TABLE 2. Normal points.

primary			secondary		
n	phase	Δm	n	phase	Δm
	P	m		P	m
9	·1026	·290	6	·6410	·260
8	·1731	·276	6	·6595	·287
8	·1911	·264	5	·6752	·287
10	·2013	·229	5	·6917	·204
10	·2114	·186	5	·7036	·152
10	·2208	·113	5	·7162	·082
10	·2346	·011	5	·7274	·025
10	·2464	—·032	5	·7352	·032
10	·2571	—·011	8	·7410	·072
10	·2690	·077	8	·7474	·116
9	·2833	·182	8	·7600	·170
9	·2987	·226	4	·7818	·278

TABLE 3. Reflected normals.

primary			secondary		
n	phase	Δm	n	phase	Δm
	P	m		P	m
10	·2500	—·032	10	·7338	·028
10	·2556	—·019	10	·7405	·071
10	·2613	·014	10	·7466	·109
10	·2688	·070	10	·7547	·148
10	·2752	·125	10	·7674	·204
10	·2810	·169	10	·7858	·290
10	·2870	·206	10	·8115	·265
10	·2930	·217			
10	·2999	·252			
7	·3073	·252			
7	·3237	·278			

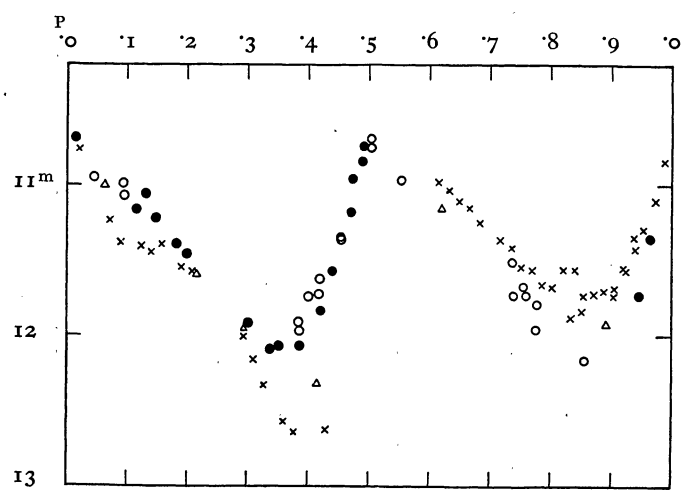
The brightest variable star in ω Centauri, by *W. Chr. Martin.*

In *Leiden Annalen* XVII, 2, 1938, an account has been given of a study of 155 variables in the globular cluster ω Centauri; 6 variables of the number known then were not included for the reasons stated on page 18[1]). The bright variable No. 1 has now been measured by the writer with a Hartmann photometer in a manner apt for the overexposed images of this star. Instead of the small diaphragm of mm·062 diameter (as projected on the plate) used formerly a larger one of mm·194 diameter was used. The density of the portion of a star image cut out by this diaphragm is not homogeneous but has a central condensation surrounded by a ring of outward decreasing density. Each measurement consisted in finding the position of the wedge for which this ring merged gradually into the density of the wedge. One may doubt if this method of measuring the edge of star images will give reliable results. However, the present research removes this doubt and shows that the accuracy is about the same as for fainter stars measured with the smaller diaphragm. It is evident that the method is only applicable to the exposures obtained with long focus refractors giving identical images over the whole plate.

A sequence of nine stars, including the whole light range of the variable, served as comparison stars. The variable and the comparison stars have been measured on the 432 plates taken at Johannesburg and Lembang in 1931 and 1935 (cf. *Leiden Annalen* XVII, 2, Table 14), and on 22 plates taken in 1937 at Johannesburg. Each plate was measured twice. The total number of settings was 9990.

[1]) Instead of No. 8 in the eighth line read: No. 80.

The magnitudes of the comparison stars were determined from the plates 28401, 38126 and 38127, each having two exposures respectively with and without a grating in front of the objective, and the plates 37971 and 37972 having respectively two and one exposures of the Selected Area 129 (Mount Wilson magnitudes). The exposures taken with a grating were, if possible, also measured with the smaller diaphragm. The scale of the adopted magnitude system is the average of the scales defined by the grating (with the grating constant m·90, cf. l.c. p. 9) and the Selected Area, which differ 8%, the latter being the steeper. This average scale corresponds



Light variation of ω Cen No. 1.

