Postscript. I learn from Mr. J. A. Parkhurst that my measures do not refer to Anderson's variable in Cassiopeia (1855.0 $23^h 37^m 5$ $+55° 47'$). Through a misunderstanding of Dr. Anderson's description, he had misidentified the variable and my measures are of another star near the place of the variable, which seems to be 3' north of the star I have measured.[*])

Williams Bay, Wisconsin, 1899 March 2.   *E. E. B.*

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[*]) Die genaue Position des Veränderlichen siehe Hartwig A. N. 3553, Bd. 149 p. 6, An derselben Stelle wird auch der von Barnard gemessene Doppelstern erwähnt. *Kr.*

Notes on variable stars.

U Vulpeculae and SU Cygni.

The variability of the stars $+20°4200$ and $+28°3460$ has been announced, and the designations U Vulpeculae and ST Cygni[*]) assigned to them by Prof. Müller and Dr. Kempf of the Potsdam Observatory (Astr. Nachr. 146.37). Measures of these stars have accordingly been made by Professor O. C. Wendell, with the photometer with achromatic prisms attached to the 15 inch Equatorial of this Observatory. The star $+20°4200$ was compared with the star $+20°4204$, which is about 12.6 distant. The results of these measures are shown by the heavy dots in Figure 1, ordinates representing magnitudes, and abscissas, phases, or intervals in days since the last computed maximum. The measures made at Potsdam are represented by the light dots connected by lines, and the dotted line shows the light curve given in the article mentioned above. The results for $+28°3460$, which was compared with $+28°3467$, distant 15.0, are similarly shown in Figure 2. It will be seen that a smooth curve can be drawn, which would not differ on the average
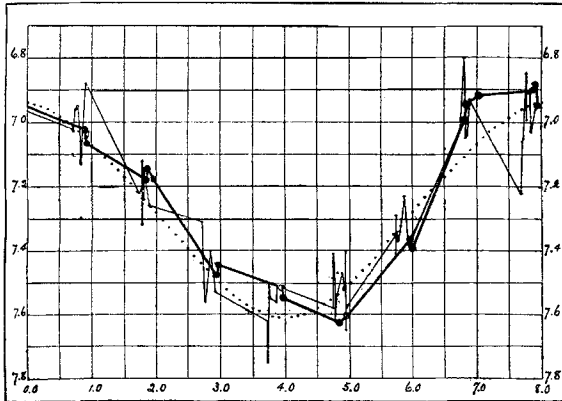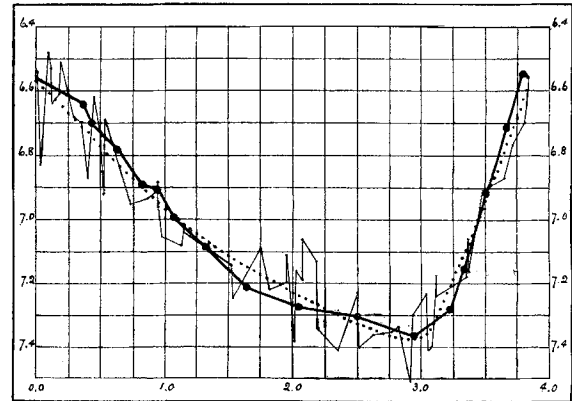

Fig. 1

Fig. 2

by more than one or two hundredths of a magnitude from the points observed here. The greater accordance of the Harvard measures as compared with those made at Potsdam, is partly due to the greater number of settings made each night, and partly to the smaller angular distance between the stars compared. At Cambridge, adjacent stars are compared directly, while at Potsdam, each star is compared with the standard stars by means of an artificial star. In drawing the light curve of $+20°4200$, too great weight seems to have been given to the Potsdam observation for which the phase is $7^d 7$, magnitude 7.22. Rejecting this, the other Potsdam observations agree closely with those made at Cambridge. To reduce the results to the same scale, the Cambridge magnitudes have been changed by $+0.16$ and $+0.32$, and the phases by $+0^d 8$ and $-0^d 2$, in Figures 1 and 2 respectively. This indicates that the period of $+20°4200$ is $7^d 98$, instead of $8^d 00$.

S Antliae.

