

Observer	Epoch	$\theta_c$	$\varrho_c$	$\theta_o - \theta_c$	$\varrho_o - \varrho_c$	Observer	Epoch	$\theta_c$	$\varrho_c$	$\theta_o - \theta_c$	$\varrho_o - \varrho_c$
Maw	1898.22	121°7	5°39	-1°4	-0°11	Comstock	1901.30	120°3	5°55	+0°4	+0°13
Lewis	98.25	"	"	+2.0	+0.28	Maw	01.31	"	5.56	-1.5	-0.01
Comstock	98.26	"	"	+1.1	+0.16	Doberck	02.08	119.6	5.59	-0.3	+0.21
Schiaparelli	98.27	"	"	+1.5	+0.01	Comstock	02.20	119.5	5.60	-0.9	+0.09
Doolittle	98.27	"	"	-1.1	+0.10	Bowyer	02.26	"	"	-0.3	+0.07
Aitken	98.31	"	5.40	+0.7	+0.13	Maw	02.28	119.4	"	-1.7	-0.10
Solá	98.97	121.5	5.42	-3.9	-0.01	Bryant	02.30	"	"	-1.6	-0.16
Lewis	99.12	121.4	5.44	-0.8	+0.38	Doberck	03.13	118.5	5.63	-0.1	+0.06
Bowyer	99.15	"	"	-0.3	+0.11	Comstock	03.15	118.4	"	-0.8	+0.05
Schiaparelli	99.15	"	"	+1.3	-0.05	Doolittle	03.20	"	"	-3.0	+0.07
Maw	99.15	"	"	-2.1	+0.09	Biesbroeck	03.21	"	"	+0.3	-0.01
Aitken	99.18	"	"	+0.9	+0.05	Bowyer	04.24	117.4	5.65	-0.4	+0.07
Seabroke	99.18	"	"	+0.7	-0.37	Comstock	04.24	"	"	-1.4	+0.12
Brown	99.21	"	"	0.0	+0.25	Salet	04.29	117.3	"	0.0	-0.11
Doolittle	99.22	"	"	-3.1	+0.09	Maw	04.34	"	"	-0.9	-0.26
Comstock	99.25	"	"	-0.4	+0.11	Farman	05.11	116.5	"	-0.6	-0.19
Coleman	99.32	"	5.45	-0.6	+0.26	Bowyer	05.23	116.4	"	-1.2	+0.05
Bryant	1900.24	121.0	5.49	-1.3	-0.12	Maw	05.36	116.3	"	-0.2	-0.30
Doolittle	00.24	"	"	-2.6	+0.15	Bryant	06.10	115.4	5.63	+0.2	+0.05
Schiaparelli	00.29	"	5.50	+0.1	0.00	Comstock	06.23	115.3	"	-1.4	+0.13
Seabroke	00.30	120.9	"	+0.3	-0.16	Furner	06.23	"	"	-1.6	-0.15
Doberck	00.87	120.6	5.53	-0.1	+0.17	Bowyer	06.25	"	"	+0.6	+0.16
Lewis	01.18	120.4	5.55	-1.8	+0.23	Maw	06.29	115.2	"	-1.7	-0.17
Aitken	01.20	"	"	0.0	+0.15	"	07.24	114.4	5.60	-0.5	-0.19
Seabroke	01.23	"	"	+0.7	-0.07	Doberck	08.35	113.4	5.53	+1.7	+0.08
Bowyer	01.27	"	"	-0.1	+0.31						

Sutton, Surrey, 1908 July 12.

W. Doberck.

## 25 new variable stars in Harvard Map, Nos. 31 and 43.

(Harvard College Observatory Circular No. 137).

Harvard Map No. 43, which has a centre in RA. =  $18^h 0^m$ , Decl. =  $-30^\circ$ , has been examined for variable stars, by Miss Cannon. 22 new variable stars were found, and 15 which were already known. The known variables thus found are RS Scorpii, RR Scorpii, 223.1907 Scorpii, RX Scorpii, X Sagittarii, SV Scorpii, W Sagittarii, 271.1904 Sagittarii, 275.1904 Sagittarii, Y Sagittarii, RV Sagittarii, X Scuti, U Coronae australis, SU Sagittarii, and RY Sagittarii. At the beginning of this investigation, there were in the region of this map 42 known variable stars as bright as magnitude 10.5 at maximum. If we therefore assume that the number of known variables found is to the total number found, as the number already known is to the whole number existing in the region, it follows that there are probably 104 variable stars in the region of H. M. 43, of which 64 or 0.62 have been discovered. In H. C. 129 (A. N. 175.167)

13 new variable stars were announced in H. M. 31, which has a centre in RA. =  $18^h 0^m$ , Decl. =  $0^\circ$ . In examining some suspected objects in this region, three additional new variable stars were found, and are included in Table I. Apparently eleven of the new variable stars belong to Class V, Algol variables; ten to Class IV, short period variables; two to Class II, long period variables; one, a Nova, to Class I. All of the stars showing a variation of less than one magnitude were confirmed by other observers.

