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SECOND CATALOGUE OF VARIABLE STARS,

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The unexpected delay in the appearance of this Catalogue has largely been due to the labor involved in carrying out the design of making the elements of every star definitive, in the sense that every observation available up to date should be included in the calculation. This design has been adhered to as faithfully as possible, and the elements here given may be regarded as a practically complete representation of our present knowledge. Even in the few cases, especially mentioned in the notes, where observations of maxima and minima have come to hand since the computation of the elements, they have been compared with the latter, in order to assure that the deviations are merely nominal.

While the general form of the First Catalogue has been retained, some changes have been made to increase its convenience in use, and to supply additional information of value to observers. The nature of these changes will be apparent in the following description of the construction.

Number. The number in the first column of both right and left-hand pages is assigned upon the system of ordinal notation introduced in the First Catalogue, by taking one-tenth of the right-ascension, expressed in time-seconds, for the equinox 1900.0. This precept has not been rigorously applied, nor in the future need be so applied, where two or more variables occur within a few seconds of right-ascension. Also, in the numbers for the newer stars, it has been thought best to violate the strict rule in a few cases, where the numbering would otherwise have been consecutive, in order to provide gaps for future variables. It is essential that numbers once assigned should not be disturbed, even at the expense of deviating by one or two units from the strict enumeration.

Star. The letters according to ARGELANDER'S system of nomenclature, extended by the use of double letters, require no special remark.

R.A. and Decl. for 1900.0. These are given to the nearest second and tenth of a minute, respectively. To secure strict accuracy in the last place, all the available meridian and micrometric determinations of position have been collected and reduced accurately to 1875.0, with precessions and secular variations calculated for this epoch. Any appreciable proper motions were then detected and assigned; and the mean places carried forward accurately to the equinox and epoch of 1900.0. For some of the newly discovered variables no precise places could be found, and for these it was necessary to employ the rude data given by the observers — often expressed merely to the tenth of a minute in R.A. and round minute in Declination. It is desirable to suggest that the use of such coarse units is insufficient for the purpose of certainly distinguishing these objects, in their fainter stages, from the small telescopic stars in their vicinity; and that those who are addicted to this habit should raise their standard of precision.

Annual Variations for 1900. Precessions *plus* proper motions for this date, to the nearest hundredth in seconds and minutes, respectively, in R.A. and Declination.

R.A. and Decl. for 1855.0. These are repeated from the First Catalogue, as a matter of general obvious convenience.

Redness. This is expressed in a numerical arbitrary scale, which may be approximately defined as follows: 0 corresponds to white; 1, to the slightest perceptible admixture of yellow with the white; 2, to yellow; 3, to yellowish orange; 4, to full orange or orange-red; 5-10, to increasing shades of intensity up to the deepest red of which we have cognizance in the heavens, exemplified nearly by such stars as 1771 *R Leporis*, 7428 *V Cygni*, 7779 *S Cephei* and 7803 μ *Cephei*. For a fuller description, with details of the determinations, reference is made to *A.J.* VIII, 137, and to the introduction to the First Catalogue. Mr. YENDELL has furnished some estimates of stars not included in my determinations, conforming to the same scale; and these are indicated by an asterisk. Where a round unit merely is given, it signifies that it is not the result of direct estimate, made uniformly with the general series, but merely a rude attempt to assign a value from general knowledge, or description by other observers.

Maximum and Minimum Magnitude. These columns contain the previously observed extremes of brightness at each of these phases, derived from a comparative scrutiny of all the trustworthy data up to date, expressed in the prevailing scale of magnitude, namely, that of the *Uranometria Nova*,

the *Durchmusterung*, the *Uranometria Argentina* and the Southern *Durchmusterung*. For the fainter magnitudes, where our knowledge of absolute standards for the extension of ARGELANDER'S scale downwards is vague, the scale used may be defined by the limits of visibility established by SCHÖNFELD for the Mannheim refactor, 12.7; by my 6¼-inch, 13.0; and by TOWNLEY for the Madison 15-inch, 14.7.

M — m. The interval in days and fractions thereof, from minimum to the next following maximum. In the First Catalogue this information was given by the calendar date. The present mode is chosen for economy of space, and is quite as convenient in computing times of minimum from the elements of maximum.

Elements of Maximum. These are uniformly in Greenwich mean time. The principal epoch is expressed in two ways; first, by the ordinary calendar date, without fractions of a day; next by the corresponding Julian date, with the fractions. For the 10 stars of the *Algol*-type, and for 2213 *η Geminorum* and 3186 *T Cancri*, the nature of the light-curves permits the minimum alone to be determined, and therefore the column contains for these stars, as well as for *β Lyrae*, the principal minimum-epoch.

The period is expressed in days and decimal fractions, except for some of the stars of short period, where hours, minutes and seconds are used, following custom, and convenience in writing the small inequalities which it would be awkward to express in decimals of a day.

The factor *E* is the number of periods elapsed since the principal epoch. The principal epoch is generally the first recorded maximum (or minimum) after discovery, in conformity with the practice of ARGELANDER and SCHÖNFELD. Wherever this rule is departed from, it is for the purpose of adhering to the enumeration already established in standard investigations of particular stars. Exceptional deviations from these rules are recorded in the notes.

Following the periods are the numerical inequalities depending on powers or periodic functions of *E*. In addition to the cases where these inequalities have been numerically determined, there are a large number of others where the existence of such terms has been discovered, but in which it is not yet practicable to determine the coefficients. These are indicated in the column of remarks by the words "periodic inequality," a query being affixed when the evidence is somewhat obscure.

The column of remarks also contains, for the non-periodic stars, a characterization of the type of variability. For want of a better concise phrase, the term "Irregularly periodic" is used for stars in which the periodicity is manifested in a slight degree. The term "Irregular" is used where there is an entire absence of any discernible law in the changes of brightness.

It is hardly necessary to say that the elements are the result of original investigation in all cases except where the authority is accredited in the remarks.

Basis of Elements. These columns contain the number of maxima, *M*, the number of minima, *m*, and the interval embraced by them, upon which the calculation of the elements depends. This information is of the utmost importance and usefulness to future observers of these objects, indicating the character of our present information, and guiding the selection of stars for observation. It should be noted that a very large proportion of the maxima and minima were determined by two or more observers, so that the actual number of observations of the phases used in the calculations is much larger than appears.

For convenience in computing ephemerides, and in comparing future observations with the elements of the Catalogue, a table is added for the conversions of Julian and Calendar dates during the next ten years.

TABLE FOR CONVERTING JULIAN AND CALENDAR DATES.

	1893	1894	1895	1896	1897	1898	1899	1900	1901	1902	1903
Jan. 1	241 2465	2830	3195	3560	3926	4291	4656	5021	5386	5751	6116
Feb. 1	2496	2861	3226	3591	3957	4322	4687	5052	5417	5782	6147
Mar. 1	2524	2889	3254	3620	3985	4350	4715	5080	5445	5810	6175
Apr. 1	2555	2920	3285	3651	4016	4381	4746	5111	5476	5841	6206
May 1	2585	2950	3315	3681	4046	4411	4776	5141	5506	5871	6236
June 1	2616	2981	3346	3712	4077	4442	4807	5172	5537	5902	6267
July 1	2646	3011	3376	3742	4107	4472	4837	5202	5567	5932	6297
Aug. 1	2677	3042	3407	3773	4138	4503	4868	5233	5598	5963	6328
Sept. 1	2708	3073	3438	3804	4169	4534	4899	5264	5629	5994	6359
Oct. 1	2738	3103	3468	3834	4199	4564	4929	5294	5659	6024	6389
Nov. 1	2765	3134	3499	3865	4230	4595	4960	5325	5690	6055	6420
Dec. 1	241 2799	3164	3529	3895	4260	4625	4990	5355	5720	6085	6450

In view of the profuse announcements of variability during the past few years, the very moderate increase in the present Catalogue over the previous one may excite surprise among those who do not know the facility with which rubbish collects about the subject. This Catalogue would be very much longer if all such announcements, made on what might be regarded as reputable authority, had been admitted. But it would have ceased thereby to represent

any exact knowledge. Among those who busy themselves with the subject there are some with whom the uncritical habits of the seventeenth century still prevail, and who emulate the exuberant enthusiasm of MONTANARI, who discovered more than a hundred new variables — only one of which is now in our lists — and who made no observations of any service whatever, as to the phenomena; rather than the critical and conscientious care of ARGELANDER, who first winnowed the chaff from the wheat, in his little catalogue of 18 stars published in 1844, and from that point elevated the subject into a science; or of SCHÖNFELD, who extended it and maintained its purity.

No apology therefore is needed for the unrelaxed application of the principles, for deciding the delicate and perplexing question as to what stars shall be admitted, which were set forth in the introduction to the First Catalogue. They may be summed up in two sentences. It is a paramount consideration that our knowledge must be kept clear of confusion, even at the risk of an incomplete statement of it. No star should be inserted, no matter how high the authority on which its variability is declared, without independent verification on undoubted authority and evidence. Otherwise the result will be chaos.

As a matter of fact then, the only stars added are those which have been sufficiently confirmed since the first edition. On the other hand, four stars which have long appeared in the older lists have been dropped, for reasons which will be stated in the notes to the supplementary list, to which they have been relegated; and there are perhaps two or three others which might be treated in the same way. During the past two years other investigations have prevented my giving the attention which I had previously given, to the observation of the long list of objects awaiting confirmation; but Mr. YENDELL has taken the matter into efficient charge, and has kept more than a hundred of them on his working list. It is to his discrimination and zeal that many of the confirmations are due, as will be seen in the notes to the catalogue. He has kindly kept me supplied with the evidence on this matter afforded by his observations. I am also deeply indebted to Mr. PARKHURST and Mr. YENDELL for the results of their very numerous observations, in advance of publication, of maxima and minima of known variables. During the last few months I have been in continual correspondence with these gentlemen, and to them is almost entirely due the completeness with which the present work has been brought up to date. Without their cordial collaboration and interest, indeed, it would have been extremely imperfect. Profound acknowledgements are also gratefully made to Messrs. TOWNLEY, ROBERTS and SAWYER, for manuscript copies of observations, and other information of the greatest value.

The work of accurate observation of the phenomena of the known variables, in which these astronomers have been so assiduous — and which, as in the case of the comets, is of a much higher grade than the discovery of new objects — is the most essential element to the progress of this branch of astronomy, and is a field which affords ample room for many more participants.

This seems as appropriate a place as any for an important remark. In comparing future observations of maxima and minima with the elements of the catalogue, it should be borne in mind that the periods here given are their mean values, determined generally from long series of observations, and that any deviations, apparently larger than the accidental error of observation, are probably due to some systematic inequality in the course of development. It will be seen from an inspection of the Catalogue that, beside the forty cases among the variables of long periods for which I have determined such terms numerically, there are about thirty others where their existence is distinctly indicated. Indeed, as I have elsewhere stated, there is scarcely a case, where the observations are sufficiently continuous to give evidence on the point, in which they are not manifest; and we may safely conclude that they are generally prevalent, and inseparably associated with this type of variability. They are in general periodic, running through cycles of fifty or sixty periods on the average, sometimes of only twenty or thirty periods. The amplitude is sometimes considerable, rising to, say, a fifth of the star's period. For the most part, however, they are comprised within the limits of twenty or thirty days from the time of the phase indicated by the mean period. In the preparation of ephemerides for the use of observers, in preparing to observe the phases, it therefore does not seem advisable to apply arbitrary corrections, dependent on one or two recently observed maxima, as is sometimes done: on account of the risk of thereby influencing prejudicially the intending observer's results, which ought to be free of all bias. It seems better that his work should be done under the influence only of the general warning that such real variations from the predicted times are continually in operation, by the very nature of the phenomena. There is no class of work in which freedom from preoccupation of mind is so essential as in this. This is so especially true of the stars of the *Algol*-type that the publication of ephemerides of their minima nearer than to the nearest hour, is to be deprecated.

The above remarks of course do not apply to stars which have been recently discovered, or which have been rather infrequently observed. The uncertainty in the elements given for these will be apparent by inspection of the column "Basis of Elements," or is especially remarked in the notes at the end of the Catalogue.

Special effort has been made to supply as many epochs of minimum in the present Catalogue as the data available permitted; this being the particular in which our knowledge is most defective. From column $M-m$ it will be seen that this element is given in 115 cases, as against only 63 in the First Catalogue.

No.	Star	1900.0 R.A.	1900.0 Decl.	1900 Annual Variation		1855.0 R.A.	1855.0 Decl.	Redness	Magnitude Max.	Magnitude Min.
		h m s	° ′	s	′	h m s	° ′			
100	T Ceti	0 16 42	−20 36.7	+3.04	+0.33	0 14 26	−20 51.8	4	5.1– 5.3	6.4– 7.0
107	T Cassiopeae	17 49	+55 14.3	3.22	0.33	15 25	+54 59.3	7.3	7.0– 8.0	11.0–11.2
112	R Andromedae	18 45	+38 1.4	3.16	0.33	16 25	+37 46.4	5.0	5.6– 8.6	<12.8
114	S Ceti	18 58	— 9 53.0	3.05	0.33	16 41	−10 7.9	2.0	7.0– 8.0	12
116	B Cassiopeae	19 15	+63 35.5	3.30	0.33	16 47	+63 20.6	–	>1	?
161	T Piscium	26 49	+14 2.9	3.11	0.33	24 29	+13 48.0	0	9.5–10.2	10.5–11.0
209	α Cassiopeae	34 50	+55 59.3	3.38	0.33	32 18	+55 44.5	5	2.2	2.8
224	S Andromedae	37 15	+40 43.2	3.26	0.33	34 49	+40 28.3	5	7	0?
243	U Cassiopeae	40 46	+47 42.6	3.33	0.33	38 16	+47 27.8	6	8.0– 8.8	<15
320	U Cephei	0 52 23	+81 20.2	5.09	0.33	0 49 38	+81 5.5	0	7.1	9.2
432	S Cassiopeae	1 12 18	+72 5.1	4.35	0.32	1 9 4	+71 50.8	6.7	6.7– 8.6	<13.5
434	S Piscium	12 21	+ 8 24.3	3.13	0.32	10 0	+ 8 9.9	1.0	8.2– 9.3	<14.7
466	U Piscium	17 41	+12 20.7	3.17	0.32	15 18	+12 6.4	–	9.5	14.5–15.0
494	R Sculptoris	22 22	−33 3.5	2.77	0.31	20 17	−33 17.8	9	5.7	7.6– 8.0
513	R Piscium	25 29	+ 2 21.9	3.09	0.31	23 10	+ 2 7.9	2.0	7 – 8.8	<13
678	U Persei	52 56	+54 20.1	3.95	0.29	50 0	+54 7.0	6.4*	8.2	<11
715	S Arietis	1 59 16	+12 2.8	3.21	0.29	1 56 51	+11 49.7	2	9.1– 9.8	14?
782	R Arietis	2 10 25	+24 35.5	3.40	0.28	2 7 53	+24 22.8	1.8	7.6– 9.0	11.7–13.0
793	T Persei	12 12	+58 29.5	4.26	0.28	9 0	+58 16.7	4	8.2	9.3
806	o Ceti	14 18	— 3 25.7	3.03	0.27	12 1	— 3 38.3	5.9	1.7– 5.0	8 – 9.5
814	S Persei	15 41	+58 7.8	4.27	0.28	12 29	+57 55.2	5.0	8.5	13
845	R Ceti	20 55	— 0 37.8	3.06	0.27	18 38	— 0 50.1	2.4	7.5– 8.8	13.5
893	U Ceti	28 56	−13 35.2	2.88	0.27	26 45	−13 47.2	3	6.8– 7.3	10.5<
906	R Trianguli	30 59	+33 49.8	3.62	0.26	28 16	+33 37.8	5.4*	5.8	11.7
976	T Arietis	42 45	+17 5.5	3.34	0.25	40 15	+16 54.1	3.2	7.9– 8.6	9.3– 9.7
1072	ρ Persei	2 58 46	+38 27.2	3.83	0.24	55 54	+38 16.5	2	3.4	4.2
1090	β Persei	3 1 40	+40 34.2	3.89	0.23	2 58 45	+40 23.6	0	2.3	3.5
1113	U Arietis	5 30	+14 24	3.32	0.23	3 3 1	+14 14.0	–	7.8	<11
1222	R Persei	23 41	+35 19.6	3.81	0.21	20 50	+35 10.1	2.3	7.7– 9.2	12.8–13.5
1367	X Tauri	47 50	+ 7 28.8	3.22	0.18	45 26	+ 7 20.6	. .	6.6	8.1
1411	λ Tauri	3 55 8	+12 12.5	3.32	0.17	3 52 39	+12 4.6	0	3.4	4.2
1537	T Tauri	4 16 10	+19 17.8	3.49	0.15	4 13 33	+19 11.3	0	9.2–11.5	12.8–<13.5
1574	W Tauri	22 16	+15 53	3.42	0.14	19 43	+15 46.5	5	9?	<12.5
1577	R Tauri	22 49	+ 9 56.4	3.29	0.14	20 21	+ 9 50.1	4.5	7.4– 9.0	12.8–13.5
1582	S Tauri	23 43	+ 9 43.5	3.28	0.14	21 16	+ 9 37.3	2.5	9.5–10.0	<13.5
1623	T Camelopardalis	30 26	+65 59	5.85	0.13	26 4	+65 53	6*	7.9– 8.2	<12
1635	R Reticuli	32 30	−63 14.2	0.61	0.12	32 3	−63 19.8	–	7	<13
1654	R Doradus	35 36	−62 16.4	0.70	0.12	35 5	−62 21.8	7	5.7	6.7
1717	V Tauri	46 15	+17 22.1	3.47	0.11	43 39	+17 17.4	3.3	8.3– 9.0	<13.5
1761	R Orionis	53 35	+ 7 58.7	3.25	0.10	51 8	+ 7 54.3	4.9	8.7– 9.1	11.2–13.5
1768	ε Aurigae	54 47	+43 40.5	4.30	0.09	51 34	+43 36.2	1	3.0	4.5
1771	R Leporis	4 55 3	−14 57.4	2.73	0.09	4 53 0	−15 1.7	9.4	6 – 7	8.5?
1855	R Aurigae	5 9 13	+53 28.4	4.83	0.07	5 5 36	+53 25.0	6.5	6.5– 7.8	12.5–12.7
1923	S Aurigae	20 31	+34 3.7	3.96	0.06	17 33	+34 2.1	6.7	9.4–11.0	<14.5
1944	S Orionis	24 5	— 4 46.4	2.96	0.05	21 51	— 4 48.7	6.4	8.3– 9.5	11.0–13.0
1953	T Aurigae	25 34	+30 22.2	3.85	0.05	22 41	+30 19.9	–	4.5	<15
1981	S Camelopardalis	30 13	+68 44.6	6.48	0.04	25 22	+68 42.5	7.8*	8.5	12
1986	T Orionis	30 56	— 5 32.4	2.94	0.04	28 43	— 5 34.5	0	9.7	13
2013	U Aurigae	35 32	+31 59	3.90	0.04	32 37	+31 57	7.5*	8.6	12
2098	α Orionis	49 45	+ 7 23.3	3.25	0.02	47 19	+ 7 22.9	6	1	1.4
2100	U Orionis	5 49 53	+20 9.5	3.56	+0.01	5 47 13	+20 8.7	7	6.4– 7.5	<12
2213	η Geminorum	6 8 51	+22 32.2	+3.62	−0.01	6 6 8	+22 32.6	3	3.2	3.7– 4.2