× 1931 } Night means of plates
● 1935 } taken at Johannesburg
Δ 1938 }
○ 1935 Plates taken at Lembang

to a grating constant of $^{m}\cdot94$. The zero point was defined by the Selected Area only. The resulting magnitudes are given in the third column of Table 1 for the nine comparison stars and a series of bright stars in the neighbourhood of ω Centauri. The stars with the index 1 have been taken from BAILEY's first sequence (*H. A.* **38**, 1902). The second column gives the approximate coordinates in seconds of arc relative to the centre of ω Centauri, as defined in *Leiden Annalen* XVII, 2, p. 20. The definitive magnitudes of the nine comparison stars, as used for the reduction (column 5) were determined by reducing their average wedge readings on 410 Johannesburg plates (column 4) to the magnitude system of column 3.

TABLE 1.
Photographic magnitudes of bright stars near ω Centauri.

star	coordinates x	coordinates y	m	$\bar{w}$	m
			m	mm	m
a	− 54″	+ 908″	11·60	42·96	11·55
b	− 203	+ 736	11·10	49·73	11·07
c	− 798	+ 752	11·81	38·98	11·83
d	− 780	+ 51	12·22	32·91	12·23
e	− 805	+ 51	10·57	55·66	10·58
f_1	− 419	+ 113	12·15	34·21	12·14
g_1	− 456	+ 115	12·82	25·83	12·84
h	− 680	− 330	11·02	49·35	11·10
e_1	− 350	− 698	11·62	41·57	11·64
No. 1	− 420	+ 299	var.		
	−1227	− 446	10·12		
	− 986	+ 803	12·26		
	− 865	− 455	12·25		
a_1	− 837	− 564	9·62		
	− 830	− 77	12·35		
d_1	− 720	− 558	11·14		
	− 289	−1104	10·78		
	− 244	− 835	12·45		
	− 194	− 705	12·48		
	− 153	− 680	11·93		
	+ 78	− 467	10·36		
	+ 166	−1312	10·40		
	+ 311	− 482	10·92		
	+ 312	+ 232	11·48		
	+ 378	− 818	13·08		
	+ 394	− 889	12·62		
	+ 458	+ 902	10·98		
	+ 487	− 849	11·21		
	+ 566	+ 583	11·92		
	+ 750	− 989	12·08		
b_1	+ 771	+ 319	9·88		
	+ 801	− 981	12·85		
	+ 846	− 284	10·38		

For each plate the wedge readings of the comparison stars were plotted against their magnitudes. The magnitude of the variable was then read from a smooth curve drawn through this plot. Table 2 gives the average magnitude of the variable for the different nights on which plates have been taken at Johannesburg. The average was taken because the plates of one night were always taken within an interval of 85 minutes. The first column of Table 2 gives the number of plates combined into an average.

The mean error of a magnitude on a single plate was determined from the differences in magnitude on the consecutive plates of each night; it was found to be $\pm\,^{m}\cdot075$. For an average of n plates it is $\pm\,^{m}\cdot075 : \sqrt{n}$; e.g. $\pm\,^{m}\cdot027$ if $n = 8$. The deviations from the reduction curves of the three comparison stars a, c and e_1 indicate about the same mean error so that there is no indication of a night error. Table 3 gives the magnitudes of the variable on 20 Lembang plates, measured with the small diaphragm of $^{mm}\cdot062$ diameter, on account of the lower sensitivity of these plates.

In *H. A.* **38** BAILEY gives a period of $29^{d}\cdot34$ for the light variation but states that the light curve may be irregular. The same is found by Mrs. HELEN SAWYER HOGG (*H. C.* No. 366, 1931). The present research shows that the light curve is irregular; especially the minimum brightness varies over a range of about 1^{m}. The maximum brightness and the period of its return, however, are constant. A plot of the magnitudes of Tables 2 and 3 against their Julian dates shows that the consecutive minima, observed in 1931, are respectively $11^{m}\cdot7$, $12^{m}\cdot6$ and $11^{m}\cdot8$; the light variation is of the RV Tauri type. In 1935 the minima are about equally deep, viz. $12^{m}\cdot1$; the light curve is nearly constant and of the δ Cephei type.