The successive columns of Table I give the designation of the variable, the number in the list of variables discovered at Harvard, the provisional designation in A. N., the number in the Durchmusterung, the right ascension for 1900, the declination for 1900, the brightest and faintest observed magnitudes, the range, and the Class.

Table I. New variable stars.

Designation	H. V.	Provis. designation in A. N.	DM.	RA. 1900	Decl. 1900	Bright	Faint	Range	Class
174734 <sup>a</sup> <sub>n</sub>	3060	18.1908 Scorpii	R	17 <sup>h</sup> 47 <sup>m</sup> 10 <sup>s</sup>	-34° 22' 6"	8.7	< 12	> 3.3	II
174734 <sup>b</sup> <sub>n</sub>	3061	19.1908 Scorpii	—	17 47 28	-34 19.7	8.8	—	—	I?
174916	3062	20.1908 Herculis	+16° 33' 11"	17 49 42	+16 57.1	8.2	9.3	1.1	V

Designation	H. V.	Provis. designation in A. N.	DM.	RA. 1900	Decl. 1900	Bright	Faint	Range	Class
174933 <sub>n</sub>	3063	21.1908 Scorpii	-33°12638	17 <sup>h</sup> 49 <sup>m</sup> 42 <sup>s</sup>	-33°48'0	9.5	11.0	1.5	IV
175237 <sub>n</sub>	3064	22.1908 Coronae Austr.	-37 12045	17 52 28	-37 52.3	8.7	9.7	1.0	V?
175423 <sub>n</sub>	3065	23.1908 Sagittarii	-23 13773	17 54 55	-23 1.1	8.7	10.1	1.4	V
180240 <sub>n</sub>	3066	24.1908 Coronae Austr.	R	18 2 13	-40 13.1	10.1	10.9	0.8	IV?
180218 <sub>n</sub>	3067	25.1908 Sagittarii	-18 4799	18 2 34	-18 34.0	8.0	9.0	1.0	IV?
180423 <sub>n</sub>	3068	26.1908 Sagittarii	-23 14026	18 4 48	-23 42.2	9.5	10.2	0.7	V
180516 <sub>n</sub>	3069	27.1908 Sagittarii	—	18 5 19	-16 29.1	9.8	11.3	1.5	V?
180529 <sub>n</sub>	3070	28.1908 Sagittarii	-29 14636	18 5 50	-29 52.9	9.5	10.7	1.2	V?
180623 <sub>n</sub>	3071	29.1908 Sagittarii	-23 14072	18 6 58	-23 8.5	7.2	8.2	1.0	IV?
181119 <sub>n</sub>	3072	30.1908 Sagittarii	-19 4945	18 11 7	-19 6.6	8.0	9.2	1.2	IV?
181113 <sub>n</sub>	3073	31.1908 Serpentes	—	18 11 40	-13 6.1	10.1	10.7	0.6	—
181625 <sub>n</sub>	3074	32.1908 Sagittarii	-25 13054	18 15 57	-25 17.1	8.9	11.2	2.3	V
181916 <sub>n</sub>	3075	33.1908 Sagittarii	-16 4859	18 18 57	-16 50.7	8.6	10.0	1.4	IV?
181912 <sub>n</sub>	3076	34.1908 Scuti	-12 5045	18 19 54	-12 45.2	8.6	9.3	0.7	IV?
182109 <sub>n</sub>	3077	35.1908 Scuti	-9 4736	18 21 5	-9 15.2	7.5	8.5	1.0	V
183342 <sub>n</sub>	3078	36.1908 Coronae Austr.	-42 13498	18 33 37	-42 19.8	9.8	10.4	0.6	V?
183807 <sub>n</sub>	3079	37.1908 Scuti	-7 4683	18 38 19	-7 49.9	7.5	8.4	0.9	IV
183819 <sub>n</sub>	3080	38.1908 Sagittarii	-19 5148	18 38 43	-19 29.8	8.8	9.7	0.9	V?
184334 <sub>n</sub>	3081	39.1908 Sagittarii	-34 13135	18 43 3	-34 47.5	8.9	10.5	1.6	V?
184420 <sub>n</sub>	3082	40.1908 Sagittarii	-20 5283	18 44 47	-20 23.5	7.6	8.6	1.0	IV?
185323 <sub>n</sub>	3083	41.1908 Sagittarii	-23 14922	18 53 38	-23 50.2	8.8	9.9	1.1	IV
190129 <sub>n</sub>	3084	42.1908 Sagittarii	R	19 1 16	-29 1.2	9.0	<13	>4	II?