No.	M—m	Elements of Maximum, Greenwich M.T. Epoch (Cal.) (Julian)	Period	Inequalities	Remarks	Basis of Elements M	m	Dates included
	d	d	d					
100	–	. . . . .			Irregularly periodic?	–	–	
107	221	1871 Mar. 31=2404515	+445.0 E		Periodic inequality	13	5	1842, 57, 71–91
112	170::	1859 Mar. 27 2400131	+410.7 E	+25 sin(12° E+90°)	•	21	1	1827, 55–93
114	145	1872 Dec. 27 2405155	+321.0 E			7	3	1872–91
116	–	. . . . .	. . . .		New star of 1572	–	–	
161	–	. . . . .	. . . .		Irregular	–	–	
209	–	. . . . .	. . . .		Irregular	–	–	
224	–	. . . . .	. . . .		New star of 1885 in *Androm.* neb.	–	–	
243	120	1886 Dec. 12 2410253	+276.0 E			7	2	1856, 57, 86–92
320	–	Min. 1880 June $23^d\ 9^h\ 28^m.0$	$+2^d\ 11^h\ 49^m\ 38^s.25$E+95^m sin(0°.08E+283°)			–	50	1828, 80–93
432	300::	1863 Mar. 18 2401583	+610.5 E	+50 sin(10°E+50°)		14	2	1843, 63–93
434	200:	1866 Jan. 4 2402606	+405.3 E		Periodic inequality	10	1	1855–85, 92
466	83	1880 Jan. 8 2407723	+172.7 E		Periodic inequality	12	11	1879–92
494	131:	1872 Dec. 11 2405139	+207.5 E			4	3	1872–91
513	149	1866 Nov. 22 2402928.0	+344.15 E	+13 sin(12°E+180°)		14	2	1850, 55, 65–91
678	–	. . . . .	. . . .			–	–	
715	165:	1872 Mar. 22 2404867	+292.2 E		Periodic inequality	9	1	1848–86, 92
782	94.5	1866 Sept. 4 2402849.0	+186.60 E	+7 sin(5°E+235°)		43	21	1828–46, 58–92
793	–	. . . . .	. . . .		Irregularly periodic?	–	–	
806	112.0	1866 Dec. 27 2402963.4	+331.60 E	+25 sin(4°.5E+90°)+*		105	15	1596–1892
814	–	. . . . .	. . . .		Irregularly periodic?	–	–	
845	70	1867 Mar. 2 2403028.0	+167.0 E		Periodic inequality	20	3	1794, 1841–93
893	–	1884 Dec. 11 2409522	+235.8 E			8	–	1877, 84–90
906	119	1890 Sept. 30 2411641	+262 E			5	3	1856, 87–92
976	127	1873 Mar. 31 2405249	+313 E			10	9	1871–74, 84–92
1072	–	. . . . .	. . . .		Irregularly periodic	–	–	
1090	–	Min. 1888 Jan. $3^d\ 7^h\ 21^m\ 29^s.23$	$+2^d\ 20^h\ 48^m\ 55.425$E+†			–	496	1782–1887
1113	–	. . . . .	. . . .			–	–	
1222	96	1861 Sept. 25 2401044.0	+210.1 E	+20 sin(7°.5E+135°)		31	3	1833, 61–92
1367	–	. . . . .	. . . .			–	–	
1411	–	Min. 1887 Dec. $6^d\ 11^h\ 57^m.0$	$+3^d\ 22^h\ 52^m\ 12^s.0$E	*Algol*-type.	Per. ineq.	–	53	1796, 1844–92
1537	–	. . . . .	. . . .		Irregular	–	–	
1574	78	1880 Feb. 15 2407761	+141 E		Parkhurst's elements	4	2	1880, 87–93
1577	140:	1862 May 1 2401262	+325 E			21	2	1798, 1855–92
1582	70:	1860 Feb. 14 2400455.5	+375.5 E			10	1	1855–59, 83–93
1623	–	1891 Dec. 24 2412091	+370 E		Elements uncertain	2	–	1891, 92
1635	–	1864 Feb. 5 2401907	+280 E			5	–	1864–67,91,92
1654	–	. . . . .	. . . .			–	–	
1717	89	1872 Sept. 14 2405051.0	+170.4 E		Periodic inequality?	18	6	1826, 54, 71–93
1761	214:	1855 Mar. 23 2398666	+380.0 E			12	1	1846–74, 83–92
1768	–	. . . . .	. . . .		Irregular	–	–	
1771	212	1864 Mar. 5 2401936.7	+436.1 E		Periodic inequality	19	13	1855–83
1855	241	1862 Nov. 16 2401461.8	+460.6 E			17	6	1862–91
1923	–	. . . . .	. . . .		Irregularly periodic	–	–	
1944	194	1870 Feb. 1 2404095	+412 E			6	11	1863–92
1953	–	. . . . .	. . . .		New star of 1892	–	–	
1981	–	1892 Aug. 22 2412333	+111 E		Elements very uncertain	3	–	1892, 3
1986	–	. . . . .	. . . .		Irregular	–	–	
2013	–	1891 Jan. 31 2411764	+397 E		Elements very uncertain	2	–	1891, 93
2098	–	. . . . .	. . . .		Irregularly periodic	–	–	
2100	145:	1885 Dec. 7=2409883	+371 E		Periodic inequality	8	1	1885–93
2213	–	Min. 1865 Nov. 5	+231.4 E		Periodic inequality	–	14	1844, 65–81

* +25 sin(1°.125 E+188°.2) † +173^m.3 sin($\frac{1}{50}$ E+202°.5) +18^m.0 sin($\frac{3}{40}$ E +203°.25). See notes.

No.	Star	1900.0 R.A.	1900.0 Decl.	1900 Annual Variation		1855.0 R.A.	1855.0 Decl.	Redness	Magnitude Max.	Magnitude Min.
		h m s	° ′	s	′	h m s	° ′			
2258	V Aurigae	6 16 18	+47 42.5	+4.54	—0.02	6 12 54	+47 43.5	–	8.5– 10	<11.5
2266	V Monocerotis	17 41	— 2 8.7	3.02	0.03	15 25	— 2 7.6	3.4	6.9	10.7<
2279	T Monocerotis	19 49	+.7 8.4	3.24	0.03	17 24	+ 7 9.7	2	5.8– 6.4	7.4– 8.2
2362	R Monocerotis	33 42	+ 8 49.3	3.28	0.05	31 15	+ 8 51.7	0	9.5	13
2375	S Monocerotis	35 28	+ 9 59.3	3.31	0.05	33 0	+10 1.5	2	4.9	5.4
2478	R Lyncis	53 3	+55 28.1	4.96	0.08	49 20	+55 31.6	4.8	7.8– 8.0	<13
2509	ζ Geminorum	6 58 11	+20 43.0	3.56	0.09	55 30	+20 46.7	2	3.7	4.5
2528	R Geminorum	7 1 20	+22 51.5	3.62	0.09	6 58 37	+22 55.4	5.7	6.6– 7.8	<13.5
2539	R Canis minoris	3 13	+10 10.9	3.30	0.09	7 0 44	+10 14.9	5.5	7.2– 7.9	9.5–10.0
2583	L_2Puppis	10 29	—44 28.8	1.82	0.10	9 7	—44 24.2	8	3.5	6.3
2610	R Canis Majoris	14 56	—16 12.4	2.70	0.11	12 55	—16 7.6	0	5.9	6.7
2625	V Geminorum	17 34	+13 17.0	3.37	0.11	15 2	+13 21.9	2.8	8.2– 9.1	12.0–14.0
2676	U Monocerotis	26 1	— 9 34.0	2.86	0.12	23 53	— 9 28.6	3	5.9– 7.3	6.6– 8.0
2684	S Canis minoris	27 18	+ 8 31.9	3.26	0.12	24 51	+ 8 37.4	4.1	7.2– 8.0	10.5–12.7
2691	T Canis minoris	28 26	+11 57.5	3.34	0.12	25 56	+12 3.0	2	9.0– 9.7	<13.5
2735	U Canis minoris	35 55	+ 8 36.8	3.26	0.14	33 28	+ 8 42.2	5.1	8.5– 9.0	12.3–13.5
2742	S Geminorum	37 3	+23 41.1	3.61	0.14	34 20	+23 47.2	3	8.2– 8.7	<13.5
2780	T Geminorum	43 18	+23 59.0	3.61	0.15	40 36	+24 5.5	3.0	8.1– 8.7	<13.5
2783	S Puppis	43 50	—47 51.9	1.74	0.15	42 31	—47 45.4	–	7.2	9
2815	U Geminorum	49 10	+22 15.8	3.56	0.15	46 30	+22 22.7	0.0	8.9– 9.7	13.1
2852	V Puppis	55 22	—48 58.4	1.73	0.16	54 4	—48 51.2	–	4.4	5.2
2857	U Puppis	7 56 8	—12 33.8	2.81	0.16	7 54 2	—12 26.6	3.2	8.5– 9.0	<14
2946	R Cancri	8 11 3	+12 2.0	3.32	0.18	8 8 34	+12 10.1	5.3	6.0– 8.3	<11.7
2976	V Cancri	16 1	+17 36.1	3.43	0.19	13 27	+17 44.5	4.3	6.8– 7.7	<12
3060	U Cancri	30 3	+19 14.4	3.44	0.20	27 28	+19 23.5	2.3	8.4–10.6	<14
3109	S Cancri	38 14	+19 23.6	3.44	0.21	35 39	+19 33.2	1	8.2	9.8
3128	R Pyxidis	41 17	—27 50.2	2.53	0.22	39 23	—27 40.5	6	8.5	<11
3170	S Hydrae	48 21	+ 3 26.7	3.13	0.22	46 0	+ 3 36.8	2.1	7.5– 8.7	<12.2
3184	T Hydrae	50 48	— 8 45.6	2.92	0.23	48 37	— 8 35.4	1.8	7.0– 8.1	<13
3186	T Cancri	8 50 57	+20 13.9	3.43	0.23	8 48 23	+20 24.1	7.4	8.0– 8.5	9.3–10.5
3407	S Antliae	9 27 56	—28 11.2	2.63	0.26	9 25 27	—27 59.4	0	6.7	7.3
3409	N Velorum	28 11	—56 35.6	1.83	0.26	26 49	—56 23.8	2	3.4	4.4
3418	R Carinae	29 44	—62 20.8	1.52	0.26	28 36	—62 8.9	5	4.3– 5.7	9.3–10.0
3477	R Leonis minoris	39 35	+34 58.3	3.61	0.27	36 52	+35 10.6	6.0	6.1– 7.8	13
3493	R Leonis	42 11	+11 53.6	3.23	0.28	39 45	+12 5.9	6.9	5.2– 6.7	9.4–10.0
3495	*l* Carinae	42 30	—62 2.8	1.65	0.28	41 16	—61 50.4	–	3.7	5.2
3567	V Leonis	9 54 28	+21 44.5	3.36	0.29	9 51 57	+21 57.3	1.7	8.6	<13.5
3633	R Antliae	10 5 27	—37 14.4	2.59	0.29	10 3 30	—37 1.2	–	6.5	<8
3637	S Carinae	6 11	—61 3.6	1.92	0.29	4 45	—60 50.4	5	6.0	9.0– 9.2
3712	U Leonis	18 42	+14 30.6	3.22	0.30	16 17	+14 44.1	–	9.5	<13.5
3796	U Hydrae	32 37	—12 51.9	2.96	0.31	30 24	—12 38.1	7	4.5	6.1–6.3
3825	R Ursae Majoris	37 34	+69 18.0	4.32	0.31	34 19	+69 32.1	1.6	6.0– 8.2	13.2
3847	η Carinae	41 11	—59 9.5	2.32	0.31	39 27	—58 55.4	5	>1	7.4
3881	V Hydrae	46 46	—20 43.2	2.91	0.32	44 34	—20 28.8	9	6.7	9.5
3890	W Leonis	48 21	+14 14.9	3.18	0.32	45 58	+14 29.2	3.5*	9	<14
3908	T Carinae	51 18	—59 54.2	2.39	0.32	49 30	—59 44.8	–	6.2	6.9
3934	R Crateris	10 55 38	—17 47.3	2.95	0.32	10 53 26	—17 32.8	8.1	>8	<9
3994	S Leonis	11 5 41	+ 6 0.2	3.11	0.32	11 3 21	+ 6 14.9	0.0	9.0–10.0	<13
4160	T Leonis	33 19	+ 3 55.5	3.08	0.33	31 0	+ 4 10.5	–	10?	<13.5
4300	X Virginis	56 44	+ 9 37.7	3.08	0.33	54 25	+ 9 52.7	–	8–10	12
4315	R Comae	11 59 7	+19 20.3	3.08	0.33	11 56 49	+19 35.4	4.0	7.4– 8.0	<13.5
4377	T Virginis	12 9 29	— 5 28.8	+3.08	—0.33	12 7 10	— 5 13.8	4.1	8.0– 8.8	10–<13.5

