No.	Star	Authority	App. α	App. δ	Date	G.C.T.	χ—ρ	σ'—σ	Obs.
			h m s	° ′ ″		h m s	° ′	″	
47	BD+15°1930	A.G. Berlin A	8 50 20.22	+15 4 28.5	June 6	4 31 3.4	+35 42	+1.5	Bk
48	BD+15°1933	Bord. ph.	8 50 53.23	+15 1 17.9	6	4 47 7.7	+32 50	+0.9	Bk
49	BD+15°1934	A.G. Berlin A	8 51 14.88	+15 0 52.2	6	4 55 1.3	+24 59	—1.0	Pe
50	BD+15°1936	A.G. Berlin A	8 51 25.37	+14 58 32.0	6	5 2 6.4	+29 14	—0.9	Bk
51	BD+ 6°2301	Greenw. (1925)	10 19 54.03	+ 6 1 16.5	8	4 3 1.5	—34 47	—2.8	Bk
52	10^h20^m, 129	Tou. ph.	10 19 54.02	+ 6 2 15.7	8	4 3 24.8	—38 57	+2.1	Bk
53	BD+ 6°2304	A.G. Leipzig II	10 21 56.84	+ 5 36 45.5	8	5 24 34.9	—11 36	+0.5	Pe
54	BD+ 5°2331	Wash. (1900)	10 22 0.44	+ 5 30 14.6	8	5 32 3.2	+ 8 53	—1.3	Bk
55	BD+ 5°2332	A.G. Leipzig II	10 22 7.27	+ 5 26 1.3	8	5 40 36.8	+20 14	+1.0	Bk

*Double star: mean position.

Denver, Colorado,
December 18, 1935.

THE PERIOD AND LIGHT CURVE OF ZZ CRUCIS,
(1900: 12h 0.6m,— 62° 56′)

By HAROLD L. ALDEN.

This star, which is H.D. 105055, was found to be variable on Franklin-Adams plates and the period and the light curve were derived by Oosterhoff at Leiden*. Since the star is rather bright for the long exposures with the Franklin-Adams and the estimates might be affected by a nearby star, Dr. Hertzsprung suggested that observations with a telescope of longer focus would prove of value.

Accordingly, thirty-nine plates were secured with the Yale telescope in 1933, with exposures ranging from fifteen to sixty seconds. In addition, the star is on twenty-five parallax and proper motion plates of BS 4599, the first of which was taken in May, 1926. Twenty-one of these plates had been sent to New Haven, where Mr. Ernest Whitworth kindly estimated the brightness of the variable, making two independent estimates for each plate. Two separate estimates of the variable were made on each of the remaining plates by the writer.

Six comparison stars were used, for which the positions relative to the variable and the adopted photographic magnitudes are given in Table 1. The zero point is based on stars in the Draper Catalogue and the scale determined from these stars in conjunction with grade

Table 1

Designation		x	y	Grades	Ptg. Magn.
Leiden	Yale				
		′	′		
a	a	— 8.0	—4.4	0.0	9.0
	b	—15.2	+2.5	0.7	9.1
	c	—17.9	+3.4	3.1	9.3
	d	— 7.4	—1.7	7.3	9.7
c	e	—14.4	+8.0	10.1	10.0
d	f	+ 1.6	+8.9	13.5	10.3

*B.A.N. *245*, 74-78, 1933.

Table 2

Julian Day G.H.T.	Epoch	O − C
3916.417 (L)	— 818	+0.019 day
3944.331 (L)	— 803	+ .002
3959.281 (L)	— 795	+ .053
3972.260 (L)	— 788	— .002
4000.210 (L)	— 773	+ .014
4294.385 (L)	— 615	—0.037
4296.228 (L)	— 614	— .056
4661.248 (Y)	— 418	— .026
4676.208 (Y)	— 410	+ .037
5404.226 (L)	— 19	— .062
5417.368 (L)	— 12	+0.044
7173.360 (Y)	+ 931	— .012
7188.307 (Y)	+ 939	+ .038
7201.258 (Y)	+ 946	— .047
7201.301 (Y)	+ 946	— .003
7201.340 (Y)	+ 946	+ .035
7959.220 (Y)	+1353	+ .003

estimates and exposure ratios. The Leiden comparison star *b* could not be used as it is a close double.

Using the period found at Leiden, the phases of the observations were computed and the magnitudes plotted. The curve closely resembles the Leiden curve except for the difference in scale and a slight but definite difference of phase. A new period was, therefore, computed from the Leiden dates of minimum, corrected for some obvious misprints, and the times when the variable was found fainter than magnitude 10.0 on the Yale plates. These are given in Table 2 for the primary minimum.

A least-squares solution gives

Period = 1.862192 ± 0.000008 days (p. e.)

Epoch of Primary Minimum = 2425439.670 ± 0.006 days.

The probable error of a single observation is 0.024 days.

A slightly different procedure was adopted in order to obtain a corrected period from the secondary minima. The mean of five dates on which the variable was fainter than magnitude 9.6, when reduced to the same epoch with an approximate period, is J.D. 2427187.350. Assuming from the Leiden curve that a secondary minimum occurred at J.D. 2424297.220, the difference of 2890.130 days for 1552 periods gives

Period = 1.862197 ± 0.000010 days (p.e., estimated)

The weighted mean is

Period = 1.862194 ± 0.000006 days and

1/P = 0.537001 periods/day.

With this value of the reciprocal period new phases were computed, the observations tabulated according to phase, and the means formed in groups of four. These means are given in Table 3.

TABLE 3

Phase in Fractions of Period=0.537001 (J.D.—2420000)

Phase	Mean Magn.	Phase	Mean Magn.
0.039	9.71	0.466	9.48
.067	9.88	.536	9.53
.103	10.14	.606	9.71
.134	10.00	.662	9.61
.193	9.58	.698	9.52
.211	9.54	.781	9.47
.262	9.44	.916	9.49
.335	9.47	.969	9.48

The primary minimum occurs at phase 0.108 ± 0.003 and the secondary practically half a period later at phase 0.613. The range on the scale adopted is from 9.45 to 10.15 for the primary and 9.75 for the secondary minimum.

Yale University Observatory,
Southern Station, Johannesburg,
October 15, 1935.

ON THE MOTION OF THE DOUBLE STAR Σ1517=ADS 8094

BY S. AREND

α_{1950} 11h 11m.1, δ_{1950} +20°25′,

Mag. 7.3, 7.3; Sp. G0.

From a fairly easy pair when first discovered in 1829, this double star has slowly closed into one that can be measured only with the largest telescopes. The equality in brightness leaves the quadrant ambiguous. THOMAS LEWIS (Mem. R.A.S. **59**, 1906) has suspected a change of 180° between the years 1896 and 1899.

Since the publication of A.D.S. the following measures have been made:

		θ	ρ	n
		°	″	
G. KUIPER (*B.A.N.*, 1933, 7)	1930.94	227.8	0.18	4
G. VAN BIESBROECK (unpublished)	1926.67	250.6	0.22	4
G. VAN BIESBROECK	1930.80	242.0	0.22	5
G. VAN BIESBROECK	1933.72	240.6	0.21	4
G. VAN BIESBROECK	1935.29	213.4	0.17	2

When trying to construct the orbit according to the law of areas it was found that nearly straight uniform motion suffices for representing all the measures so far.

The following formulæ

$\rho \cos (\theta - 208°.4) = +0''.177$

$\rho \sin (\theta - 208°.4) = -0''.00952\ (t - 1941.87)$