

FIVE-YEAR CATALOGUE
OF
258 FUNDAMENTAL STARS,
DEDUCED FROM
OBSERVATIONS
EXTENDING FROM 1887 TO 1891,
MADE AT THE
ROYAL OBSERVATORY, GREENWICH,
UNDER THE DIRECTION OF
WILLIAM HENRY MAHONEY CHRISTIE, M.A., F.R.S.,
ASTRONOMER ROYAL,
REDUCED TO THE EPOCH
18 90·0.

(Forming Appendix to the Greenwich Observations for the Year 1891.)

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INTRODUCTION

TO THE

GREENWICH FIVE-YEAR CATALOGUE

OF

258 FUNDAMENTAL STARS,

DEDUCED FROM OBSERVATIONS EXTENDING FROM 1887 TO 1891,
AND REDUCED TO THE EPOCH

1890.0.

This Catalogue has been formed to supply revised places of Fundamental Stars, available for determination of instrumental and clock errors, and for use in the Nautical Almanac, in the interval between two successive Greenwich General Catalogues, which it is proposed to form at intervals of ten years, so that a sufficient number of observations of each star may be accumulated. In the case of the Fundamental Stars, however, there are usually a sufficient number of observations in the course of five years to give trustworthy positions, and it has, therefore, been thought advisable, in view of possible uncertainty of proper motion when applied for more than ten years, to publish the present provisional Catalogue of Fundamental Stars based on the five years' observations 1887-1891, strengthened, where necessary, by combining with them the places of the Ten-Year Catalogue (1880.0).

The stars whose places are given in this Catalogue are—

1. Those contained in the Greenwich Clock Star Lists.
2. Circumpolar stars whose Ephemerides are published in the "Connaissance des Temps," or in the "Éphémérides des Étoiles de Culmination Lunaire et de Longitude, par M. M. Loewy."
3. Stars in the Nautical Almanac, but not in the Greenwich Clock Star Lists.

The following is the process of formation of the star places in this Catalogue.

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I.—FORMATION OF RIGHT ASCENSIONS.

The determinations of Right Ascension of each star, which are to be combined in order to form the Right Ascensions in this Catalogue, are those given in the Annual Catalogues printed in the successive volumes of Greenwich Observations from 1887 to 1891.

The Right Ascensions of each Annual Catalogue depend essentially upon the Right Ascensions assumed for the stars whose transits are employed in each year to ascertain the errors of the Transit-Clock; it is necessary, therefore, in the first instance to ascertain the amount of correction required for the assumed Right Ascensions of the Clock Stars. Now it appears from the discussions of the Observations for the Position of the Ecliptic in the Greenwich Observations 1887–1891, that the Right Ascensions of the Clock Stars used in those years require the following corrections:—

1887	...	^{s.} − 0 ^h 059.
1888	...	+ 0 ^h 072.
1889	...	+ 0 ^h 024.
1890	...	+ 0 ^h 092.
1891	...	+ 0 ^h 088.

The mean of these is + 0^h043; but it was considered advisable to wait for further information before making such a large correction to the Right Ascensions, and no correction for Epoch has therefore been applied to the Right Ascensions taken from the Greenwich Observations 1887 to 1891. The present Catalogue is thus referred to the Epoch of the Standard Right Ascensions of the Ten-Year Catalogue (1880.0); and also of the Nine-Year Catalogue (1872.0); for it is shown on page 9 of the Introduction to the former, that the mean difference between the two sets of Standard Right Ascensions is only 0^s.0001, which is practically insensible. It should be remarked that the Mean R.A.'s of Clock Stars used during 1887 and 1888 were taken from the Standard R.A.'s of the Nine-Year Catalogue; during 1889, 1890, and 1891, from those of the Ten-Year Catalogue.

The results for the separate years as given in the Annual Catalogues were reduced to 1890.0 by using the elements given in the Ten-Year Catalogue, where Struve's Constant of Precession, and Prof. Auwers' Proper Motions are used. In the case of Sirius and Procyon, corrections for orbital motion deduced from Prof. Auwers' Papers (Publ. Astr. Gesellschaft, No. VII., and Astr. Nachr., Nos. 1373 and 3085) have been applied to the separate years in forming the Mean R.A. 1890.0.