No.	$M-m$	Elements of Maximum, Greenwich M.T. Epoch (Cal.) (Julian)	Period	Inequalities	Remarks	Basis of Elements M	m	Dates included
2258	–	1886 Dec. 9=2410250	+315^d	E	Elements very uncertain	3	–	1886, 91, 92
2266	–	1883 Feb. 14 2408843	+333.5	E		6	–	1853, 83–93
2279	7.93	1885 Apr. 1 2409633.81	+ 27.0037	E		–	–	
2362	–	. . . . .	. . .		Irregular	–	–	
2375	1.84	1870 Jan. 31 2404094.83	+ 3.44305		Winnecke's elements; doubtful	–	–	
2478	143:	1874 Sept. 15 2405782	+380.0	E		8	1	1874, 84–92
2509	5.015	1888 Jan. 3 2410640.603	+ 10.15382	E	See notes	–	–	
2528	121	1868 Feb. 24 2403387.0	+370.2	E	Periodic inequality	20	7	1796, 1855–92
2539	135	1859 Feb. 28 2400104.5	+336.5	E	Periodic inequality	15	2	1859–74, 83–93
2583	60	1872 Mar. 28 2404881.0	+136.50	E		6	2	1872–74, 86, 91
2610	–	MIN. 1887 Mar. 26^d 15^h 18^m	+1^d 3^h 15^m 46^s.0	E	*Algol*-type	–	23	1887–93
2625	134	1880 Feb. 1 2407747	+277.0	E		10	2	1857, 80–92
2676	18.0	1873 Apr. 19 2405268	+ 45.20	E	See notes	–	–	
2684	164	1863 May 3 2401629	+330.3	E	+20 sin(12°E+30°)	16	2	1856–92
2691	–	1870 Mar. 16 2404138	+322.7	E	Periodic inequality?	9	–	1854, 70–93
2735	175	1880 Feb. 14 2407760	+410	E		6	6	1880–93
2742	127:	1852 Feb. 27 2397546	+294	E		18	1	1848–73, 86–93
2780	–	1848 Dec. 7 2396369.5	+288.1	E		16	–	1848–74, 86–93
2783	–	. . . . .	. . . .			–	–	
2815	–	1892 Dec. 15 2412448	+ 86.3	E	Irregularly periodic	–	–	
2852	–	. . . . .	. . . .			–	–	
2857	–	1881 Mar. 8 2408148	+315	E		5	–	1881–83, 93
2946	125::	1852 Apr. 21 2397600.1	+352.81	E	+0.207 E^2	18	–	1830, 52–85
2976	102:	1871 May 20 2404568	+271.9	E		10	1	1871–89
3060	–	1853 Apr. 6 2397950	+307.5	E	–0.06 E^2	14	–	1853–59, 69–93
3109	–	MIN. 1867 Aug. 31^d 14^h 2^m.89	+9^d 11^h 37^m 45^s	E	Schönfeld's el. *Algol*-type	–	–	
3128	–	. . . . .	. . . .			–	–	
3170	–	1857 Feb. 13 2399359	+257.0	E	Periodic inequality	16	–	1852–86
3184	–	1858 Feb. 23 2399734.5	+289.4	E	Schönfeld's elements	18	–	1851–73, 84, 92
3186	–	MIN. 1858 Jan. 26 2399706	+482	E		–	9	1858–75, 84, 87
3407	–	MIN. 1888 Apr. 13^d 12^h 38^m.0	+0^d 7^h 46^m 48^s.0	E	*Algol*-type	–	15+	1888–93
3409	–	. . . . .	. . . .		Period short	–	–	
3418	153	1871 July 31 2404640	+311.5	E	Periodic inequality	16	10	1752, 1867–92
3477	170	1865 Mar. 12 2402308.0	+370.5	E	+20 sin(10°E+300°)	18	3	1796, 1865–87
3493	144	1757 Apr. 21 2362902.0	+312.90	E	+25 sin(2°.75E+318°)	46	15	1757–1890
3495	15	1871 July 24 2404633.0	+35.05	E		24	7	1871–74, 91, 92
3567	–	1882 Apr. 10 2408546	+274	E	Parkhurst's elements	6	–	1855, 56, 82–91
3633	–	. . . . .	. . . .			–	–	
3637	86	1872 May 8 2404922	+148.7	E		4	3	1872–80, 91
3712	–	. . . . .	. . . .		Variability doubtful	–	–	
3796	–	. . . . .	. . . .		Irregularly periodic?	–	–	
3825	107	1853 Apr. 7 2397951.2	+302.1	E	+15 sin(10°E+190°)	38	15	1843–92
3847	–	. . . . .	. . . .		Irregular	–	–	
3881	–	1873 Mar. 15 2405233	+575	E	Elements very uncertain	5	3	1873–93
3890	–	1872 Feb. 12 2404836	+394.3	E	Parkhurst's elements	6	–	1872–91
3908	–	. . . . .	. . . .			–	–	
3934	–	. . . . .	. . . .		Variability not certain	–	–	
3994	125:	1860 Dec. 1 2400746.0	+190.0	E	+25 sin(10°E+60°)	18	1	1859–93
4160	–	. . . . .	. . . .		Variability not certain	–	–	
4300	–	. . . . .	. . . .			–	–	
4315	–	1856 Dec. 18 2399302	+361	E		7	–	1831, 56, 83–91
4377	–	1861 Apr. 26=2400891	+339.5	E		8	–	1861–75, 84, 88

No.	Star	1900.0 R.A.	1900.0 Decl.	1900 Annual Variation R.A.	1900 Annual Variation Decl.	1855.0 R.A.	1855.0 Decl.	Redness	Magnitude Max.	Magnitude Min.
		h m s	° ′	s	′	h m s	° ′			
4407	R Corvi	12 14 27	−18 42.0	+3.10	−0.33	12 12 8	−18 26.9	3.7	6.8– 7.7	<11.5
4492	Y Virginis	28 44	− 3 52.3	3.08	0.33	26 25	− 3 37.3	3.6	8 – 9.4	11.5–13
4511	T Ursae Majoris	31 50	+60 2.3	2.75	0.33	29 47	+60 17.2	2.0	6.0– 8.5	12.2–13.0
4521	R Virginis	33 26	+ 7 32.3	3.05	0.33	31 9	+ 7 47.2	1.3	6.5– 8.0	9.7–11.0
4536	R Muscae	35 58	−68 51.5	3.61	0.33	33 17	−68 36.7	–	6.6	7.4
4557	S Ursae Majoris	39 34	+61 38.4	2.63	0.33	37 35	+61 53.3	3.2	6.7– 8.2	10.2–11.5
4596	U Virginis	12 46 1	+ 6 5.8	3.04	0.33	12 43 45	+ 6 20.6	1.1	7.7– 8.1	12.2–12.8
4731	S Canum Venat.	13 8 31	+37 54.5	2.77	0.32	13 6 24	+38 8.9	6.3*	7.3	9
4805	W Virginis	20 52	− 2 51.5	3.09	0.31	18 33	− 2 37.4	0.4	8.7– 9.2	9.8–10.4
4816	V Virginis	22 38	− 2 39.2	3.09	0.31	20 19	− 2 25.2	2.7	8.0– 9.0	<13
4826	R Hydrae	24 15	−22 45.9	3.27	0.31	21 48	−22 31.8	5.9	3.5– 5.5	9.7
4847	S Virginis	27 47	− 6 40.8	3.13	0.31	25 26	− 6 26.8	2.6	5.7– 7.8	12.5
4940	W Hydrae	43 23	−27 52.0	3.38	0.30	40 51	−27 38.5	7	6.7	8.0
4948	R Canum Venat.	44 39	+40 2.4	2.58	0.30	42 43	+40 15.9	–	6.7– 7.0	11.5
5037	RR Virginis	13 59 35	− 8 43.1	3.17	0.29	13 57 12	− 8 30.0	–	>11	<14
5070	Z Virginis	14 4 58	−12 49.8	3.23	0.29	14 2 33	−12 36.5	–	9.5–11	<14
5095	R Centauri	9 22	−59 26.9	4.28	0.28	6 10	−59 14.1	6	6.0– 6.3	8.7– 9.8
5097	T Bootis	9 25	+19 32.0	2.82	0.28	7 18	+19 44.7	–	9.7?	<13
5156	X Bootis	19 27	+16 46.4	2.84	0.27	17 19	+16 58.8	4	9.0– 9.4	10.2
5157	S Bootis	19 32	+54 15.9	+2.01	0.27	18 1	+54 28.3	2.8	7.7– 8.5	12.5–13.2
5190	R Camelopardalis	25 6	+84 17.1	−4.83	0.27	28 54	+84 29.2	2.1	7.2– 8.6	11.8–13.5
5194	V Bootis	25 42	+39 18.5	+2.42	0.27	23 54	+39 30.4	3.6	6.9– 7.3	9.2–10.5
5237	R Bootis	32 47	+27 10.2	2.65	0.26	30 48	+27 22.1	2.7	5.9– 7.8	11.3–12.2
5249	V Librae	34 48	−17 13.6	3.33	0.26	32 18	−17 1.8	–	9.3	12.2
5274	W Bootis	39 2	+26 57.2	2.64	0.26	37 3	+27 8.9	–	5.2	6.1
5319	R Apodis	46 28	−76 15.3	6.70	0.26	41 30	−76 4.0	–	5.5	6.2
5338	U Bootis	49 42	+18 6.0	2.78	0.25	47 37	+18 17.1	2.7	9.1– 9.3	12–13.6
5374	δ Librae	14 55 38	− 8 7.3	3.20	0.24	53 14	− 7 56.4	1	5.0	6.2
5402	T Triang. Austr.	15 0 24	−68 20.1	5.46	0.24	14 56 20	−68 9.4	–	6.9	7.4
5430	T Librae	5 2	−19 38.3	3.42	0.23	15 2 28	−19 27.8	–	9.2–10.2	<14.7
5438	Y Librae	6 24	− 5 38.0	3.17	0.23	4 2	− 5 27.6	–	8.5	?
5465	R Triang. Austr.	10 49	−66 7.7	5.31	0.22	6 52	−65 57.5	–	6.6– 6.8	7.5– 8.0
5484	U Coronae	14 7	+32 0.8	2.45	0.22	12 17	+32 10.8	0.0	7.5	8.9
5494	S Librae	15 39	−20 1.6	3.44	0.22	13 4	−19 51.7	3.0	7.6– 8.3	<13
5501	S Serpentis	16 59	+14 40.4	2.81	0.22	14 52	+14 50.3	4.1	7.6– 8.7	12.5?
5504	S Coronae	17 19	+31 43.6	2.45	0.22	15 29	+31 53.5	4.9	6.1– 7.8	11.9–12.5
5583	X Librae	30 26	−20 50.0	3.48	0.20	27 50	−20 40.8	–	9.5– 9.9	14
5593	W Librae	32 12	−15 50.6	3.37	0.20	29 40	−15 41.5	–	9.8	<14
5617	U Librae	36 13	−20 51.5	3.48	0.20	33 37	−20 42.6	3.4	9	<14
5644	Z Librae	40 42	−20 48.8	3.49	0.19	38 5	−20 40.1	–	11	<13
5667	R Coronae	44 27	+28 27.8	2.47	0.19	42 36	+28 36.3	0.5	5.8	13.0
5675	V Coronae	45 57	+39 52.3	2.14	0.18	44 21	+40 0.7	5.9	7.2– 7.7	10.3–12.0
5677	R Serpentis	46 5	+15 26.3	2.76	0.18	44 1	+15 34.6	3.7	5.6– 7.6	15
5682	R Lupi	46 59	−35 59.9	3.88	0.18	44 5	−35 51.6	–	9	<11
5688	R Librae	47 56	−15 56.3	3.39	0.18	45 24	−15 48.1	2	9.2–10.0	<13
5704	RR Librae	50 39	−18 0.7	3.44	0.18	48 4	−17 52.6	3	8.4	14
5713	S Triang. Austr.	52 12	−63 29.5	5.35	0.18	48 12	−63 21.4	–	6.5	7.5
5732	T Coronae	55 19	+26 12.2	2.51	0.17	53 26	+26 20.1	1	2.0	9.5
5758	X Herculis	15 59 39	+47 30.8	1.81	0.17	58 18	+47 38.4	7	6.0	7.2
5761	Z Scorpii	16 0 8	−21 27.7	3.53	0.17	57 29	−21 20.1	–	9	12?
5770	R Herculis	1 44	+18 38.4	2.68	0.16	15 59 43	+18 45.9	2.0	8.0– 9.2	<13
5776	X Scorpii	16 2 40	−21 15.6	+3.53	−0.16	16 0 2	−21 8.3	–	>11	<13

No.	$M-m$	Elements of Maximum, Greenwich M.T. Epoch (Cal.)	(Julian)	Period	Inequalities	Remarks	Basis of Elements M	m	Dates included
4407	–	1868 June 11	=2403495.8	+317.2 E	Periodic inequality?		12	–	1796, 1851–90
4492	85:	1883 Mar. 10	2408880	+218.8 E			4	2	1882–93
4511	107.5	1860 Oct. 21	2400705.8	+257.2 E	+20 sin(9°E+90°)		35	13	1843, 60–93
4521	68.5	1809 June 0	2381934.8	+145.47E	$+20\sin(\frac{2}{5}°E+216°)+4.8\sin(\frac{4.5}{8}°+343°)$		87	28	1809–91
4536	0.295	1871 Aug. 16	2404656.656	+ 0.882253 E			19	15	1871–92
4557	113.0	1860 June 24	2400586.0	+226.1 E	+43 sin(5°.76E+181°.5)		54	32	1790, 1843–92
4596	88	1866 June 25	2402778.0	+297.0 E	Periodic inequality		20	7	1813–31, 57–93
4731	–	. . . . .	. . . .	. . . .			–	–	
4805	8.20	1866 Apr. 16	2402708.2666	+17.2711 E			41	45	1866–72, 89–92
4816	–	1860 Feb. 15	2400456.5	+250.5 E			15	–	1857–75, 83–92
4826	190	1891 July 17	2411931.0	+425.15 E	$-0.36E^2+15\sin(7°.5E+202°)$		24	6	1784–1890
4847	157:	1852 Jan. 24	2407512	+376.4 E	+20 sin(7°.5E+180°)		17	2	1795, 1824–93
4940	–	1889 Feb. 27	2411061	+384 E			5	–	1875, 89–93
4948	–	1888 Mar. 25	2410722	+340 E			6	–	1858, 85–91
5037	–	1879 May 13	2407483	+217 E			8	–	1873, 79–92
5070	–	1880 May 25	2407861	+305 E			7	–	1855, 80–91
5095	60:	1871 May 25	2404573	+160.5 E			8	3	1871–78, 91, 92
5097	–	. . . . .		. . . .		Only one appearance known	–	–	
5156	79	1880 July 3	2407900	+121.5 E			7	7	1880–84, 88–92
5157	130	1863 Apr. 13	2401609.0	+274.0 E	$-0.073E^2$		32	6	1790, 1865–92
5190	135	1869 Aug. 29	2403939	+269.5 E	Periodic inequality		31	7	1862–92
5194	97	1884 Aug. 30	2409419	+256 E	Dunér's elements		4	3	1884–92
5237	101.5	1858 June 8	2399839	+223.4 E	+10 sin(10°E+80°)		31	17	1858–90
5249	–	1882 Apr. 30	2408566	+370 E			3	–	1880–89
5274	–	. . . . .		. . . .	Irregular		–	–	
5319	–	. . . . .		. . . .			–	–	
5338	80	1880 Mar. 25	2407800.5	+173.8 E			11	5	1857, 80–93
5374	–	Min. 1867 Oct.	$25^d\,9^h\,17^m.5$	$+2^d\,7^h\,51^m\,22^s.8$ E	*Algol*-type		–	93	1797, 1837–88
5402	–	. . . . .		0.98			–	–	
5430	105	1878 Apr. 30	2407105	+238 E			5	3	1878–92
5438	–	1861 June 22	2400949	+327 E			4	–	1861, 78, 87, 88
5465	0.83	1871 July 14	2404623.71	+ 3.38922 E			3	3	1871, 72, 91
5484	–	Min. 1870 Mar.	$25^d\,10^h\,38^m.5$	$+3^d\,10^h\,51^m\,12^s.4E-0^s.0018E^2$	*Algol*-type		–	37	1858–89
5494	100:	1874 June 17	2405692	+192.3 E			9	1	1874–93
5501	–	1828 Apr. 16	2388829	+365.1 E	+59 sin(6°E+8°)		30	–	1794, 1828–92
5504	116	1860 Aug. 24	2400647	+360.8 E			28	10	1860–92
5583	80	1878 July 17	2407183	+163.6 E			13	1	1878–93
5593	–	1878 May 27	2407132	+206 E			9	–	1878–92
5617	–	1873 July 23	2405363	+226.2 E	Periodic inequality?		11	–	1849, 73–93
5644	–	1878 May 4	2407109	+295 E			4	–	1878–86
5667	–	. . . . .		. . . .	Irregular		–	–	
5675	171	1878 Oct. 21	2407279	+356.5 E			13	4	1857–61, 78–92
5677	151	1827 May 14	2388491	+357,2 E	+35 sin(4°.5E+22°.5)		30	5	1783, 1827–90
5682	–	. . . . .		. . . .			–	–	
5688	–	1858 Apr. 6	2399776	+730 E			4	–	1858–68. 84
5704	–	1885 June 17	2409710	+277.0 E			5	–	1851, 85–91
5713	–	. . . . .		6.3			–	–	
5732	–	. . . . .		. . . .	New star of 1866		–	–	
5758	–	. . . . .		. . . .			–	–	
5761	–	1873 May 31	2405306	+368 E			9	–	1854, 73–92
5770	–	1865 July 18	2402436	+317.7 E	+20 sin(12°E+324°)		21	–	1825, 56–92
5776	–	1876 Apr. 19	=2400634	+199.0 E			9	–	1876–91

