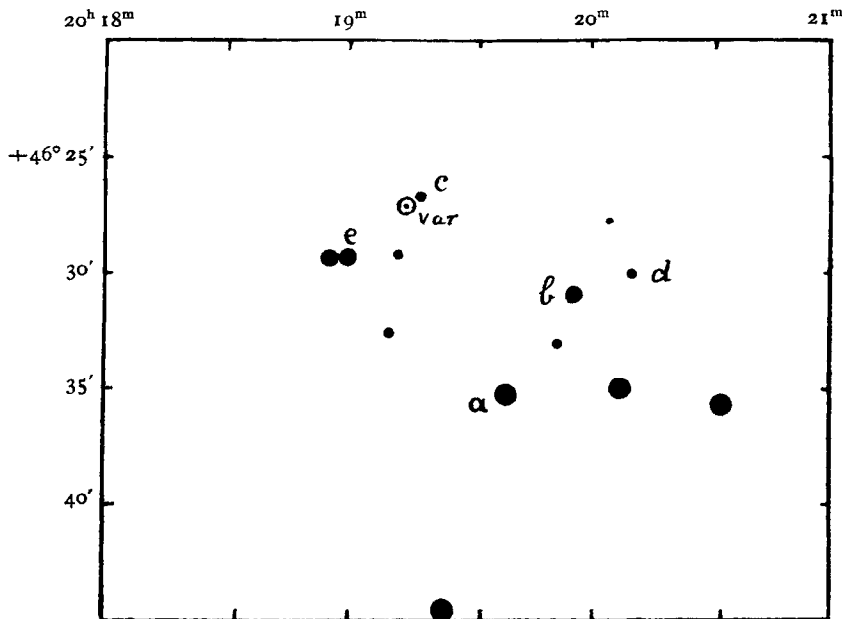


Chart of 193.1906 Cygni.

Fig. 1.

The variable is shown on a large number of photographs obtained here. On two of these the star is so faint that it must certainly have been at or very near minimum brightness at the times of the photographs. Twelve minima were also observed visually with a 6 1/2-inch reflector. Approximate times of minimum were derived in the first place by inspection of the observations (single curves), and these when compared with the two early photographic observations yielded the following elements of variation

Min. = 1899 Dec. 31 8^h 54^m.2 (Gr. m. t.) + 0^d 15^h 5^m 12^s.2 E
= J. D. 2415020.371 + 0^d 6286135 E.

There are 145 visual observations, made when the star was near a minimum, available for the determination of the light curve during the period of change. These were arranged according to the intervals by which they followed

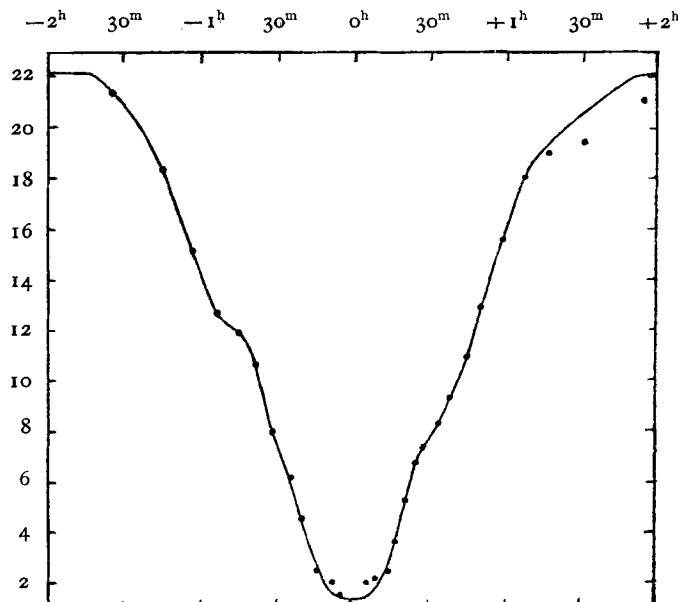
the times of minimum computed by the above elements, and formed into groups of 10 observations, and the mean taken for each group. Intermediate groups were also formed by combining 5 observations from each of two adjacent groups. In this manner were derived the 29 mean values for the brightness of the variable (each being the mean of 10 observations) contained in the following table.