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A separate determination of the Right Ascensions of Clock Stars was made in which only those observations were included where the group of Clock Stars extended over 12 hours at least, in a similar manner precisely to that described in the Introductions to the Nine-Year and Ten-Year Catalogues, though the number of such groups is, of course, not so large. The excess of R.A. from the 12-hour groups above that of the Five-Year Catalogue was tabulated for each star and the mean formed for each hour of R.A. by combining the individual excesses with weights $= \frac{m n}{m + n}$, where m and n are the numbers of observations in the Twelve-Hour Groups, and in the Catalogue respectively. Similarly the corrections to the R.A.'s of the Five-Year Catalogue, as depending on the N.P.D. of the star, were formed for each 10° of N.P.D. Both sets of corrections are given in the following tables, the Resultant Corrections applicable to the R.A.'s of the Five-Year Catalogue being the algebraic sums of the two. The mean of all the corrections is less than $-.0005$, and though it enters into both sets, no sensible error is thus introduced by adding the two sets together.

MEAN CORRECTIONS TO RIGHT ASCENSIONS OF FIVE-YEAR CATALOGUE,
DERIVED FROM A COMPARISON WITH R.A.'s OF 204 CLOCK STARS FROM
12-HOUR GROUPS.

Limits of R.A.	Correction.	Weight.	Limits of R.A.	Correction.	Weight.	Limits of R.A.	Correction.	Weight.	Limits of N.P.D.	Correc- tion.	Weight.
^h ^h 0-1	^s ^s + ^s .010± ^s .005	48	^h ^h 8-9	^s ^s - ^s .015± ^s .007	23	^h ^h 16-17	^s ^s + ^s .005± ^s .007	30	[°] [°] 50-60	^s ^s - ^s .002	67
1-2	- ^s .007± ^s .005	56	9-10	- ^s .009± ^s .008	20	17-18	- ^s .005± ^s .005	44	60-70	+ ^s .002	176
2-3	- ^s .002± ^s .005	45	10-11	- ^s .009± ^s .007	26	18-19	- ^s .001± ^s .004	63	70-80	' ^s .000	192
3-4	- ^s .005± ^s .006	33	11-12	+ ^s .012± ^s .009	16	19-20	+ ^s .002± ^s .004	68	80-90	- ^s .003	221
4-5	- ^s .001± ^s .005	47	12-13	+ ^s .005± ^s .008	20	20-21	+ ^s .014± ^s .006	37	90-100	- ^s .001	146
5-6	+ ^s .010± ^s .006	32	13-14	- ^s .004± ^s .005	46	21-22	- ^s .010± ^s .006	36	100-110	- ^s .001	80
6-7	+ ^s .010± ^s .006	35	14-15	- ^s .005± ^s .006	37	22-23	' ^s .000± ^s .005	53	110-124	+ ^s .006	35
7-8	- ^s .011± ^s .006	39	15-16	+ ^s .002± ^s .006	32	23-24	+ ^s .002± ^s .006	31			

The probable errors appended with the sign $\pm$ have been computed by taking the probable error of a single determination of R.A. as $\pm 0^s.034$.

It appears that the errors of the assumed places of the Clock Stars, originally derived from Pond's Catalogue, have been greatly diminished and are now very small.

II.—FORMATION OF MEAN NORTH POLAR DISTANCES.

The determinations of N.P.D. of each star, which are to be combined in order to form the N.P.D. in this Catalogue, are those given in the Annual Catalogues printed in the successive volumes of Greenwich Observations, 1887 to 1891, to which the sam

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statements apply generally as have been made for R.A., omitting all that relates to Correction for Equinox. The adopted colatitude is $38^{\circ} 31' 21'' \cdot 90$ throughout. The corrections required for orbital motion, in the case of Sirius and Procyon, have been deduced from Prof. Auwers' papers referred to before.

III.—EXPLANATION OF THE SEPARATE COLUMNS OF THE PRINTED CATALOGUE.

The "No." is the ordinal number of this Catalogue, the stars being arranged in order of R.A. 1890·0.

The "Star's Name" is taken from one of the following authorities, the order of preference being the order of mention of the authority below :—

1. Flamsteed's Constellation No. and Constellation, with Bayer's Letter, taken from Baily's Edition of Flamsteed, or the British Association Catalogue.
2. The No. in Bessel's *Fundamenta Astronomiæ* deduced from Bradley's Observations, referred to as "Bradley."
3. The Hour and No. in Piazzi's Catalogue, Edition 1814.
4. The No. in Groombridge's Catalogue.

For Circumpolar Stars the result of observations below the pole is shown separately.