No.	Star	1900.0 R.A.	1900.0 Decl.	1900 Annual Variation		1855.0 R.A.	1855.0 Decl.	Redness	Magnitude Max.	Magnitude Min.
		h m s	° ′	s	′	h m s	° ′			
5795	W Scorpii	16 5 55	—19 52.6	+3.50	—0.16	16 3 18	—19 45.3	–	10–11.2	<14.7
5826	T Scorpii	11 5	—22 43.6	3.57	0.15	8 25	—22 36.7	–	7.0	<12
5830	R Scorpii	11 41	—22 41.9	3.57	0.15	9 1	—22 35.0	0.9	9.4–10.5	<13
5831	S Scorpii	11 42	—22 39.0	3.57	0.15	9 2	—22 32.0	0	9.1–10.5	<13
5856	W Ophiuchi	16 2	— 7 27.5	3.23	0.15	13 36	— 7 21.3	6	8.9– 9.5	<13.5
5860	U Scorpii	16 45	—17 38.5	3.46	0.15	14 10	—17 1.9	–	9?	<12
5887	V Ophiuchi	21 10	—12 12.0	3.33	0.14	18 40	—12 5.5	6.6	7.0– 7.5	9.6–10.5
5889	U Herculis	21 22	+19 7.2	2.65	0.14	19 23	+19 13.6	6.5	6.6– 7.8	11.4–12.7
5903	Y Scorpii	23 49	—19 13.3	3.50	0.14	21 12	—19 7.1	–	10?	14
5912	*g* Herculis	25 21	+42 6.1	1.97	0.13	23 53	+42 12.2	3	4.7– 5.5	5.4– 6.0
5928	T Ophiuchi	28 1	—15 55.2	3.42	0.13	25 27	—15 49.2	–	10	<12.5
5931	S Ophiuchi	28 30	—16 57.0	+3.45	0.13	25 55	—16 51.1	1	8.3– 9.0	<13
5948	R Ursae minoris	31 18	+72 28	—0.84	0.13	31 57	+72 34.4	3.2	8.6– 9.0	10.5
5950	W Herculis	31 41	+37 32.4	+2.13	0.13	30 5	+37 38.1	3.2	8.0– 8.4	11.5–14
5952	Y Herculis	32 0	+ 7 18.6	2.91	0.13	29 50	+ 7 23.3	–	6.9	8.0
5955	R Draconis	32 23	+66 57.8	0.14	0.12	32 17	+67 3.5	2.0	6.5– 8.7	12–13
6005	S Draconis	40 46	+55 7.2	1.27	0.11	39 49	+55 11.8	–	7.3	9.2
6044	S Herculis	47 21	+15 6.6	2.73	0.10	45 18	+15 11.4	5.6	5.9– 7.5	11.5–13
6083	Ophiuchi	16 53 54	—12 44.4	3.36	0.10	51 23	—12 40.0	5	5.5	12.5
6132	R Ophiuchi	17 2 1	—15 57.6	3.44	0.08	16 59 27	—15 53.7	4.5	7.0– 8.1	<12
6181	*α* Herculis	10 5	+14 30.2	2.73	0.07	17 8 2	+14 33.5	5	3.1	3.9
6189	U Ophiuchi	11 27	+ 1 19.3	3.04	0.07	9 11	+ 1 22.6	0	6.0	6.7
6202	*u* Herculis	13 38	+33 12.3	2.21	0.07	11 58	+33 15.5	4	4.6	5.4
6268	Serpentarii	24 38	—21 23.7	3.59	0.05	21 57	—21 21.2	–	>1	?
6368	X Sagittarii	41 16	—27 47.6	3.77	0.03	38 26	—27 46.2	1	4	6
6404	Y Ophiuchi	47 17	— 6 7.1	3.22	—0.02	44 52	— 6 6.2	–	6.2	7.0
6472	W Sagittarii	17 58 38	—29 35.1	3.83	0.00	17 55 45	—29 34.9	1	4.8	5.8
6512	T Herculis	18 5 19	+31 0.2	2.27	+0.01	18 3 37	+30 59.9	1.4	6.9– 8.5	9.8–12.7
6573	Y Sagittarii	15 30	—18 54.3	3.53	0.02	12 51	—18 55.2	0	5.8	6.6
6624	T Serpentis	23 56	+ 6 14.0	2.93	0.03	21 44	+ 6 12.5	2.0	9.1–10.5	<13.5
6636	U Sagittarii	26 0	—19 11.7	3.54	0.04	23 21	—19 13.3	3.7	7.0	8.3
6682	X Ophiuchi	33 35	+ 8 44.4	2.87	0.05	31 26	+ 8 42.3	5	6.8	9.0
6726	T Aquilae	40 56	+ 8 38.3	2.87	0.06	38 47	+ 8 35.7	3.3	8.8	10.0
6733	R Scuti	42 9	— 5 48.7	3.21	0.06	39 45	— 5 51.4	4	4.7– 5.7	6.0– 9.0
6758	*β* Lyrae	46 23	+33 14.8	2.21	0.07	44 44	+33 11.8	1	3.4	4.5
6760	*κ* Pavonis	46 38	—67 21.5	6.21	0.07	41 58	—67 24.4	–	4.0	5.5
6794	R Lyrae	52 17	+43 48.8	1.82	0.08	50 55	+43 45.5	4	4.0	4.7
6806	S Coronae austr.	54 26	—37 5.3	4.06	0.08	51 22	—37 8.6	–	<9.5	13.0
6811	R Coronae austr.	55 9	—37 5.6	4.06	0.08	52 8	—37 8.8	–	9.8–11.5	13.2
6812	T Coronae austr.	55 14	—37 6.4	4.06	0.08	52 12	—37 9	–	<9.8	13
6834	V Aquilae	18 59 4	— 5 50.0	3.21	0.09	56 40	— 5 53.7	6.3*	6.5	8.0
6849	R Aquilae	19 1 33	+ 8 4.8	2.89	0.09	18 59 23	+ 8 0.8	5.5	5.9– 7.4	10.9–11.5
6903	T Sagittarii	10 28	—17 8.7	3.47	0.10	19 7 52	—17 13.2	6.5	7.6– 8.1	<11
6905	R Sagittarii	10 49	—19 29.0	3.52	0.10	8 11	—19 33.5	3.6	7.0– 8.0	12.5
6921	S Sagittarii	13 35	—19 12.4	3.51	0.11	10 57	—19 17.1	0	9.1–10.4	14.5
6923	Z Sagittarii	13 47	—21 6.6	3.56	0.11	11 7	—21 11.2	2	8.5	<12
6984	U Aquilae	23 58	— 7 15.0	3.23	0.12	21 33	— 7 20.3	0	6.4	7.1
7045	R Cygni	34 8	+49 58.5	1.61	0.13	32 56	+49 52.5	6.0	5.9– 8.0	<14
7085	RT Cygni	40 50	+48 31.9	1.70	0.14	39 33	+48 25.5	–	7?	11?
7101	11 Vulpeculae	43 28	+27 4.2	2.46	0.15	41 37	+26 57.7	–	3	?
7106	S Vulpeculae	44 18	+27 2.3	2.46	0.15	42 27	+26 55.7	3.0	8.4– 8.9	9.0–10.0
7120	*χ* Cygni	19 46 44	+32 39.7	+2.31	+ 0.15	19 45 0	+32 33.0	6.5	4.0– 6.5	13.5

No.	$M-m$	Elements of Maximum, Greenwich M.T. Epoch (Cal.)	(Julian)	Period	Inequalities	Remarks	Basis of Elements M	m	Dates included
5795	146:	1876 May 26	=2406401	+222.3 E			11	2	1876–92
5826	–	. . . . .		. . . .		New star of 1860 in *Messier* 80	–	–	
5830	–	1863 Mar. 25	2401590.5	+224.5 E		Periodic inequality	22	–	1837–53, 63–91
5831	–	1837 June 1	2392162.4	+176.7 E			23	–	1837, 39, 54–83
5856	–	1881 July 10	2408272	+331.3 E			5	–	1823, 81–93
5860	–	. . . . .		. . . .		Only one appearance known	–	–	
5887	–	1874 May 16	2405660	+304 E			8	–	1874–92
5889	167	1860 Nov. 8	2400723	+409 E		Periodic inequality?	16	6	1860–85, 93
5903	–	1876 June 26	2406432	+359 E			3	–	1876, 80, 83
5912	–	. . . . .		. . . .		Irregular	–	–	
5928	–	1860 Apr. 6	2400507	+361 E			5	–	1860, 69–74, 83
5931	–	1857 June 29	2399495	+233.8 E			7	–	1857–71, 89–93
5948	–	. . . . .		. . . .		Irregularly periodic	–	–	
5950	125	1879 July 12	2407543	+280.0 E		+25 sin(15°E+330°)	12	4	1857, 79–92
5952	–	. . . . .		20.5			–	–	
5955	112	1877 Apr. 5	2406715.8	+245.6 E			17	3	1790, 1858–92
6005	–	. . . . .		. . . .			–	–	
6044	148	1856 Sept. 9	2399202	+307.6 E		+45 sin(10°E+90°)	21	9	1840–90
6083	–	. . . . .		. . . .		New star of 1848	–	–	
6132	–	1857 July 11	2399567	+302.9 E			9	–	1847, 57–90
6181	–	. . . . .		. . . .		Irregular	–	–	
6189	–	Min. 1881 July	$17^d\,14^h\,45^m.0$	$+20^h\,7^m\,42^s.56$E		$+80^m \sin(0°.0225E+140°.0)$	–	98	1863, 71, 81–92
6202	–	. . . . .		. . . .		Irregularly periodic	–	–	
6268	–	. . . . .		. . . .		New star of 1604	–	–	
6368	2.876	1870 Aug. 16	2404291.78	+ 7.01185 E			388	367	1866–88
6404	6.250	1882 Sept. 4	2408693.43	+ 17.12564 E		Sawyer's elements	25	26	1882, 86–91
6472	3.00	1866 Sept. 4	2402849.45	+ 7.59460 E			–	–	
6512	78.0	1868 Mar. 9	2403401.0	+164.85 E		+8 sin(7°E+59°)	37	28	1856–92
6573	1.80	1886 Sept. 25	2410175.02	+ 5.7732 E			–	–	
6624	–	1861 May 11	2400907.0	+342.3 E			15	–	1861–74, 83–89
6636	2.97	1870 July 1	2404245.00	+ 6.7446 E			–	–	
6682	196	1886 Apr. 15	2410012	+354 E			3	4	1854, 86–92
6726	–	. . . . .		. . . .		Irregular	–	–	
6733	35	1886 Aug. 22	2410141	+ 71.1 E			–	–	
6758	–	Min. 1855 Jan.	$6^d\,14^h\,28^m.7$	$+12^d\,21^h\,46^m\,58^s.3$ E		$+0^s.4217\,E^2-0.00007\,E^3$	–	–	
6760	4.0	1871 Dec. 3	2404765	+ 9.102 E			5	3	1871–73, 83, 91
6794	15.0	1887 Oct. 16	2410561	+ 46.0 E			–	–	
6806	–	. . . . .		. . . .			–	–	
6811	–	. . . . .		30.6			–	–	
6812	–	. . . . .		. . . .			–	–	
6834	–	. . . . .		. . . .			–	–	
6849	144	1856 Aug. 5	2399167	+351.0 E		$-0.34\,E^2$	16	5	1854–59, 69–92
6903	–	1866 Sept. 10	2402855	+384 E			6	–	1865–70, 83
6905	158:	1866 July 18	2402801	+268.7 E		+20 sin(14°.4 E+296°)	14	1	1849, 58–92
6921	110::	1866 Sept. 25	2402870	+230.6 E		Periodic inequality	10	1	1863–71, 83–92
6923	–	. . . . .		. . . .			–	–	
6984	2.25	1886 Sept. 20	2410170.146	+ 7.02645 E		Yendell's elements	45	22	1886–92
7045	150	1854 Oct. 16	2398508.9	+425.7 E			25	7	1817, 52–92
7085	–	. . . . .		. . . .			–	–	
7101	–	. . . . .		. . . .		New star of 1670	–	–	
7106	26.5	1865 Jan. 2	2402239.0	+ 67.50 E		+4 sin(3°.6E+20°)	48	44	1836, 37, 62–86
7120	171.5	1763 June 3	=2365136.5	+406.02 E		$+0.0075E^2$+25 sin(5°E+272°)	85	8	1687–1891