## Remarks.

174734<sub>n</sub>. This is the south preceding component of a double star, one or both of which might be identified as C.P.D. —34°7303, mag. 9.2. The position of the variable precedes that of the catalogue star, 0°7, south 0°3. When the variable is at maximum, the two objects are approximately equal in brightness. Observations of the variable on 111 photographs, taken between July 18, 1899 and May 2, 1907, show that the times of maxima may be represented by the formula  $J. D. 2411360 + 237 E$ .

174734<sub>n</sub>. On 193 photographs, taken between July 18, 1899, and Sept. 1, 1907, a star of the eleventh magnitude appears nearly in the position of this object and shows no certain variability. 111 of these photographs were taken with the Bache Telescope, 80 with the Cooke lens, and 2 with the Bruce Telescope. Plates taken with the Bache and Bruce Telescopes show this star to be double, the south preceding component being brighter than the north following. The position of the brighter component, for 1875, is RA. = 17<sup>h</sup>45<sup>m</sup>48<sup>s</sup>.0, Decl. = -34°19'2". The photographs on which the star was found to be brighter than the magnitude 11, are enumerated in Table II, and discussed below.

174916. This star has been observed on 40 photographs, taken between July 25, 1899 and May 25, 1905. It is of normal brightness on 37, and faint on 3, of these photographs. The variation is of the Algol type, and the minimum is apparently of very short duration. The spectrum of this star is first type, either Class B 9, or A.

174933<sub>n</sub>. This star has been observed on 15 photographs, taken between May 1, 1893 and Aug. 20, 1903. The period is probably short.

175237<sub>n</sub>. This star is faint on 3 out of 15 photographs, taken between July 20, 1893 and Aug. 25, 1907. The spectrum is Class A, and the variation may be of the Algol type.

175423<sub>n</sub>. This star is faint on 8 out of 59 photographs, taken between July 26, 1899 and Aug. 25, 1907. On the other 51 plates, the light is nearly normal. The variation is probably of the Algol type. The spectrum is Class A.

180240<sub>n</sub>. This is C.P.D. —40°8479, and is not in the Cordoba Durchmusterung. The period appears to be short, and the variation is suspected to be like that of variables in clusters.

180218<sub>n</sub>. The variability was confirmed by an examination of 18 photographs, taken between Sept. 6, 1901 and Aug. 25, 1907. The period is probably short. The spectrum is Class G 5.

180423<sub>n</sub>. This star is faint on 3 out of 79 photographs, taken between July 23, 1889 and Sept. 1, 1907. The variation appears to be of the Algol type. Variability was confirmed by Mrs. *Fleming* and Miss *Wells*.

180516<sub>n</sub>. This star is faint on 7 out of 46 photographs, taken between July 21, 1893 and May 5, 1904. The variation may be of the Algol type.

180529<sub>n</sub>. This star is faint on 6 out of 45 photographs, taken between Aug. 2, 1900 and May 2, 1905. The variation may be of the Algol type.

180623<sub>n</sub>. The period is probably short. The spectrum is Class G.

181119<sub>n</sub>. The period is probably short.

181113<sub>n</sub>. This star has been observed on 27 photographs, taken between May 30, 1891 and June 17, 1904. The variability was confirmed by Miss *Wells*.

181625<sub>n</sub>. This star is fainter than normal on 15 out of 109 photographs, taken between Aug. 21, 1889 and Sept. 1, 1907. Three plates taken with the Cooke lens, having respectively, 17, 11, and 18 exposures of 30 minutes each, show the star to be varying, and that minima occurred on July 13, 1904, June 27, 1906, and July 12, 1907. The spectrum of this star is Class A. It has the largest range of variation of any star of the Algol type given in Table I.

181916<sub>n</sub>. The period is probably short.

181912<sub>n</sub>. This star was observed on 43 photographs, taken between June 22, 1901 and Sept. 1, 1907. The period is probably short.

182109<sub>n</sub>. This star is faint on 2 out of 35 photographs, taken between June 16, 1889 and July 1, 1904. The variation is probably of the Algol type. The spectrum is Class B 3.

183342<sub>n</sub>. This star is faint on 6 out of 96 photographs, taken between July 3, 1889 and Aug. 6, 1906. The variation was confirmed by two other observers. The range is small, but easily seen, as suitable comparison stars are near.

183807<sub>n</sub>. The period appears to be short. The spectrum is Class G.

183819<sub>n</sub>. This star is faint on 5 out of 66 photographs, taken between May 29, 1891 and Aug. 25, 1907. The variation may be of the Algol type.

184334<sub>n</sub>. This star is faint on 3 out of 25 photographs, taken

between May 29, 1891 and Sept. 1, 1907. The variation may be of the Algol type.

184420<sub>n</sub>. The period is probably short.