The "Magnitude" is taken from the *Harvard Photometry* for stars contained in that work, and for other stars (marked *) from the *Bonn Durchmusterung*. The magnitude in the *Uranometria Nova Oxoniensis* is given in the Notes for all cases in which it differs by more than 0·2 magnitude from that in the *Harvard Photometry*. The magnitudes of the components of double stars, taken from Struve's *Mensuræ Micrometricæ* or other authority, are given in the Notes. In the case of Variable Stars, the limits of magnitude and the period given in the Notes are taken from Mr. Chandler's Catalogue in the *Astronomical Journal*, Nos. 179, 180.

The next six columns consist of three pairs, the first of each pair referring to the observations in 1887–1891, immediately under discussion, and the second to the Ten-Year Catalogue.

The first pair gives the "Mean Date" expressed in years and decimals of a year reckoned from 1800.

The second pair (columns 6 and 7) gives the "Number of Observations," being the aggregate of all the observations in the different years, above and below the Pole respectively, in column 6, and the aggregate of all observations in column 7.

The third pair (columns 8 and 9) gives the seconds of Mean R.A. formed in the manner already described.

In forming the adopted Mean R.A. 1890.0 the following rules have been observed :—

(1.) In all cases where the total number of observations in the years 1887–1891 is ten or more, the mean of these observations is the adopted Mean R.A., equal weight being assigned to observations above and below the Pole.

(2.) When there are five to nine observations in the period 1887–1891, the adopted Mean R.A. is formed by combining these with the result brought up from the Ten-Year Catalogue, *giving weight $\frac{1}{4}$ to each observation in the latter.*

(3.) When there are less than five observations in the period 1887–1891, *weight $\frac{1}{2}$ is given to each observation in the Ten-Year Catalogue in combining the two means.*

Assuming that there are on the average twice as many observations of a star in the Ten-Year Catalogue as in the Five-Year Catalogue, this is equivalent to giving the Ten-Year Catalogue weight $\frac{1}{2}$ on the average when there are from five to nine observations in the Five-Year Catalogue, and to taking the simple mean between the Five-Year and Ten-Year (on the average) when there are less than five observations in the former. If we assume that the probable error of one observation of R.A. is $\pm 0^s.034$, and that the Ten-Year Catalogue deduced place for 1890.0 is affected by a probable error of proper motion, or other systematic error represented by x , and express the condition that the result of seven observations in the Five-Year Catalogue should have double the weight of 14 observations in the Ten-Year Catalogue; then $x = \pm 0^s.016$; or the method of combination adopted is equivalent to assuming that the results of the Ten-Year Catalogue reduced to 1890.0 are affected by a probable error of proper motion or other systematic error amounting to $\pm 0^s.016$.

The "Annual Precession 1890.0" for stars beyond 5° from the Pole has been formed by applying to the Precession in the Ten-Year Catalogue the proportional part of the "Secular Variation 1880.0" to reduce it to 1890.0.

The "Secular Variation 1890.0" is the same as that given in the Ten-Year Catalogue, except for stars within 5° of the Pole. For these latter stars both the Annual

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Precession and the Secular Variation have been computed by the help of Folie's "Douze Tables pour le calcul des reductions stellaires," in which Struve's Constant of Precession is used. The Precession is given by the formula—

$$3^{\circ}0725 + 1^{\circ}3369 [\log. = 0^{\circ}12611] \sin R.A. \cot. N.P.D.$$

and the Secular Variation by the formula—

$$A + B \cot. N.P.D. + C \cot.^2 N.P.D.$$

where—

$$A = 0^{\circ}00190 + 0^{\circ}00650 \sin 2 R.A.$$

$$B = - 0^{\circ}00057 \sin R.A. + 0^{\circ}02987 \cos. R.A.$$

$$C = + 0^{\circ}01300 \sin 2 R.A.$$

The second term of the precession is readily computed from these tables, and the quantities A, B, C, are therein tabulated for every minute of R.A. These formulæ correspond essentially with those used in previous Catalogues, but the method of computation is simpler.

The "Annual Proper Motion 1890.0" has been taken from Prof. Auwers' "Neue Reduction der Bradleyschen Beobachtungen," or his "Catalog der Fundamental Sterne," for stars contained in either of those works. The authority for other Proper Motions is given in the Notes.

To the columns relating to N.P.D. the same remarks generally apply as in the case of R.A., except that in combining observations above and below Pole the weights mentioned below were used in forming the means. For stars whose N.P.D. does not exceed 15° the observations above and below Pole are considered equally good; from N.P.D. 15° to N.P.D. 36° , those below Pole have the weight $\frac{2}{3}$ for each observation; from N.P.D. 36° to N.P.D. 41° those below Pole have the weight $\frac{1}{2}$; beyond 41° N.P.D. the observations below Pole are not used, and in the case of those stars observed below Pole only the mean result is enclosed within brackets.