No.	Star	1900.0 R.A.	1900.0 Decl.	1900 Annual Variation		1855.0 R.A.	1855.0 Decl.	Redness	Magnitude Max.	Magnitude Min.
		h m s	° ′	s	′	h m s	° ′			
7124	η Aquilae	19 47 23	+ 0 44.9	+3.06	+0.15	19 45 5	+ 0 38.2	2	3.5	4.7
7149	S Sagittae	51 29	+16 22.2	2.73	0.16	49 25	+16 15.4	0	5.6	6.4
7192	Z Cygni	19 58 38	+49 45.9	1.70	0.17	19 57 21	+49 38.4	9.0*	7.1– 8.5	11.5–12
7220	S Cygni	20 3 24	+57 41.9	1.26	0.17	20 2 28	+57 34.2	5.1	8.8–11.3	<14.5
7234	R Capricorni	5 42	—14 33.8	3.37	0.17	3 10	—14 41.6	4	8.8– 9.7	<13
7242	S Aquilae	7 1	+15 19.4	2.76	0.18	4 57	+15 11.5	0.8	8.4–10.1	10.7–11.8
7252	W Capricorni	8 36	—22 16.8	3.54	0.18	5 57	—22 24.8	–	10.2–10.5	<14.7
7257	R Sagittae	9 30	+16 25.4	2.74	0.18	7 27	+16 17.4	0.8	8.5– 8.7	9.8–10.4
7259	RS Cygni	9 45	+38 27.8	2.18	0.18	8 7	+38 17.4	9.4*	6.8	8.3–10
7261	R Delphini	10 5	+ 8 47.1	2.90	0.18	7 55	+ 8 39.1	4.0	7.6– 9.0	11.1–12.8
7285	P Cygni	14 6	+37 43.3	2.21	0.18	12 27	+37 35.1	2	3–5	<6
7299	U Cygni	16 30	+47 34.7	1.86	0.19	15 7	+47 26.3	9.3	7.0– 8.1	9.4–11.6
7428	V Cygni	38 5	+47 47.1	1.93	0.21	36 28	+47 37.5	8.3	6.8– 9.5	13.5
7431	S Delphini	38 28	+16 43.7	2.76	0.21	36 24	+16 34.2	6.0	8.4– 9.5	10.4–12.0
7437	X Cygni	39 29	+35 13.6	2.35	0.21	37 44	+35 4.0	0	6.4	7.2–7.7
7444	T Delphini	40 43	+16 2.1	2.78	0.22	38 38	+15 52.5	2.0	8.2–10.3	<13
7446	U Delphini	40 53	+17 43.7	2.75	0.22	38 50	+17 34.0	7	6.4	7.3
7455	U Capricorni	42 34	—15 9.1	3.35	0.22	40 4	—15 18.8	–	10.2–10.8	<13
7456	RR Cygni	42 37	+44 30.2	2.07	0.22	41 3	+44 20.4	6.7*	8.1– 8.7	9.3– 9.7
7459	T Cygni	43 11	+34 0.4	2.39	0.22	41 24	+33 50.6	1	5.5?	6?
7468	T Aquarii	44 40	— 5 31.1	3.17	0.22	42 17	— 5 40.9	1.2	6.7– 8.7	12.4–13.0
7483	T Vulpeculae	47 13	+27 52.5	2.55	0.22	45 19	+27 42.3	0	5.5	6.5
7488	Y Cygni	48 4	+34 17.0	2.40	0.22	46 16	+34 7.0	0	7.1	7.9
7560	R Vulpeculae	20 59 56	+23 25.5	2.66	0.24	57 56	+23 14.9	2.0	7.5– 8.5	12.5–13.6
7571	V Capricorni	21 1 47	—24 19.3	3.50	0.24	20 59 9	—24 30.2	–	9	14?
7577	X Capricorni	2 50	—21 45.1	3.44	0.24	21 0 15	—21 55.8	–	9.5–10	<16.2
7609	T Cephei	8 13	+68 5.0	0.81	0.24	7 33	+67 54.4	6.3	5.2– 6.8	9.5–9.9
7659	T Capricorni	16 30	—15 35.0	3.32	0.25	14 0	—15 46.4	2	8.8– 9.7	13 5
7733	Y Capricorni	28 55	—14 25.1	3.28	0.26	26 27	—14 36.9	–	10?	14?
7754	W Cygni	32 14	+44 55.6	+2.27	0.27	30 34	+44 43.7	4.2*	5.0– 6.3	6.1–6.7
7779	S Cephei	36 28	+78 10.3	—0.67	0.27	36 57	+77 58.2	9.1	7.4– 9.2	11.5
7783	RU Cygni	37 19	+53 52.2	+2.00	0.27	35 46	+53 40.0	–	7.6	9.1
7787	Q Cygni	37 47	+42 23.1	2.36	0.27	36 1	+42 11.0	3	3	13.5
7795	RV Cygni	39 8	+37 33.6	2.48	0.27	37 18	+37 21.2	9.0*	7.1–7.8	8.8–9.3
7803	μ Cephei	40 27	+58 19.3	1.83	0.27	39 4	+58 7.0	6.2	4?	5?
7907	U Aquarii	57 52	—17 6.5	3.28	0.29	55 24	—17 19.5	–	10?	14?
7909	S Piscis austrini	21 58 2	—28 32.0	3.44	0.29	21 55 27	—28 44.9	–	8.7– 9.2	<11
7944	T Pegasi	22 4 1	+12 3.0	2.93	0.29	22 1 49	+11 49.9	3	8.5– 9.3	<13
7994	R Piscis austrini	12 19	—30 6.2	3.42	0.30	9 45	—30 19.6	–	5.7?	<11?
8068	S Lacertae	24 38	+39 48.2	2.62	0.31	22 40	+39 34.3	–	8.4	<12
8073	δ Cephei	25 27	+57 54.2	2.22	0.31	23 48	+57 40.4	2	3.7	4.9
8093	R Indi	28 53	—67 48.3	4.34	0.31	25 36	—68 2.1	–	9?	11?
8153	R Lacertae	38 50	+41 50.9	2.66	0.31	36 50	+41 36.8	1.8	8.3– 9.3	<13.5
8230	S Aquarii	51 45	—20 52.6	3.22	0.32	49 20	—21 7.0	4.0	7.7– 9.1	<12.5
8273	β Pegasi	22 58 55	+27 32.4	2.90	0.32	56 45	+27 17.8	2	2.2	2.7
8290	R Pegasi	23 1 38	+10 0.2	3.01	0.32	22 59 22	+ 9 45.7	4	6.9– 7.9	<13
8373	S Pegasi	15 29	+ 8 22.3	3.03	0.33	23 13 13	+ 8 7.6	1.7	7.3– 8.0	<13
8512	R Aquarii	38 39	—15 50.3	3.11	0.33	36 19	—16 5.3	4.3	5.8– 8.5	11?
8588	R Phœnicis	51 16	—50 20.6	3.13	0.33	48 55	—50 35.6	–	8.5?	11?
8591	V Cephei	51 44	+82 38.1	2.70	0.33	49 44	+82 23.0	–	6.2– 6.4	7.1
8597	V Ceti	52 47	— 9 31.1	3.08	0.33	50 29	— 9 46.1	–	8.5– 9.5	14?
8600	R Cassiopeae	23 53 19	+50 49.9	+3.02	+0.33	23 51 4	+50 34.9	6.5	4.8– 7.0	9.7–12

No.	$M-m$	Elements of Maximum, Greenwich M.T. Epoch (Cal.)	(Julian)	Period	Inequalities	Remarks	Basis of Elements M	m	Dates included
				d					
7124	$2^d\ 9^h$	1888 Jan. $6^d\ 12^h\ 32^m$		$+7^d\ 4^h\ 14^m\ 0^s.0$ E			–	–	
7149	3.40	1876 Dec. 13	=2406602.60	+ 8.38320 E			81	55	1876–91
7192	125:	1887 Mar. 11	2410342	+265 E			6	4	1887–92
7220	144::	1865 June 29	2402417	+322.8 E	+15 sin(15°E+45°)		30	1	1841, 60–92
7234	–	1859 Dec. 12	2400391	+345 E		Elements uncertain	5	–	1859–68
7242	72	1865 Nov. 12	2402553	+146.7 E			27	26	1855–91
7252	87::	1872 June 27	2404972	+209 E			8	1	1872–91
7257	16.0	1859 Nov. 12	2400361.0	+ 70.52 E	+5 sin(2°.5E+55°)	See notes	133	54	1859–92
7259	–	. . . . .		. . . .		Irregularly periodic	–	–	
7261	–	1865 Aug. 26	2402475	+285.5 E		Periodic inequality?	10	–	1851, 59–83, 93
7285	–	. . . . .		. . . .		So called new star of 1600	–	–	
7299	229.0	1871 June 7	2404586.0	+463.5 E	+12 sin(36°E+324°)		15	16	1871–92
7428	220	1881 June 12	2408244	+418 E			8	2	1857, 81–92
7431	118	1866 Jan. 19	2402661	+277.5 E			14	11	1863–92
7437	6.8	1886 Oct. 10	2410190.55	+ 16.389 E			54	48	1886–90, 92
7444	–	1864 Sept. 11	2402128	+331.9 E			16	–	1855, 63–92
7446	–	. . . . .		. . . .		Irregular?	–	–	
7455	–	1857 Sept. 15	2399573.5	+202.5 E		Periodic inequality	10	–	1852–59, 72–92
7456	–	. . . . .		. . . .			–	–	
7459	–	. . . . .		. . . .			–	–	
7468	88	1861 Nov. 16	2401096.0	+203.3 E	+8 sin(7°.5E+255°)		19	4	1794, 1865–93
7483	1.30	1885 Nov. 2	2409848.95	+ 4.4362 E			54	39	1885, 86, 91
7488	–	Min. 1886 Dec. $9^d\ 12^h\ 20^m\ 10^s$		$+1^d\ 11^h\ 57^m\ 22^s$ E*.		See notes.	–	66	1886–92
7560	6.20	1865 Sept. 18	2402498.0	+136.90 E	+18 sin(4°E+80°)		27	10	1807, 10, 59–88
7571	–	1867 Aug. 18	2403197	+157.1 E		Periodic inequality	10	–	
7577	117	1867 Aug. 17	2403196	+218.1 E		Periodic inequality?	9	1	1867, 76–91
7609	193	1873 Aug. 29	2405400	+383.3 E			13	7	1789, 1841–92
7659	135:	1855 Oct. 21	2398878	+269.2 E			14	1	1850–72, 83, 91
7733	–	1885 Sept. 5	2409790	+206 E		Elements uncertain	3	–	1871, 85, 89
7754	72.9	1884 Nov. 30	2409511.3	+130.8 E		Yendell's elements	21	17	1885–92
7779	257	1865 June 21	2402409	+484 E			12	4	1789, 1841–93
7783	–	. . . . .		. . . .			–	–	
7787	–	. . . . .		. . . .		New star of 1876	–	–	
7795	–	. . . . .		. . . .			–	–	
7803	–	. . . . .		. . . .		Irregularly periodic	–	–	
7907	–	1875 Aug. 4	2406105	+258 E		Elements uncertain	8	–	1875–92
7909	–	1890 Sept. 9	2411620	+272 E		Holetschek's elements	2	–	1890, 92
7944	–	1864 Oct. 6	2402151	+373 E		Periodic inequality	14	–	1822, 54–83
7994	–	. . . . .		. . . .			–	–	
8068	–	. . . . .		. . . .			–	–	
8073	$1^d14^h36^m$	1840 Sept. $26^d\ 10^h\ 50^m$		$+5^d\ 8^h\ 47^m\ 39^s.3$ E	$-0^s.0008$ E^2	$-0^s.000\,000\,15$ E^3	289	278	1785–1889
8093	–	. . . . .		. . . .			–	–	
8153	–	1883 Feb. 15	2408857	+299.8 E			7	–	1856, 83–92
8230	–	1859 Dec. 16	2400395	+279.7 E		Periodic inequality?	14	–	1798, 1853–92
8273	–	. . . . .		. . . .		Irregular	–	–	
8290	172:	1850 Dec. 26	2397118	+380.0 E	+30 sin(10E°+200°)		19	5	1841–55, 66–92
8373	–	1864 Dec. 4	2402210.5	+317.5 E			7	–	1864–84, 92
8512	–	1811 Nov. 30	2382847.6	+387.16 E	+35 sin(10°E+235°)		23	–	1811–86
8588	–	. . . . .		. . . .			–	–	
8591	220	1883 Mar. 16	2408886	+360 E			5	6	1882–83, 90–93
8597	–	1879 Aug. 28	2407590	+261 E			7	–	1879–92
8600	170	1854 July 14	=2398414.0	+429.0 E	+23 sin(16°E+346°)		26	7	1850–92

*Subtract $3^h\ 24^m\ 44^s$ if epoch is odd.

NOTES TO THE CATALOGUE.

The following notes give, first, the facts with regard to the discovery of the variability of the several stars. For the stars contained in SCHÖNFELD's Second Catalogue, the name of the discoverer and the date, only, are given; except in special instances where, from any doubt that might exist as to the variability, the facts as to independent confirmation are added. For variables announced since that time, pains have been taken to supply also the name of the observer by whom the suspicion or discovery was first confirmed. The imperative necessity for requiring such independent verification, as a criterion for assigning ARGELANDER's letters and for insertion in the catalogue, has been adverted to on so many occasions, and the danger of departing from this course has been so forcibly illustrated in many instances, that the matter need not be further insisted upon here.

To facilitate the identification of the variables in their fainter stages, I have given, in as many cases as was convenient or possible, the positions, relative to the variable, of the neighboring fainter stars. (See *A.J.* VIII, 114.)

The other data in the notes relate mainly to peculiarities of the light-curves, etc. If space had permitted, these would have been much more complete. In the next edition of the catalogue it is hoped to incorporate, in compact form, the results of numerous original investigations in this direction, which will be useful to observers.

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100. Disc. by CHANDLER, 1881; conf. by SAWYER. Occasionally rudely periodic, 60–70 days, at other times irregular.

107. Disc. by KRUEGER, 1870. Light-curve flat at max., with sometimes a sec. min. near this phase. 8^{M} foll. 10^{s}, 0′.5 N.

112. Disc. at Bonn, 1858. Sometimes has sec. phases following principal max. one or two months. 12^{M} pr. 3^{s}, 2′ S; 9^{M} pr. 31^{s} on parallel.

114. Susp. by BORRELLY, 1872; proved by SCHÖNFELD. 12^{M} foll. 2^{s}, 4′.5 S; 12^{M} pr. 3^{s}, 6′ N.

116. TYCHO's star. Probable place according to ARGELANDER. Possibly identical with a $10^{M}.5$ now visible 0′.8 N.

161. Disc. by LUTHER, 1855. SCHÖNFELD's obsns. show irregular periods, $2\frac{1}{2}$–5 mos.

209. Disc. by BIRT, 1831; conf. by Sir J. HERSCHEL and others. Var. only occasionally evident. ARGELANDER found per. 79^{d}, uncertain.

224. Disc. by HARTWIG, 1885. New star in *Andromeda* nebula.

243. Disc. by ESPIN, 1887; conf. by CHANDLER.

320. Disc. by CERASKI, 1880. *Algol*-type. Light-curve unusually flat at min., and unsymmetric; decrease more rapid than increase. Oscillations occupy one-sixth of period, or 10 hours; nearly stationary for 2 hours at minimum. See investigations *A.J.* IX, 49 and XIII, 45.

432. Disc. at Bonn, 1861. Light-curve variable. $9^{M}.6$ foll. 20^{s}, 2′S; 12^{M} pr. 15^{s}, 0′.3 S.

434. Disc. by HIND. 1851. $11^{M}.5$ foll. $0^{s}.5$, 0′.7 N; 12^{M} directly S.

466. Disc. by PETERS, 1880; conf. by PARKHURST. For stars of ident. see *A.N.* 99, 114.

494. Disc. by GOULD, 1872; conf. by SAWYER.

513. Disc. by HIND, 1850. 11^{M} foll. 7^{s}, 0′.5 N; 9^{M} pr. 9^{s}, 4′ N.

678. Susp. by FLEMING, 1890; conf. by YENDELL and REED. Period perhaps about 6 mos.

715. Disc. by PETERS, 1865. $9^{M}.5$ pr. 10^{s}, 6′S; $10^{M}.5$ foll. 5^{s}, 4′.5 N.

782. Disc. at Bonn, 1857. Light-curve flat near max., 6^{M} pr. 23^{s}, 0′.7 S.

793. Disc. by SAFARIK, 1882; conf. by CHANDLER and SCHWARZCHILD. Either irregular or rudely periodic, with period of several months.

806. Disc. by FABRICIUS, 1596; recognized as periodically var. by HOLWARDA, 1638. Principal epoch of elements in catalogue corresponds to Ep. 227 of ARGELANDER. $9^{M}.1$ foll. $7^{s}.7$, 10″ N.

814. Disc. by KRUEGER, 1872. Probably irregular. SAFARIK and HAGEN think it is rudely periodic; period long, $2\frac{1}{3}$ years. 10^{M} foll. 2^{s}, 1′.1 N.

845. Disc. by ARGELANDER, 1866. 11^{M} pr. 12^{s}, 5′ N.

893. Disc. by SAWYER, 1885; conf. by CHANDLER.

906. Susp. by ESPIN, 1890; proved by YENDELL and KNOTT.

976. Disc. by AUWERS, 1870. Light-curve very flat near max.

1072. Disc. by SCHMIDT, 1854. SCHMIDT's period of $32^{d}.98$ not conf. by SCHÖNFELD's obsns.

1090. Susp. by MONTANARI, 1669; independently disc. by GOODRICKE, 1782. Additional term of elements, $+3^{m}.5 \sin(\frac{1}{6}°\mathrm{E}+90°.33)$. Principal epoch of elements corresponds to Ep. 11210 of ARGELANDER. See investigations, *A.J.* VII, 165–183; XI, 113–126. Light oscillations occupy a little over 9 hours.

1113. Disc. by SCHAEBERLE, 1892; conf. by GLASENAPP. Position only rudely known.

1222. Disc. by SCHÖNFELD, 1861. 12^{M} foll. 5^{s}, 0′.2 S; 12^{M} foll. 4^{s}, 1′.2 S; 12^{M} pr. 12^{s}, 0′.5 S.

1367. Disc. by GOULD, 1876; conf. by CHANDLER, also YENDELL.

1411. Disc. by BAXENDELL, 1848. Period certainly subject to inequalities, whose law it is not yet possible to determine. Deviations from uniform elements sometimes amount to 3 hours. The light-oscillations occupy 10 hours.