The diagram gives a plot of the observations against the phases of the double period, $58^{d}\cdot7027$; they have been calculated with the formula: phase $= ^{d^{-1}}\cdot017035 \times$ (J.D. — 2400000). The minimum at phase $^{P}\cdot40$ varies from $12^{m}\cdot1$ to $12^{m}\cdot6$, that at phase $^{P}\cdot85$ from $11^{m}\cdot6$ to $12^{m}\cdot1$. The rising and descending branches show corresponding changes. The light variation corresponds well to the definition of RV Tauri variables as given by Gerasimovič in *H. C.* No. 341. Classified as a δ Cephei star it would fall close to the period-luminosity curve for ω Centauri (cf. *H. C.* No. 366). The present series of observations are not long enough for the conclusion whether the irregularities of the light curve are restricted to the observed ones. The older observations of BAILEY and Mrs. SAWYER HOGG show only a slight, uncertain difference between the two minima; here the minimum at phase $^{P}\cdot40$ is about $^{m}\cdot2$ deeper than that at phase $^{P}\cdot85$.

The median brightness of the variable is $11^{m}\cdot4$, whereas 61 stars brighter than $12^{m}\cdot3$ and within 30′

of the cluster show no concentration near ω Centauri. Its distance from the centre of the cluster is only 8′·4 and the cluster variables extend to about 20′ from the centre. When the variable belongs to the cluster we may conclude that the absolute median magnitude of an RV Tauri variable with a period of 58 days is about the same as that of a δ Cephei variable with a period of 29 days.

TABLE 2.

Photographic magnitudes of the variable ω Cen No. 1, on plates taken at Johannesburg.

n	J.D. — 2420000	$\bar{m}$	phase	n	J.D. — 2420000	$\bar{m}$	phase
		m	P			m	P
2	6406·545	11·87	·835	8	6469·365	11·68	·906
3	07·524	11·83	·852	8	70·360	11·57	·923
3	10·520	11·73	·903	8	71·356	11·42	·940
5	11·525	11·55	·920	8	72·354	11·29	·957
6	12·519	11·34	·937	8	73·352	11·10	·974
3	15·510	10·84	·988	6	6523·220	11·56	·823
7	17·500	10·76	·022	5	24·211	11·56	·840
8	20·496	11·23	·073	1	6836·363	11·39	·157
4	21·485	11·38	·090	1	7891·443	11·06	·131
8	23·487	11·40	·124	8	92·466	11·22	·148
8	24·485	11·44	·141	8	94·460	11·39	·182
7	27·478	11·54	·192	7	95·456	11·46	·199
8	28·473	11·57	·209	8	7901·441	11·92	·301
8	33·461	12·00	·294	8	04·433	12·07	·352
8	34·458	12·16	·311	8	06·427	12·07	·386
8	35·455	12·33	·328	8	08·422	11·84	·420
7	37·446	12·57	·362	8	11·414	11·18	·471
8	38·446	12·64	·379	4	12·410	10·84	·488
8	41·442	12·62	·430	8	39·336	11·73	·947
8	52·410	10·98	·617	8	40·334	11·35	·964
8	53·406	11·03	·634	8	43·327	10·69	·015
8	54·403	11·10	·651	4	49·309	11·16	·116
8	55·401	11·15	·668	4	62·289	12·09	·338
7	56·400	11·25	·685	8	68·256	11·57	·439
8	58·392	11·36	·719	8	70·251	10·96	·473
8	59·390	11·41	·736	8	71·248	10·74	·490
8	60·387	11·54	·753	6	8605·505	11·95	·295
8	61·384	11·56	·770	6	12·488	12·32	·414
8	62·381	11·66	·787	7	59·366	11·57	·212
6	63·385	11·67	·804	1	83·307	11·15	·620
7	66·375	11·73	·855	1	99·269	11·92	·892
3	67·388	11·72	·872	1	8709·249	11·00	·062
8	68·365	11·70	·889				

TABLE 3.

Photographic magnitudes of ω Cen No. 1 on plates taken at Lembang

J.D. — 2420000	m	phase
	m	P
7927·059	11·51	·737
·181	11·73	·740
28·073	11·67	·755
34·083	12·16	·857
45·181	10·95	·046
48·074	10·99	·095
·086	11·07	·096
65·062	11·97	·385
·073	11·91	·385
66·027	11·74	·401
67·040	11·72	·419
·046	11·62	·419
69·047	11·36	·453
·057	11·34	·453
71·993	10·75	·503
72·012	10·69	·503
75·048	10·97	·555
87·049	11·73	·759
88·038	11·96	·776
·047	11·79	·776