The accuracy attainable with the photometer described above is illustrated by the following observations of the variable star, S Antliae. This star has a period of $7^h 46^m 8$, which is the shortest known, except in the case of variables in clusters. In Circulars Nos. 23 (A. N. 3476) and 25, it was shown that the period of U Pegasi, which was at one time supposed to be shorter than that of any other variable, should really be doubled. The alternate minima were bright and faint, the difference in magnitude amounted to 0.15 and was determined with a probable error but little exceeding one hundredth of a magnitude. It, therefore, appeared important to see if S Antliae belonged to the same class of variables, and if its period should be doubled. A series of measurements was accordingly made by Prof. Wendell on

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[*]) Diese Bezeichnung musste in SU Cygni umgeändert werden; vgl. Hartwig V. J. S. Bd. 33 p. 346. In Tabelle I der Hartwig'schen Ephemeriden ist für SU Cygni irrthümlich der Ort des benachbarten Sterns BD. $+28°3447$ angegeben worden. Die richtige Position lautet (1855.0): $19^h 39^m 1^s$ $+28° 54.9$. *Kr.*

different nights near the times of minima, care being taken that some of the minima should correspond to an odd, and others to an even number of periods of variation, E. The comparison star was $-28°7347$, distant, $21'.8$. A light curve was then formed from these measures, and residuals taken from it. On two nights E was odd, 11229 and 11349, and the means of the corresponding residuals were $+0.011$ and 0.000; on three nights E was even, 11306, 11340, and 11346, and the mean residuals were $+0.004$, -0.007, and $+0.008$. The assumed value of the difference in magnitude of S Antliae when at minimum and $-28°7347$, was -1.676.

Harvard College Observatory, 1899 February 21.

Accordingly, the mean difference in magnitude at minimum when E was odd, was -1.670, and when E was even, -1.674. It seems impossible that thousandths of a magnitude should have any real value, but if neglected, the accuracy of these observations would not be properly indicated. An error of two or three hundredths of a magnitude could not have failed to be detected. The variable star S Antliae, therefore, does not have a light curve resembling that of β Lyrae and U Pegasi, and the period of variation should not be doubled.

Edward C. Pickering.

Beobachtungen des Cometen 1898 I

am Utrechter Refractor (Brennweite 319 cm, Oeffnung 26 cm) von Prof. *A. A. Nijland.*

1898	M.Z.Utrecht	$\Delta\alpha$	$\Delta\delta$	Vgl.	α app.	$\log p.\Delta$	δ app.	$\log p.\Delta$	Red. ad 1. app.	*
März 31	$15^h 40^m 12^s$	$+2^m 54^s03$	$+10'\ 7''.3$	8.4	$22^h\ 3^m 51^s63$	9.612_n	$+28° 38'\ 7''.4$	0.872	$+0^s32\ -5''.4$	1
April 1	15 55 42	$+2\ 5.31$	$+\ 5\ 29.0$	8.4	22 8 9.10	9.614_n	$+29\ 33\ 53.8$	0.756	$+0.31\ -5.3$	2
6	14 55 8	$-1\ 42.86$	$+\ 5\ 30.8$	10.4	22 29 55.63	9.635_n	$+34\ 12\ 59.4$	0.792	$+0.21\ -4.5$	3
13	13 32 6	$+0\ 13.96$	$+\ 4\ 41.8$	12.5	23 2 43.27	9.608_n	$+40\ 4\ 34.8$	0.851	$+0.17\ -3.2$	4
20	13 37 2	$+3\ 53.53$	$-\ 6\ 8.0$	8.4	23 38 15.12	9.639_n	$+45\ 3\ 8.4$	0.837	$+0.09\ -2.2$	5
21	13 41 22	$-0\ 0.59$	$+\ 0\ 6.4$	1.1	23 43 30.35	9.649_n	$+45\ 40\ 57.3$	0.833	$+0.09\ -1.7$	6
21	14 7 44	$+0\ 5.20$	$+\ 0\ 49.2$	8.3	23 43 36.14	9.675_n	$+45\ 41\ 40.1$	0.808	$+0.09\ -1.7$	6
23	14 29 49	$-0\ 54.86$	$+\ 5\ 21.7$	12.4	23 54 16.38	9.698_n	$+46\ 53\ 42.5$	0.771	$+0.09\ -1.1$	7
24	14 15 17	$+1\ 56.90$	$-\ 3\ 26.8$	10.3	23 59 29.85	9.692_n	$+47\ 32\ 5.2$	0.796	$+0.09\ -1.1$	8
27	14 10 26	$+2\ 45.01$	$+\ 4\ 39.3$	10.3	0 15 42.63	9.696_n	$+49\ 1\ 15.1$	0.800	$+0.11\ -0.4$	9
Mai 1	12 46 47	$+4\ 6.48$	$-\ 1\ 38.6$	8.4	0 37 10.69	9.512_n	$+50\ 48\ 10.8$	0.897	$+0.11\ +0.3$	10
11	11 37 33	$-0\ 34.16$	$-\ 3\ 37.7$	12.4	1 31 10.07	9.342_n	$+54\ 0\ 32.6$	0.912	$+0.30\ +2.3$	11
12	13 44 49	$-0\ 42.44$	$-\ 6\ 56.5$	10.3	1 36 57.37	9.691_n	$+54\ 15\ 29.6$	0.828	$+0.32\ +2.5$	12
22	13 4 19	$-1\ 40.07$	$+\ 2\ 45.5$	8.4	2 27 42.92	9.623_n	$+55\ 47\ 53.4$	0.862	$+0.65\ +3.2$	13
23	13 28 31	$-0\ 35.80$	$+\ 3\ 25.1$	12.4	2 32 36.84	9.661_n	$+55\ 53\ 22.3$	0.848	$+0.63\ +3.2$	14