1537. Disc. by HIND; conf. by AUWERS and CHACORNAC, 1861. A supposed variable nebula (HIND and D'ARREST) precedes $2^{m}\,38^{s}$, 6′.5 S.

1574. Susp. by ESPIN, 1886; conf. by GAGE, CHANDLER and PARKHURST, although there is some doubt and confusion about its exact place. The region within 15′ should be watched.

1577. Disc. by HIND, 1849. 8^{M} pr. 15^{s}, 5′.5 S; 10^{M} foll. 3^{s}, 2′ N.

1582. Disc. by OUDEMANS, 1855. TOWNLEY thinks period is one-half of that in table. The small value of $M-m$ seems to favor this hypothesis, although there are no obsns. of max. to confirm it. $11^{M}.5$ foll. 9^{s}, 1′ S; $11^{M}.5$ foll. 4^{s}, 0′.7 S; 12^{M} pr. 6^{s}, 1′ N.

1623. Disc. by ESPIN, 1891; conf. by DUNÉR. Elements provisional and uncertain, from DUNÉR's two max.

1635. Disc. by RAGOONATHACHARI, 1867; conf. by ROBERTS.

1654. Disc. by GOULD, 1874; conf. by ROBERTS. Period about 11 mos., by ROBERTS's obsns.

1717. Disc. by AUWERS, 1871. $12^{M}.5$ foll. 11^{s}, 1′ S; $11^{M}.5$ foll. 10^{s}, 3′.5 N.

1761. Disc. by HIND, 1848. 11^{M} foll. 11^{s}, 0′.3 N; 12^{M} pr. 7^{s}, 0′.6 S.

1768. Susp. by FRITSCH, 1821; conf. by SCHMIDT, 1843; independently disc. by HEIS, 1847. Variations irregular, often unnoticeable during many months.

1771. Disc. by SCHMIDT, 1855. HIND's "crimson star." Accurate obsns. of max. and min. difficult.

1855. Disc. at Bonn, 1862. SCHÖNFELD notes, and CHANDLER's obsns. confirm, the unusual phenomenon of a "standstill" during increase at about 9^{M}, from 2 to 4 mos. before max. 9^{M} pr. 5^{s}, 0′.6 S.

1923. Disc. by DUNÉR, 1881; conf. by CHANDLER. Period irregular; probably over 400 days, with secondary phases.

1944. Disc. by WEBB, 1870; conf. by SCHÖNFELD. Marked irregularities, and secondary phases in light-curve. 10^{M} about 1′ N; $9^{M}.5$ pr. $2^{s}.5$, 0′.4 S.

1953. Disc. by ANDERSON, 1892. A secondary max. occurred in Aug., 1892, $9^{M}.2$. No apparent change in 6 mos. prec. Apr., 1893, according to PARKHURST.

1981. Disc. by ESPIN, 1891; conf. by YENDELL. Elements mere guess-work, from YENDELL's 3 max.

1986. Disc. by BOND, 1863. SCHMIDT's obsns. 1868–81, and CHANDLER's 1883–84, certainly confirm. While this is the only star in the nebula of *Orion* inserted in the Catalogue, there is little doubt that several others are variable. But the subject is a very intricate one, and requires especial investigation. See note to "unconfirmed list" with regard to STONE's and SCHMIDT's observations.

2013. Susp. by ESPIN, 1891; proved by YENDELL. Elements consistent with DM. obsns., but numeration of periods not certain.

2098. Disc. by Sir J. HERSCHEL, 1840. ARGELANDER found period of 196^{d}. SCHÖNFELD thought periodicity questionable.

2100. Disc. by GORE, 1885; generally confirmed. Elements deduced from combination of obsns. with various negative data, 1797–1857.

2213. Disc. by SCHMIDT, 1865. Elements will satisfy SCHMIDT's min. of 1844, which SCHÖNFELD's would not.

2258. Susp. by ESPIN, 1886; proved by CHANDLER, 1891; and YENDELL, 1893. Elements given are mere guess-work. They satisfy hypothetically all present data.

2266. Disc. by SCHÖNFELD, 1883; conf. by CHANDLER.

2279. Disc. by GOULD, 1871. Elements of First Catalogue retained, although not definitive. YENDELL gets 1885 Apr. 2.68+27.0059 E.

2362. Disc. by SCHMIDT, 1861. In southerly end of the nebula *h* 399.

2375. Disc. by WINNECKE, 1867. SCHÖNFELD's obsns. partly confirm partly contradict WINNECKE's elements. YENDELL's obsns. also render them doubtful. The star requires further investigation before the question can be settled.

2478. Disc. by KRUEGER, 1870–74; conf. by SCHÖNFELD. 10^{M} foll. 20^{s}, 2′.3 N; 10^{M} pr. 11^{s}, 3′.5 N.

2509. Disc. by SCHMIDT, 1847. Elements of First Cat. retained. Definitive investigation not completed.

2528. Disc. by HIND, 1848. Light-curve variable. Variations near max. frequently very slow. 12^{M}, 2′.5 N; $12^{M}.5$ pr. 4^{s}, 1′ S; 9^{M} foll. 25^{s}, 3′ N.

2539. Disc. at Bonn, 1855. Light-curve flat at max. Obsns. of LALANDE and BESSEL cannot yet be certainly included in calculation of elements.

2583. Disc. by GOULD, 1872; conf. by WILLIAMS and ROBERTS.

2610. Disc. by SAWYER, 1887; conf. by CHANDLER. Elements of Supplement (*A.J.* 216) retained, as recent obsns. give no certain correction. Light-oscillations occupy 5 hours.

2625. Disc. by BAXENDELL, 1880; conf. by KNOTT and CHANDLER.

2676. Disc. by GOULD, 1873. Elements of First Cat. retained. Definitive investigation not completed. Light-curve has rudely alternating bright and faint minima.

2684. Disc. by HIND, 1856. Light-curve flat at max. $9^{M}.5$ foll. 19^{s}, 4′ N; $9^{M}.3$ pr. 25^{s}, 3′ N.

2691. Disc. by SCHÖNFELD, 1865. $12^{M}.7$ pr. 1^{s}. 0′.3 S; $12^{M}.2$ foll. 4^{s}, 0′.1 N.

2735. Disc. by BAXENDELL, 1879; conf. by SCHMIDT. Period and light-curve very irregular, with secondary max. and min. Elements uncertain.

2742. Disc. by HIND, 1848. $11^{M}.5$ foll. 4^{s}, 0′.6 S; 12^{M} pr. 5^{s}, 1′.6 N.

2780. Disc. by HIND, 1848. A halt frequently occurs during increase, at about $9^{M}.5$. $12^{M}.5$ pr. 1^{s}, 2′.3 S; 11^{M} pr. 12^{s}, 3′ N.

2783. Disc. by GOULD, 1872?

2815. Disc. by HIND, 1855. Light-variation of a unique character. The star remains at or near min., about 13^{M}, most of the time, suddenly brightens to about $9^{M}.3$, and diminishes again in 5–12 days to min. Irregular periods, from two to five mos., average 86.3 days. For purpose of approx. prediction the epoch of last observed max. is given as epoch

of catalogue. For comparison-stars and light-scale see WINNECKE, *A.N.* 1120.

2852. Disc. by WILLIAMS, 1886; conf. by ROBERTS. The former thinks period is 4½ days; the latter, about half of this.

2857. Disc. by PICKERING, 1881; conf. by CHANDLER. Elements uncertain. 10^M foll. 26^s, 4′ N; 11^M pr. 16^s, 1′.5 N; 13^M foll. 2^s, 1′.5 S.

2946. Disc. by SCHWERD, 1829. 10^M foll. 6^s, 4′.4 S; 12^M pr. 4^s, 1′.5 S.

2976. Disc. by AUWERS, 1870. Occasionally secondary phases near max. 11^M foll. 4^s on parallel; $10^M.5$ foll. 18^s, 0′.3 N.

3060. Disc. by CHACORNAC, 1853. Light-variation, occasionally at least, slow near max. 11^M pr. 3^s, 7′ N.

3109. Disc. by HIND, 1848. SCHÖNFELD's elements retained, since 6 min. by YENDELL in 1890 give unimportant deviations. Light-oscillations occupy 21½ hours.

3128. Susp. by WEISS; proved by HOLETSCHEK, 1890. Period just about a year. This letter assigned because the var. of the star to which the letter *R* was assigned, (*Uran. Argent.* p. 297,) has not yet been confirmed.

3170. Disc. by HIND, 1848. Var. near max. sometimes slow, sometimes rapid. 11^M pr. 12^s on parallel; 12^M foll. 7^s, 0′.3 N.

3184. Disc. by HIND, 1851. 10^M foll. 6^s, 3′ N; $10^M.5$ pr. 4^s, 2′.5 N.

3186. Disc. by HIND, 1850. Elements give minimum-epoch only, as light-curve is too flat near max. to determine the latter.

3407. Disc. by PAUL, 1888; conf. by SAWYER. Period of Supplement to First Cat. (*A.J.* 216) retained, correcting Epoch by $-17^m.4$. Light-oscillations occupy about 3½ hours.

3409. Disc. by GOULD, 1871; conf. by ROBERTS. ROBERTS's obsns. not entirely consistent with GOULD's period of 4.25 days.

3418. Disc. by GOULD, 1871; conf. by TEBBUTT.

3477. Disc. by SCHÖNFELD, 1863. $10^M.5$ foll. 10^s, 2′ N.

3493. Disc. by KOCH, 1782. The periodical inequality of the elements is very certain.

3495. Disc. by GOULD, 1871; conf. by ROBERTS.

3567. Disc. by BECKER, 1882; conf. by CHANDLER. $11^M.5$ foll. 5^s, 1′.2 N.

3633. Disc. by GOULD, 1872; conf. by ROBERTS.

3637. Disc. by GOULD, 1871; conf. by ROBERTS. Light-curve regular.

3712. Disc. by PETERS, 1876. SCHÖNFELD thought it variable. Certainly seen by no one except PETERS and the DM. observers. The writer has never been able to see the star, although it was sought for many times in different years. PARKHURST's experience is similar. The variability is extremely doubtful.

3796. Disc. by GOULD, 1871; conf. by ESPIN and YENDELL. ESPIN's period not confirmed.

3825. Disc. by POGSON, 1853. Light-curve very variable.

3847. Disc. by BURCHELL, 1827. Fluctuations very capricious.

3881. Susp. by GOULD; proved by CHANDLER, 1888. Large irregularities in period. Elements uncertain.

3890. Disc. by PETERS, 1880; conf. by PARKHURST. A max. obsd. by YENDELL, 1893, contradicts PARKHURST's period. For stars of identification see *A.N.* 99, 114.

3908. Disc. by GOULD, 1877; conf. by UPTON and ROBERTS. The latter thinks periods is about 18^h.

3934. Disc. by WINNECKE, 1861. Variations very small, and, according to some observers, doubtful. SCHÖNFELD found, very uncertainly, period of 160^d, from WINNECKE's obsns. *α Crateris* pr. 43^s, 1′.2 N; 9^M pr. 5^s; $8^M.5$ foll. 10^s, 2′.5 S.

3994. Disc. by CHACORNAC, 1856. Increase apparently slower than decrease by CHANDLER's obsns. $11^M.5$ foll. 6^s, 1′.7 S.

4160. Disc. by PETERS, 1862. Variation not confirmed by any other observer, and indeed, from obsns. of SCHÖNFELD, PARKHURST and CHANDLER — none of whom have ever certainly seen the star — is subject to considerable doubt.

4300. Disc. by PETERS, 1871; conf. by SCHÖNFELD and CHANDLER. A period of about 340^d is consistent with a large part of the very defective data. $11^M.5$ foll. 2^s, 0′.4 N.

4315. Disc. by SCHÖNFELD, 1856. $7^M.5$ pr. 13^s, 2′.2 N.

4377. Disc. by BOGUSLAWSKI, 1849. 11^M pr. 8^s, 2′ N; 12^M foll. 1^s, 2′ N; $11^M.5$ foll. 12^s, 2′ N; $11^M.5$ pr. 2^s, 4′ N.

4407. Disc. by KARLINSKI, 1867. Increase rapid. 8^M pr. 5^s, 3′.5 S; 10^M pr. 5^s, 0′.5 N; 8^M foll. 18^s, 1′ S.

4492. Disc. by HENRY, 1874; conf. by CHANDLER. 8^M foll. 19^s, 1′ S; 11^M foll. 12^s, 2′.5 N.

4511. Disc. at Bonn, 1860.

4521. Disc. by HARDING, 1809. See investigation *A.J.* VIII, 164.

4536. Disc. by Gould, 1871; conf. by UPTON.

4557. Disc. by POGSON, 1853.

4596. Disc. by HARDING, 1831. Periodic inequality of small range indicated. 10^M pr. 9^s, 1′ N.

4731. Susp. by ESPIN, 1891; proved by YENDELL.

4805. Disc. by SCHÖNFELD, 1866. Light-curve very regular.

4816. Disc. by GOLDSCHMIDT, 1857. Increase somewhat irregular, decrease more uniform. Star isolated, and identification easy.

4826. Susp. by MONTANARI, 1672 (1670?); proved by MARALDI, 1704. Elements of catalogue are based on obsns. since 1784 only, the attempt to reconcile HEVEL's, MONTANARI's and MARALDI's max. having been given over for the present. The principal epoch of catalogue corresponds to Ep. 170 of investigation in *A.N.* 103, 225.

4847. Disc. by HIND, 1852.

4940. Disc. by SAWYER, 1888; conf. by YENDELL.

4948. Disc. by ESPIN, 1888; conf. by CHANDLER.

5037. Disc. by PETERS, 1880; conf. by PARKHURST.

5070. Disc. by PALISA, 1880; conf. by CHANDLER. 9^M pr. 12^s, 2′ S; 10^M pr. 7^s, 2′ N.

5095. Disc. by GOULD, 1871; conf. by ROBERTS.

5097. Disc. by BAXENDELL, 1860. Only one appearance known. SCHÖNFELD suggested that it may belong to the class of new stars.

5156. Disc. by BAXENDELL, 1859; conf. by CHANDLER, 1888, and YENDELL, 1893. $7^M.3$, directly south 2′.8, renders obsn. difficult.

5157. Disc. at Bonn, 1860. Quadratic term of elements very certainly established.

5190. Disc. by HENCKE, 1858. Light-curve somewhat irregular.

5194. Disc. by DUNÉR, 1884; conf. by CHANDLER. Observed max. show considerable deviations.

5237. Disc. at Bonn, 1858.

5249. Disc. by SCHÖNFELD, 1882; conf. by CHANDLER.

5274. Disc. by SCHMIDT, 1867; conf. by SCHWAB.

5319. Disc. by GOULD, 187– (?); conf. by ROBERTS.

5338. Disc. by BAXENDELL, 1880; conf. by SCHWAB. PARKHURST suggests period to be lengthening ($P = 173^d.5 + 0^d.16\,E$).

5374. Disc. by SCHMIDT, 1859. Epoch of catalogue elements corresponds to Ep. 391 of SCHÖNFELD. SCHMIDT found an inequality of 9 yrs. cycle in period. I suspect that this is not real, but a subjective effect, dependent on hour-angle at which min. are obsd. The subject is reserved for definitive investigation. Light-oscillations occupy 12 hours.

5402. Disc. by GOULD, 187– (?); conf. by ROBERTS, who also confirms GOULD's period.

5430. Disc. by PALISA, 1878; conf. by CHANDLER. Period of first catalogue was 723^d. Townley discovered the subdivision. $10^M.5$ foll. 7^s on parallel; 13^M pr. 4^s, 0′.2 N; $13^M.5$ pr. 1^s, 1′ N.

5438. Disc. by BAUSCHINGER, 1887; conf. by CHANDLER. Period uncertain.

5465. Disc. by GOULD, 1871; conf. by ROBERTS.

5484. Disc. by WINNECKE, 1869. Elements of supplement, *A.J.* 216, retained, as they represent subsequent obsns. to date, without appreciable certain correction. See investigation *A.J.* IX, 97. Light-oscillations occupy nearly 10 hours.