Table III. Mean observed brightness of variable.

Interval fr. minimum	Bright- ness	Interval fr. minimum	Bright- ness	Interval fr. minimum	Bright- ness
-1 ^h 34 ^m .3	21.4	-0 ^h 8 ^m .7	2.0	+0 ^h 32 ^m .7	8.2
-1 15.6	18.4	-0 5.3	1.5	+0 38.2	9.3
-1 3.7	15.1	-0 0.9	1.0	+0 43.6	10.9
-0 53.4	12.8	+0 4.7	2.0	+0 50.0	12.9
-0 46.0	11.9	+0 9.0	2.2	+0 58.7	15.6
-0 39.0	10.7	+0 12.8	2.5	+1 7.6	18.0
-0 31.3	8.0	+0 17.3	3.7	+1 16.9	19.0
-0 25.0	6.2	+0 20.7	5.2	+1 30.6	19.4
-0 20.1	4.6	+0 24.1	6.8	+1 54.5	21.1
-0 14.8	2.5	+0 28.2	7.3		

The observations contained in the foregoing table were then plotted on squared paper, and the mean light curve shown in Fig. 2 drawn. With reference to this light curve, it may be doubted whether, having regard to the number of observations available, certain departures from a smooth uniform curve indicated by the observations are real. This is particularly the case with regard to the slow final recovery of brightness, which may, perhaps, be partly subjective.

Definitive times of minimum were then carefully determined by means of the mean light curve shown in Fig. 2. These times are given in Table IV, which also shows the



Light curve of 193.1906 Cygni.

Fig. 2.

comparison with the times computed from the foregoing elements. The two early photographic observations have also been included. It is evident that the two photographs must have been taken almost exactly at the time when the star was at its minimum brightness. Since the residuals in the penultimate column of the table indicate a correction of less than a minute to the adopted epoch of minimum, I have not thought it worth while to make any alteration to the elements of variation already given.

Table IV. Observed and computed minima.

<i>E</i>	Date	Observed minimum Gr. M. T.	J. D.	Computed minimum	O-C	Wt.
0	1899 Dec. 31	8 ^h 56 ^m .0	2415020.3722	20.3710	+1 ^m .7	ph.
468	1900 Oct. 21	13 27.0	5314.5604	14.5621	-2.4	ph.
3853	1906 Aug. 19	9 56.4	7442.4142	42.4188	-6.6	2
3866	" " 27	14 13.9	7450.5929	50.5908	+3.0	3
3869	" " 29	11 25.9	7452.4763	52.4766	-0.4	2
3872	" " 31	8 42.8	7454.3631	54.3625	+0.9	2
3874	" Sept. 1	14 50.8	7455.6186	55.6197	-1.6	2
3880	" " 5	9 26.2	7459.3932	59.3914	+2.6	3
3885	" " 8	12 53.7	7462.5373	62.5344	+4.2	3
3888	" " 10	10 7.1	7464.4216	64.4203	+1.9	5
3904	" " 20	11 28.4	7474.4780	74.4781	-0.1	5
3912	" " 25	12 10.2	7479.5070	79.5070	0.0	5
3915	" " 27	9 23.2	7481.3911	81.3928	-2.4	4
3942	" Oct. 14	8 52.3	7498.3696	98.3654	+6.0	4

The normal brightness of the variable, from 20 observations made when the star was not near a minimum, is 22.2 on the light-scale = 10.40 mag. The minimum brightness is 1.3 of the same scale = 11.45 mag., the range of variation being thus 1.05 mag.

20 Hove Park Villas, Hove, 1906 Dec. 31.

A. Stanley Williams.