Mittlere Oerter der Vergleichsterne.

*	α 1898.0	δ 1898.0	Autorität	*	α 1898.0	δ 1898.0	Autorität
1	$22^h\ 0^m 57^s28$	$+28° 28'\ 5''.5$	AG. Cambr. 13175	8	$23^h 57^m 32^s86$	$+47° 35'\ 33''.1$	AG. Bonn 18400
2	22 6 3.48	$+29\ 28\ 30.1$	AG. Cambr. 13245	9	0 12 57.51	$+48\ 56\ 36.2$	AG. Bonn 195
3	22 31 38.28	$+34\ 7\ 33.1$	AG. Leiden	10	0 33 4.10	$+50\ 49\ 49.1$	AG. Cambr. 272
4	23 2 29.14	$+39\ 59\ 56.2$	AG. Lund	11	1 31 43.93	$+54\ 4\ 8.0$	AG. Cambr. 726
5	23 34 21.50	$+45\ 9\ 18.6$	AG. Bonn 18013	12	1 37 39.49	$+54\ 22\ 23.6$	AG. Cambr. 793
6	23 43 30.85	$+45\ 40\ 52.6$	AG. Bonn 18176	13	2 29 22.34	$+55\ 45\ 4.7$	AG. Hels. 2365
7	23 55 11.15	$+46\ 48\ 21.9$	AG. Bonn 18363	14	2 33 12.01	$+55\ 49\ 54.0$	AG. Hels. 2409

Bemerkungen.

April 1, 24, 27, Mai 11, 23. Kern nicht ganz scharf. — April 6. Den Ort des Sterns verdanke ich einer brieflichen Mittheilung des Herrn Wilterdink in Leiden. — April 21, erste Beob. Der Comet ging $13^h 41^m 22^s$ über den Doppelstern BD. $+45°4335 = $ AG. Bonn 18176 hinweg, und zwar theilte der Kern den Abstand der Componenten im Verhältniss von $3:5$. Aus dieser Beobachtung habe ich die Werthe $-0^s59\ +6''.4$ hergeleitet.

Der Comet hatte einen Schweif von etwa 5' Breite, dessen Länge und Richtung ich im Sucher (Oeffn. 7.4 cm) mittelst einer Skizze der benachbarten Sterne schätzte. Auch die Gesammthelligkeit des Cometen schätzte ich im Sucher, während die Grösse des Kerns im Refractor mit Nachbarsternen verglichen wurde.

Die hier folgende Tabelle giebt eine Uebersicht der Beobachtungen. Dieselbe enthält das Datum, die Zeit der