5494. Disc. by BORRELLY, 1872. 13^M pr. 2^s, 2′ N; $12^M.5$ foll. 5^s. 2′.5 N.

5501. Disc. by HARDING, 1828. Increase more rapid than decrease. 11^M pr. 8^s, 0′.5 N; $12^M.7$ foll. 2^s, 0′.4 N.

5504. Disc. by HENCKE, 1860.

5583. Disc. by PETERS, 1878; conf. by PARKHURST. TOWNLEY suggested period of 169^d, in place of PETERS's of 295^d. PARKHURST suggests the elements 1878 July 27 + 112.6 E.

5593. Disc. by PETERS, 1878; conf. by PARKHURST.

5617. Disc. by PETERS, 1878; conf. by CHANDLER.

5644. Disc. by PETERS, 1879. Elements very uncertain. S. DM. gives R. A. 10^s smaller. Identification not certain.

5667. Disc. by PIGOTT, 1795. Remains frequently nearly unchanged, near max., then diminishes at irregular intervals suddenly to min., and after repeated large oscillations resumes its normal unchanging condition.

5675. Disc. by DUNÉR, 1878; conf. by SCHMIDT. Secondary phases near max. sometimes marked.

5677. Disc. by HARDING, 1826. Star isolated and identification easy.

5682. Disc. by GOULD, 1884.

5688. Disc. by POGSON, 1858. Not recently observed, and elements consequently not trustworthy for prediction. 12^M pr. 3^s, 1′.2 S.

5704. Disc. by PETERS, 1885; conf. by PARKHURST.

5713. Disc. by GOULD, 187– (?); conf. by ROBERTS, who gives period as $6^d.3$.

5732. Disc. by BIRMINGHAM, 1866. See note to SCHÖNFELD's Second Catalogue for history of its appearance.

5758. Disc. by GORE, 1890; conf. by YENDELL.

5761. Disc. by PETERS, 1883; conf. by PARKHURST.

5770. Disc. at Bonn, 1855. Identification easy.

5776. Disc. by PETERS, 1876; conf. by PARKHURST.

5795. Disc. by PALISA, 1870; conf. by SCHMIDT. 10^M pr. 8^s, 1′ N; 10^M foll. 10^s, 3′ S.

5826. Disc. by AUWERS, 1860, independently by POGSON, one week later. Position, $0^s.29$ foll. 2″.7 N of the center of cluster *Messier* 80. Not since seen.

5830. Disc. by CHACORNAC, 1853. Light-curve very variable; marked secondary phases. Increase from 12^M rapid. 8^M pr. 24^s, 2′ N; 9^M foll. 10^s, 3′ N.

5831. Disc. by CHACORNAC, 1854. $9^M.4$ foll. 9^s, 0′.2 N.

5856. Disc. by SCHÖNFELD, 1881; conf. by CHANDLER. 11^M pr. 13^s on parallel; 12^M foll. 13^s, 4′ N; 10^M foll. 34^s, 1′ N.

5860. Disc. by POGSON, 1863. Decreased from 9^M to invisibility in 12 days. Not seen by any one else.

5887. Disc. by DUNÉR, 1881; conf. by CHANDLER.

5889. Disc. by HENCKE, 1860. Elements will not satisfy BESSEL's obsn., hence period is probably variable. 9^M pr. 12^s, 3′.3 N.

5903. Disc. by PETERS, 1876; conf. by CHANDLER. Elements very uncertain.

5912. Disc. by BAXENDELL, 1857.

5928. Disc. by POGSON, 1860. Elements very uncertain. 10^M foll. 5^s, 9′ S; 10^M pr. 5^s, 2′.5 S.

5931. Disc. by POGSON, 1854. Recent obsns. confirm SCHÖNFELD's elements, which are retained. Light-curve variable. $11^M.5$ pr. 6^s, 3′ N; 12^M pr. 13^s, 0′.2 N.

5948. Disc. by PICKERING, 1881; conf. by CHANDLER. Period 4 to 6 mos., very irregular.

5950. Disc. by DUNÉR, 1880; conf. by CHANDLER.

5952. Disc. by CHANDLER, 1882; conf. by YENDELL. The former, in 1882–83, found period $20^d.5$; the latter in 1889–93, period of $20^d.6$.

5955. Disc. by GEELMUYDEN, 1876; conf. by HARTWIG. $8^M.5$ foll. 35^s, 1′.5 S; 11^M foll. 2^s, 3′ S.

6005. Susp. by ESPIN, 1892; proved by YENDELL.

6044. Disc. at Bonn, 1856. Decrease unusually rapid immediately after max. $9^{M}.7$ foll. 9^{s}, $1'.4$ S; 6^{M} foll. 11^{s}, $1'.9$ N.

6083. Disc. by HIND, 1848. At present visible as $12^{M}.5$, without change since 1867.

6132. Disc. by POGSON, 1853. $10^{M}.5$ foll. 6^{s}, $4'$ S; $10^{M}.5$ pr. 2^{s}, $6'$ S. Also a small nebula, not in HERSCHEL's G.C. or DREYER's supplement, foll. 36^{s}, $2'$ S.

6181. Disc. by W. HERSCHEL, 1795. Very irregular oscillations in periods of 2 to 4 mos.

6189. Disc. by GOULD, 1871; conf. in 1881 by SAWYER, who also first recognized its character as of the *Algol*-type. See investigations *A.J.* VII, 129–140, and XIII, 46. Light-oscillations occupy 5 hours.

6202. Disc. by SCHMIDT, 1869 (?). SCHMIDT gave period about 37–40 days. Very rapid secondary oscillations near min. remarked by SCHMIDT, and confirmed by SCHWAB.

6268. Disc. by BRUNOWSKI and FABRICIUS, 1604. See note to SCHÖNFELD's Second Catalogue.

6368. Disc. by SCHMIDT, 1866; obsns. to 1892 give no certain corr. to SCHONFELD's elements.

6404. Disc. by SAWYER, 1888; conf. by CHANDLER.

6472. Disc. by SCHMIDT, 1866; obsns. to 1892 give no correction to elements of supplement, *A.J.* No. 216.

6512. Disc. at Bonn, 1857. 10^{M} pr. 3^{s}, $0'.9$ N.

6573. Disc. by SAWYER, 1886; conf. by CHANDLER. Elements nearly definitive.

6624. Disc. by BAXENDELL, 1860. Recent obsns. confirm SCHÖNFELD's elements, which are retained. $11^{M}.5$ foll. 3^{s}, $0'.1$ N.

6636. Disc. by SCHMIDT, 1866. Elements not quite definitive.

6682. Disc. by ESPIN, 1886; conf. by CHANDLER.

6726. Disc. by WINNECKE, 1860. Irregularly variable in period of 3 to 5 mos.

6733. Disc. by PIGOTT, 1795. ARGELANDER found bright and faint minima, usually alternating, and this has been confirmed by all subsequent observers. Provisional elements of First Catalogue retained, pending the completion of full discussion.

6758. Disc. by GOODRICKE, 1784. Light-curve double. Secondary min. about midway. REED's provisional corr. of ARGELANDER's elements retained, pending final discussion.

6760. Disc. by THOME, 1872; conf. by UPTON.

6794. Disc. by BAXENDELL, 1856. Elements of First Catalogue retained.

6806. Disc. by SCHMIDT, 1866. The period of 6^{d}, found from his earlier obsns., not conf. by the later ones.

6811. Disc. by SCHMIDT, 1866. Period given in Catalogue is SCHMIDT's.

6812. Disc. by SCHMIDT, 1876.

6834. Recognized by various observers, KNOTT, 1871; SCHMIDT, 1872; SAFARIK, 1884; SAWYER, 1892.

6849. Disc. at Bonn, 1856. Secondary fluctuations near max. Light-curve very variable. $9^{M}.6$ pr. 12^{s}, $0'.3$ S; $10^{M}.6$ pr. 4^{s}, $0'.5$ N.

6903. Disc. by POGSON, 1863. Lack of recent obsns. makes prediction uncertain. $11^{M}.5$ foll. 10^{s}, $0'.5$ N.

6905. Disc. by POGSON, 1858. 11^{M} pr. 1^{s}, $0'.4$ S; $10^{M}.8$ pr. 4^{s}, $1'$ N.

6921. Disc. by POGSON, 1860. 11^{M} foll. 24^{s}, $2'.5$ S.

6923. Disc. by PETERS, 1888; conf. by PICKERING. No elements possible, from data available.

6984. Disc. by SAWYER, 1886; conf. by CHANDLER.

7045. Disc. by POGSON, 1852. *θ Cygni* pr. 22^{s}, $0'.7$ N; 9^{M} foll. 2^{s}, $1'.5$ N.

7085. Disc. by PICKERING, 1890; conf. by PORRO (?).

7101. Disc. by ANTHELM, 1670. See note to SCHÖNFELD's Second Catalogue.

7106. Susp. by HIND, 1861; proved by BAXENDELL, 1862. Periodical term of elements uncertain.

7120. Disc. by KIRCH, 1686. See investigation *A.J.* X, 103. $11^{M}.5$ pr. 10^{s}, $1'$ 9 S; $11^{M}.5$ foll. 3^{s}, $1'$ S; $11^{M}.5$ foll. 6^{s}, $0'.1$ N.

7124. Disc. by PIGOTT, 1784. Elements of First Catalogue retained, pending definitive discussion.

7149. Disc. by GORE, 1885; conf. by CHANDLER.

7192. Disc. by ESPIN, 1887; conf. by BAXENDELL, Jr.

7220. Disc. at Bonn, 1860. Coefficients of periodical inequality only approximate. Secondary phases near max. $8^{M}.9$ foll. 1^{s}, $0'.8$ N.

7234. Disc. by HIND, 1848. Want of recent obsns. makes elements uncertain for prediction. 13^{M} dist. $20''$, pos.-angle 355°.

7242. Disc. by BAXENDELL, 1863. Extraordinary and unexplained irregularities in period. 9^{M} foll. 1^{s}, $1'.5$ S.

7252. Disc. by PETERS, 1872; conf. by PARKHURST and CHANDLER. For stars of identification see *A.N.* 109, 120.

7257. Disc. by BAXENDELL, 1859. Double light-curve, like *β Lyrae*. Second max. and second min. follow principal ones about 35^{d}, respectively. Reversals of light-curve occurred in 1874 and 1883, so that between these dates the secondary minima were fainter than the principal minima.

7259. Disc. by ESPIN, 1887; conf. by CHANDLER. DUNÉR thinks period may be 380^{d}; PARKHURST, 120^{d}; but it is doubtful whether the star is regularly periodic. Place from BESSEL. DM. decl. is $2'.4$ smaller.

7261. Found by HENCKE, 1851, and suspected to be an asteroid, until SCHÖNFELD, 1859, proved variability. 12^{M} pr. 2^{s}, $1'$ S.

7285. Disc. by JANSON, 1600.

7299. Disc. by KNOTT, 1871. KNOTT thinks brightness at minimum is systematically variable. $8^{M}.5$ foll. 5^{s}, $0'.7$ N.

7428. Disc. by BIRMINGHAM, 1881; conf. by SCHMIDT. Second max. follows principal one about two months.

7431. Disc. by BAXENDELL, 1860. $8^{M}.3$ pr. 1^{s}, $0'.9$ N.

7437. Disc. by CHANDLER, 1886; conf. by YENDELL. The

former finds brightness at min. variable; the latter confirms this fact, and thinks the phenomenon is periodic in a cycle of 21 periods. Elements not quite definitive.

7444. Disc. by BAXENDELL, 1863. Possibly a secondary max. near principal one. Decrease unusually rapid. 11^M pr. 3^s, $2'.7$ N; $10^M.1$ foll. 12^s, $0'.1$ N.

7446. Susp. by D'ARREST, 1874; conf. by ESPIN, GORE and CHANDLER.

7455. Disc. by POGSON, 1858. $8^M.5$ foll. 20^s, $7'$ N; 10^M pr. 15^s, $6'$ S.

7456. Disc. by ESPIN, 1888; conf. by CHANDLER, 1888; YENDELL, 1890.

7459. Disc. by SCHMIDT, 1864. Period about one year, by SCHMIDT's obsns. Light-variations exceedingly small, and for the most part unnoticeable. Variability not sufficiently confirmed to be regarded as certain.

7468. Disc. by GOLDSCHMIDT, 1861.

7483. Disc. by SAWYER, 1885; conf. by CHANDLER. Elements practically but not strictly definitive.

7488. Disc. by CHANDLER, 1886; conf. by SAWYER. *Algol*-type. The extraordinary anomalies signalized in *A.J.* VIII, 130 and IX, 92 are explained by DUNÉR *A.J.* XII, 1, whose elements are adopted in the Catalogue. DUNÉR gives also the additional term $\pm 2^s.2$ (E-792), where upper sign is for even epochs, lower for odd. CHANDLER found brightness at min. to be variable, and YENDELL's obsns. confirm. Light-oscillations occupy about 8 hours.

7560. Disc. at Bonn, 1858. $9^M.5$ foll. 6^s, $0'.3$ N.

7571. Disc. by PETERS, 1867; conf. by PARKHURST. For stars of identification see *A.N.* 109; 121.

7577. Disc. by PETERS, 1872; conf. by PARKHURST. For stars of identification see *A.N.* 109; 122.

7609. Disc. by CERASKI, 1878; conf. by KNOTT.

7659. Disc. by HIND, 1854. 9^M pr. 5^s, $3'.9$ N.

7733. Disc. by PETERS, 1884; conf. by PARKHURST. Period may perhaps be 412^d, or double that of the Catalogue.

7754. Disc. by GORE, 1885; conf. by SAWYER.

7779. Disc. by HENCKE, 1858. Light-curve flat at max.

7783. Susp. by ESPIN, 1890; proved by YENDELL and REED.

7787. Disc. by SCHMIDT, 1876.

7795. Disc. by SAFARIK, 1885, and independently by YENDELL, 1892; conf. by SAWYER and PARKHURST. YENDELL thinks period is about 470^d.

7803. Susp. by HIND, 1848; conf. by ARGELANDER. ARGELANDER's period of 432^d not borne out by SCHMIDT's and other obsns.

7907. Disc. by PETERS, 1881; conf. by PARKHURST.

7909. Susp. by WEISS; proved by HOLETSCHEK, 1890.

7944. Disc. by HIND, 1863. 11^M pr. 13^s, $1'.5$ N. R.A. of DM. is 6^s too small.

7994. Disc. by GOULD, 1884.

8068. Susp. by FLEMING, 1891; proved by REED, 1893.

8073. Disc. by GOODRICKE, 1784. The variation of the period indicated by the elements is certain.

8093. Disc. by GOULD, 1884.

8153. Disc. by DEICHMÜLLER, 1883; conf. by CHANDLER. Increase from 13^M to 10^M very rapid. $9^M.3$ foll. 20^s, $2'.8$ N; 11^M foll. 7^s, $2'.8$ N; 11^M pr. 13^s, $2'.5$ N.

8230. Disc. by ARGELANDER, 1853. Decrease from 10^M rapid. $7^M.5$ foll. 31^s, $4'$ N; 10^M foll. 9^s, $3'$ S.

8273. Disc. by SCHMIDT, 1847. ARGELANDER found period 41 days; SCHÖNFELD thinks irregular oscillations, in period of 30–50 days, more probable.

8290. Disc. by HIND, 1848. 11^M foll. 10^s, $0'.2$ N; $10^M.5$ pr. 9^s, $3'$ N.

8373. Disc by MARTH, 1864 (?). No faint stars near, and identification easy. Increase from 11^M rather slow.

8512. Disc. by HARDING, 1811. Identification easy. Increase from 10^M quite rapid.

8588. Disc. by GOULD, 1884.

8591. Disc. by CHANDLER, 1882; conf. by YENDELL and SAWYER.

8597. Disc. by PETERS, 1879; conf. by PARKHURST. For stars of identification, see *A.N.* 109, 123.

8600. Disc. by POGSON, 1853. 10^M pr. $0^s.5$, $0'.6$ N.

LIST OF UNCONFIRMED STARS.

The following list is to a certain extent heterogeneous, and makes no pretension to completeness; that is, it by no means contains all the stars which, even in the last few years, have been alleged to be variable. It may be best described as a list of stars whose variations are plausible, at least, and therefore which require the attention of observers. No personal opinion is implied, or should be inferred, as to the variability of the stars, from the selection of these objects. There is no doubt that many of them are variable, and that some of them are not. Of the former class may be mentioned those of GOULD and SAWYER, whose critical authority is not open to question. In this connection it may be mentioned that six of the variables of the *Uranometria Argentina*, excluded from the First Catalogue, merely for want of independent verification, have been since confirmed, and will be found in the preceding Catalogue.