On 15 photographs, taken at Arequipa with the Cooke lens, between June 14, and Sept. 11, 1906, the star 19.1908 Scorpii shows large variations in brightness. No plates covering this region were taken with the Bruce or Bache

185323<sub>n</sub>. The period is probably short.

190129<sub>n</sub>. This is C.P.D. —29°5883, mag. 10.2, and is not in the Cordoba Durchmusterung. The period is probably several months.

Telescopes, during this interval. Observations of this star are given in Table II, in which the successive columns give the number of the Plate, the date, the length of exposure, the Julian Day, and the magnitude.

Table II. Observations of 19.1908 Scorpii.

Plate	Date	Exp.	J. D.	Mag.
4205	1906 May 4	61 <sup>m</sup>	2417335	11.0
4249	„ 22	65	7353	11.0
4269	„ 29	63	7360	10.9
4273	June 1	62	7363	11.0
4311	„ 14	65	7376	9.7
4321	„ 15	64	7377	9.4
4331	„ 16	60	7378	9.4
4365	July 2	60	7394	8.9
4367	„ 2	60	7394	8.9
4369	„ 2	61	7394	8.8
4388	„ 11	60	7403	9.0
4455	Aug. 6	70	7429	8.8
4457	„ 6	62	7429	8.9

Plate	Date	Exp.	J. D.	Mag.
4480	1906 Aug. 9	65 <sup>m</sup>	2417432	9.5
4486	„ 10	64	7433	9.3
4527	„ 24	69	7447	9.9
4539	„ 27	61	7450	9.9
4540	„ 27	102	7450	10.1
4562	Sept. 11	60	7465	10.4
4590	„ 22	50	7476	10.5
4612	Oct. 9	62	7493	10.5
4613	„ 9	75	7493	10.5
4620	„ 11	85	7495	10.5
4778	1907 April 20	120	7686	10.7
4804	May 7	60	7703	11.0

It will be seen that on June 1, 1906, this object was not brighter than magnitude 11, but on June 14, 1906, the magnitude was 9.7. From June 14 to July 2, it increased to magnitude 8.9, and probably remained nearly constant until Aug. 6. On Aug. 9, it was distinctly fainter, and decreased gradually until its magnitude was 10.5 on Sept. 22. Since then, no star brighter than magnitude 10.5 to 11 has been seen in this position. Owing to the duplicity of the object the image when faint is ill-defined on photographs taken with the Cooke lens, and estimates are difficult and somewhat uncertain. So far as is now known, this object has had but one maximum, and should apparently be re-

garded as a Nova, whether or not we assume that it is identical with the star of the eleventh magnitude in approximately the same position. If identical, its light curve appears to be similar to that of T Coronae which was observed at Bonn, and recorded in the Durchmusterung before its sudden increase in light in 1866. This object is still visible in the sky as a star of about the tenth magnitude. RS Ophiuchi is another object of the same character. See H. C. 99, A. N. 169.45. The star 19.1908 Scorpii should therefore be designated as Nova Scorpii, No. 2, the name Nova Scorpii, No. 1, being applied to T Scorpii.

Harvard College Observatory, Cambridge, Mass., 1908 June 26.

Edward C. Pickering.

## Notiz über SZ Cygni.

In den Jahren 1905, 1906 und 1907 beobachtete ich diesen Stern so oft wie möglich. Es liegen 300 Beobachtungen vor, welche 34 Maxima zu bestimmen gestatten. Die Schätzungen wurden mit vorläufigen Helligkeiten der Vergleichsterne und mittels der Hartwigschen Periode 15<sup>d</sup>084 reduziert. Zu einer endgültigen Reduktion fehlt mir jetzt die Zeit; aber auch die provisorische Rechnung gibt mit ziemlich großer Gewißheit einige Resultate, welche ich, dazu durch den Artikel des Herrn Luizet im Bull. Astr. 25.209 veranlaßt, schon jetzt mitteilen möchte.

Die Formel  $2417394.0 + 15^d084 E$  ließ Differenzen in den beobachteten Maxima übrig, welche einen deutlichen positiven Gang zeigten. Sie wurden zu 7 Normaldifferenzen zusammengezogen, welche in der Tabelle unter B—F angeführt sind.

E	B—F	B—F'
—30	—1 <sup>d</sup> 0	+0 <sup>d</sup> 02
—19	—0.7	+0.03
—11	—1.0	—0.47
—4	0.0	+0.34
+4	+0.2	+0.34
+19	—0.1	—0.35
+30	+0.6	+0.06

Eine verbesserte Formel  $2417393.76 + 15^d110 E$  gibt, wie aus der Spalte B—F' ersichtlich, die Beobachtungen ziemlich gut wieder. Die genauere Reduktion wird zweifelsohne diese Differenzen herabdrücken können; das Normalmaximum dürfte aber schon jetzt als recht sicher bestimmt