With regard to ESPIN's and FLEMING's stars, a watch by independent observers shows yet no trace of variation in many of them. I do not presume to account for this fact, but mention it as a justification for adhering to the rules, even while there is reason to regard the variability of many of them as highly probable. Similarly, the particularity of the evidence adduced by ROBERTS for several of his stars, — including apparently well-determined periods, — would seem

to entitle the results of this industrious observer to confidence. The number of variables of short period announced by him, within such a limited time, is in every respect remarkable.

Observers may be embarrassed in identifying some of the stars by means of the positions here given. In many cases discordant data have been published in different places by the original observer; the differences sometimes amounting to several minutes of arc; for instance, (1018), (2141), (3055), (5174), (6275), (7139), (8499), (8594). It is hoped that this unfortunate want of care will disappear in future announcements. It has been assumed that the latest published positions are more nearly correct.

The list contains also four stars,—(1961), (6088), (6633), (7194), — which have heretofore appeared in the catalogues of known variables, but which subsequent observation has disproved, or rendered extremely doubtful.

No further explanation is needed, except that, in the column of remarks, the abbreviations Y., Pkt., R. and C., stand for YENDELL, PARKHURST, REED and CHANDLER.

No.	Star	1855.0 R.A.	1855.0 Decl.	Supposed limits	Observer	Remarks
		h m s	° ′	M M		
(294)	– Cassiopeae	0 46 21	+57 46.5	8.4– 9.5	Espin	
(571)	– Ceti	1 33 0	— 7 21.6	8.4– 9.2	Safarik	Period over 4 mos.?
(691)	– Persei	1 52 6	+56 2	9.3–15	Fleming	Y. and R. do not confirm. See note
(1018)	– Horologii	2 48 12	—50 32	6.2– 9.7	Fleming	
(1220)	– Camelopardalis	3 19 53	+58 1.6	8.5–10?	Espin	
(1279)	– Camelopardalis	29 23	+62 10.4	7.3– 8.8	Fleming	Y. and R. do not confirm
(1344)	– Persei	3 41 9	+35 16.7	9– ?	Kam	C. found it invis. 1888 Apr. and Aug.
(1636)	– Reticuli	4 32 3	—63 7.4	5.8– 6.4	?	R. says period probably long
(1662)	– Caelum	35 30	—38 31	7.5–10.5	Fleming	
(1709)	– Tauri	42 20	+15 31.7	8.0– 9.4	Espin	
(1745)	(R) Eridani	48 48	—16 39.3	5.4– 6.0	Gould	S's obsns. show no change
(1772)	(S) Eridani	53 11	—12 45.1	4.7– 5.7	Gould	S's " " " "
(1801)	– Camelopardalis	55 36	+68 18.7	7.8– ?	Espin	
(1805)	– Orionis	4 58 25	+ 3 54.1	9–11.5	Boss	
(1945)	– Orionis	5 21 48	— 4 49.1	10.9–13<	Safarik	Near *S Orionis*
(1948)	31 Orionis	22 22	— 1 11.7	4.7– 6	Gould	Gore's obsns. app. conf.; Y's do not
(1961)	δ Orionis	24 36	— 0 24.6	2.2– 2.7		See note
(1988)	– Orionis	29 –	— 5 34	. .		See note
(2170)	– Leporis	5 59 47	—24 11.1	6.7– 7.5	Sawyer	Period 69^d. See note
(2141)	– Octantis	6 10 33	—86 25.7	7.4–<11.3	Fleming	
(2305)	– Lyncis	20 14	+58 50.6	7.5– 9	Kreutz	C. and Y. do not yet confirm
(2445)	– Monocerotis	6 45 17	— 6 58.2	8.8–10?	Espin	
(2659)	– Canis Majoris	7 21 3	—11 15.9	6.3	Espin	S., Y. and C. find star constant
(2741)	(R) Puppis	35 15	—31 19.6	6.5– 7.5	Gould	S. and C. find no certain var.
(2788)	(T) Puppis	7 43 11	—40 17.5	6.5– 7.2	Gould	
(2903)	– Cancri	8 1 16	+19 50.0	9.7– ?	Peters	Pkt. and C. cannot yet confirm
(3055)	– Carinae	28 8	—58 44.1	7.2– 8.0	Roberts	Period $6^d.66$. See note
(3087)	– Velorum	32 58	—46 51.3	7.5– 8.5	Roberts	Period $4^d.6$
(3197)	– Cancri	8 50 23	+11 23.4	8.5– 9.3?	Baxendell, jr.	
(3355)	– Carinae	9 17 53	—55 20.5	7.5– 8.5	Roberts	Period $4^d.38$
(3614)	(R) Velorum	10 0 42	—51 29.0	6.5– 7.5	Gould	
(3911)	– Carinae	10 51 54	—58 27.4	6.7– 8.5	Roberts	Elements, 1892 Feb. 1 + $38^d.6$ E
(4364)	– Muscae	12 5 1	—69 20.7	6.5– 7.3	Roberts	Elements, 1892 Jan. 3.6 + $9^d.66$ E
(4429)	– Crucis	15 42	—60 49.5	6.8– 8.0	Roberts	Elements, 1891 Dec. 25 + $5^d.827$E
(4435)	– Centauri	16 48	—48 38.2	6– ?	Pickering	
(4495)	β Corvi	26 47	—22 35.7	. .	Gould and Sawyer.	See note
(4611)	– Crucis	12 45 49	—57 38.5	6.8– 7.6	Roberts	Elements, 1892 Jan. 2.4 + 4.84 E
(4856)	– Virginis	13 26 58	—12 28.0	5.5– 6.5	Schmidt	*U.A.* obsns. confirm.; S's do not
(4905)	– Canum Venat.	13 35 29	+29 6.7	. .	Pickering	20″ S. of center of neb. G.C. 3636
(5076)	– Bootis	14 3 55	+10 30.1	8.7–12	Pogson	

No.	Star	1855.0 R.A.	1855.0 Decl.	Supposed limits	Observer	Remarks
		h m s	° ′	M M		
(5174)	– Virginis	14 20 15	+ 5 19.3	8.2–10.7	Fleming	See note
(5481)	– Librae	15 11 15	+ 2 36.9	9.5–12	Packer	See note
(5511)	– Librae	15 53	—22 24.2	8.4–<11	Fleming	
(5626)	– Librae	15 35 17	—10 27.7	7.0– 8.8	Weisse	Per. about 4 mos. C's obsns. favor
(5823)	– Normae	16 6 52	—57 32.1	6.5– 7.4	Roberts	Period $9^d.75$
(5949)	– Arae	27 43	—56 41.8	6.9– 8.0	Roberts	Period $4^d.422$
(6050)	– Scorpii	45 7	—44 51.6	7–11.4	Fleming	
(6088)	(V)Herculis	16 52 58	+35 17.4	9.5–11.7	Baxendell	Removed from Catal. See note
(6275)	– Octantis	17 6 17	—86 43.1	8.2–<11.7	Fleming	
(6470)	– Ophiuchi	17 56 7	+ 2 30.5	8.2– 8.8	Safarik	Period $58^d.2$
(6502)	*o* Herculis	18 1 54	+28 44.4	3.4– 3.8	Schwab	See note
(6546)	– Sagittarii	8 0	—34 9.1	6.2– 7.4	Gould	
(6633)	(V)Sagittarii	22 54	—18 21.5	7.6– 8.8	Quirling	Removed from Catal See note
(6749)	– Scuti	18 42 28	— 8 1.0	7.1– 9.5	Birmingham	C's obsns. favor
(6915)	– Sagittarii	19 9 53	—19 19.4	9.4–10.1	Safarik	Near *S Sagittarii*
(6943)	– Sagittae	15 13	+17 23.1	8.3– 9.9	Espin	Y's and C's obsns. favor somewhat
(7010)	– Sagittae	26 15	+17 26.0	6.3–<13	Chandler	See note
(7020)	– Sagittarii	27 13	—25 2.0	5.2– 6.7	Gould	S's few obsns. do not confirm
(7139)	– Sagittarii	46 54	—29 34.0	7.5–<12.6	Fleming	
(7151)	– Sagittarii	48 34	—42 13.9	8–<12.6	Fleming	
(7182)	– Cygni	55 18	+30 25.6	9– ?	Espin	
(7205)	– Cygni	19 59 6	+36 24.8	8.0– 9.2	Espin	
(7240)	– Cygni	20 4 55	+35 31.0	8.5– 9.5	Espin	
(7238)	– Cygni	5 3	+47 25.4	7.7– 8.9	Espin	C's obsns. do not confirm
(7264)	– Sagittarii	7 42	—39 33	7.7–10.7	Fleming	
(7268)	– Capricorni	8 37	—21 45.6	7.0– 7.7	Safarik	Secchi and Gore also suspect
(7280)	– Cygni	11 45	+39 54.9	5.2– 8.0	Espin	Y's obsns. do not confirm
(7279)	– Cygni	11 53	+49 29.6	8.7– 9.6	Espin	
(7302)	– Capricorni	14 28	—16 28.2	10.4–<12	Pogson	
(7351)	– Cygni	23 34	+39 29.9	7.7– 9.2	Espin	Y's obsns. do not confirm
(7194)	(R)Cephei	34 37	+88 41.0	5?–10?	Pogson	Removed from Catal. See note
(7435)	– Cygni	37 50	+46 30.1	9.2–11.5	Espin	
(7450)	– Aquarii	39 30	+ 1 54.6	8.2– 9.0	DeBall	
(7452)	– Cygni	40 15	+40 33.7	9.5–11	Espin	
(7457)	– Aquarii	40 43	— 4 35.8	8.3– 9.6	Fleming	
(7458)	– Delphini	41 4	+18 48	9?–12?	Fleming	Y's obsns. do not yet confirm
(7481)	– Cygni	45 13	+33 57.1	7.9– 9.0	Yendell	
(7502)	– Vulpeculae	20 48 24	+27 30.5	4.9– 6.4	Yendell	
(7579)	$63 f_2$ Cygni	21 1 37	+47 3.9	4.7– 6.0	Espin	See note
(77·4)	– Cygni	21 35 46	+53 40.0	7.5– 9.0	Espin	
(8006)	– Cephei	22 12 44	+56 15.7	8.4– 9.5	Kreutz	
(8100)	– Cephei	28 3	+55 52.6	5.8– 6.8	Yendell	
(8104)	– Aquarii	28 17	— 8 20.8	9–11.5	Hind	See note
(8106)	– Pegasi	28 48	+ 8 14.0	9.5–<13	DeBall	
(8116)	– Cephei	22 30 56	+57 40.7	7.0– 8.0	Espin	"Period probably short"
(8499)	104 Aquarii	23 34 14	—18 37.2	4.7– 5.1	Jones	Period $19^d.6$. See note
(8528)	19 Piscium	39 0	+ 2 40.8	4.8– 6.0	Gould	See note
(8594)	– Tucanae	50 0	—66 11	10.2–<12.6	Fleming	
(8617)	– Cassiopeae	53 54	+59 33.1	8–9 ?	Secchi	See note
(5)	– Ceti	23 58 30	—15 14.3	6.5–9	Tacubaya Observatory	

NOTES TO LIST OF UNCONFIRMED STARS.

(691). The letter V, which at one time seemed justified (see *A.J.* XIII, 13), must be withheld for the present.

(1961). After careful consideration of all the facts, this star has been removed from the Catalogue. Neither SAWYER, YENDELL, nor CHANDLER finds the slightest variation, so that the star, even if variable at times within the range of accidental error of obsn., must belong to that large class of similar objects, which for the present do not seem to belong properly among the recognized variables.

(1988). There are several stars in the great nebula in *Orion*, which have been strongly suspected, or alleged to be variable. Only one of these, 1986 *T Orionis*, appears yet to have been sufficiently confirmed to enter into the Catalogue. SCHMIDT also found evidence of var. in B 746 and B 784; but my careful watch of these in 1883-84, resulted in no certain confirmation of their var. STONE has carefully observed the region for several years, and finds probable fluctuation in 575, 589, 622 and 647. He also confirms HOLDEN's suspicions as to 641. STONE also finds that the relative brightness of 612 and 618, and of 671 and 676, seems to be variable. But he finds 675 invariable.

(2170). The fact that SAWYER has never announced a star as variable which has not proved to be so, gives reason to regard the variability of this star as certain. But since it has not been observed by any one else, the letter must be withheld.

3055? This star cannot be certainly identified on account of diverse data given by ROBERTS, who identifies it with Lac. 3393 [(1855) $8^h\ 25^m\ 46^s$, —59° 38′.3], but also gives a chart putting it at about (1855) $8^h\ 26^m\pm$, —58° 40′±. On the other hand, the identification by PICKERING, *A.J.* XIII, 79, agrees with neither place, and seems improbable from the magnitude, 9, assigned in the *Cord. Z. Catal.* The singular confirmation by the H. C. O. photographs of the variation of a star apparently not the variable, is thus unaccounted for.

(4495). From GOULD's and SAWYER's evidence, the var. of β *Corvi*, by a magnitude, seems certain, but it seems best to await other confirmation, in so difficult a case, before inserting it in the Catalogue.

(5174). This star, which HARTWIG calls *W Bootis*, is not in *Bootes*, but in *Virgo* (see *A.J.* XIII, 13), nor has its variation been yet confirmed, to my knowledge.

(5481). PACKER says two stars in 5 *M. Librae* are variable. For description and particulars, see *A.N.* 125, 157.

(6088). This star has been taken out of the Catalogue. It was inserted as *V Herculis*, in one of the *V.J.S.* ephemerides many years ago, but I know of no evidence of var. beyond a single obsn. of BAXENDELL. On the other hand, in a continuous watch of it for two years, and occasionally in other years, I found its light absolutely constant. PARKHURST's obsns. give equally good evidence to the same effect; and YENDELL's also lead to the same conclusion.

(6502). SCHWAB in 1878 thought variable by $0^M.3$ or $0^M.4$, in period of $6\frac{1}{2}$ days. CHANDLER several years previously had thought the relative difference between *o* and ξ *Herculis* to be variable. OUDEMANS had also noticed that the difference between θ and *o* was different from that assigned by ARGELANDER's obsns. HAGEN, also, thought *o* slightly var. See, too, WOLFF's *Photom Unters.* and SAFARIK's remarks, *V.J.S.* XVII, 93.

(6633). Removed from the Catalogue for the reasons given in the note to (1961), which apply here equally.

(7010). I have given the evidence which, it seems to me, render the variability almost certain, in the *Science Observer*, Nos. 43-44, Vol. IV. It lies $0^s.7$ foll, north 2′.2, DM. +17.3997. I have looked for it at least fifty times unsuccessfully, when it must have been below 13.

(7194). Removed from the Catalogue for the same reasons as given for (1961) and (6633).

(7458). HARTWIG calls this star *U Delphini*. But; even if its variation be confirmed, this is a wrong designation, for there is already a star bearing this letter. See supplement to 1st Catalogue, *A.J.* no. 216.

(7579). ESPIN alleges as variable from 4.7 to 6.0, in long or irregular period; but my observations, some of them nearly coincident in date with his, contradict them and give no support to the idea of fluctuation. SAWYER also thinks the star is constant. It is very red and difficult to observe.

(8104). Suspected by HIND, having been estimated by him as $9^M.5$, but generally as 11^M. ARGELANDER thought it not variable, but SCHÖNFELD was inclined to think var. not improbable. KNOTT's observations in 1884 gave $11^M.7$. My observations too few to decide.

(8499). JONES of Haverford College observed several max. and min. giving the period $19^d.6$. From the place he gives, there remains a doubt whether the star observed was 103 or 104 *A Aquarii*.

(8528). GOULD was inclined to suspect variability, and obsns. of GORE, ESPIN and MARKWICK seem to favor. SAWYER's and mine do not confirm, and I am strongly of the opinion that the red color is reponsible for much, if not all, of the observed contradiction in the estimates.

(8617). SECCHI marked this as "var.?" My own obsns. in 1875 led me independently to suspect it, at first; but I afterwards concluded that the trouble lay entirely in the difficulty of estimating properly this very red star so close to a bluish companion.

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