The Annual Precession and Secular Variation for stars not within 5° of the Pole have been formed as explained above; for the stars within 5° of the Pole they have

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been computed by the help of Folie's Tables referred to above. The Precession is given by the formula—

$$- 20''.0530 \cos R.A.$$

which is taken directly from the Tables, and the Secular Variation by the formula—

$$A^1 + B^1 \cot. N.P.D.$$

where—

$$A^1 = + 0''.0086 \cos R.A. + 0''.4480 \sin R.A.$$

$$B^1 = + 0''.1950 \sin^2 R.A.$$

The quantities A^1 and B^1 are given directly in the Tables for every minute of R.A.

IV.—COMPARISON OF THE PLACES OF CLOCK-STARS IN R.A. AND N.P.D. FROM OBSERVATIONS MADE IN THE YEARS 1887–1891 WITH THOSE OF THE TEN-YEAR CATALOGUE.

The following tables give the mean excess of R.A. and N.P.D. from the Five-Year Catalogue over those deduced from the Ten-Year Catalogue, for each hour of R.A., and for every 10° of N.P.D., weights being assigned to the individual excesses according to the formula $\frac{mn}{m+n}$, where m and n are the numbers of observations in the two Catalogues respectively.

EXCESS OF R.A.'s OF CLOCK STARS FROM FIVE-YEAR CATALOGUE ABOVE THOSE OF THE TEN-YEAR CATALOGUE REDUCED TO 1890.0 FOR EVERY HOUR OF R.A. AND EVERY 10° OF N.P.D.

Limits of R.A.	Correction.	Weight	Limits of R.A.	Correction.	Weight	Limits of R.A.	Correction.	Weight	Limits of N.P.D.	Correction.	Weight.
^h ^m 0-1	+ '005 ± '003	147	^h ^m 8-9	- '014 ± '005	55	^h ^m 16-17	- '008 ± '004	74	^o ['] 50-60	+ '005	156
1-2	'000 ± '003	133	9-10	- '006 ± '004	68	17-18	- '009 ± '003	95	60-70	+ '001	461
2-3	+ '005 ± '003	111	10-11	+ '007 ± '004	87	18-19	+ '003 ± '003	150	70-80	'000	525
3-4	- '007 ± '003	95	11-12	- '005 ± '004	74	19-20	+ '006 ± '003	157	80-90	+ '001	601
4-5	'000 ± '004	88	12-13	+ '004 ± '004	75	20-21	+ '004 ± '003	109	90-100	- '005	339
5-6	+ '004 ± '004	87	13-14	+ '001 ± '003	117	21-22	- '010 ± '004	90	100-110	- '002	227
6-7	- '002 ± '003	99	14-15	+ '008 ± '004	89	22-23	- '016 ± '003	125	110-124	- '006	89
7-8	+ '001 ± '003	107	15-16	'000 ± '004	87	23-24	+ '002 ± '004	79			

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EXCESS OF N.P.D.'s OF 211 CLOCK STARS FROM FIVE-YEAR CATALOGUE ABOVE THOSE OF THE TEN-YEAR CATALOGUE REDUCED TO 1890-0 FOR EVERY HOUR OF R.A. AND EVERY 10° OF N.P.D.

Limits of R.A.	Correction.	Weight.	Limits of R.A.	Correction.	Weight.	Limits of R.A.	Correction.	Weight.	Limits of N.P.D.	Correction.	Weight.
^h 0-1	-0°09	113	^h 8-9	+0°13	47	^h 16-17	+0°13	87	50-60	+0°13	137
1-2	0°00	90	9-10	-0°04	74	17-18	-0°22	130	60-70	-0°18	407
2-3	-0°14	91	10-11	-0°09	78	18-19	+0°12	148	70-80	-0°09	499
3-4	-0°18	76	11-12	+0°03	93	19-20	-0°07	147	80-90	-0°04	531
4-5	-0°15	64	12-13	-0°05	66	20-21	-0°10	93	90-100	-0°02	327
5-6	-0°29	65	13-14	+0°11	96	21-22	-0°13	84	100-110	+0°01	205
6-7	-0°15	79	14-15	+0°05	129	22-23	-0°20	103	110-124	+0°13	79
7-8	+0°05	81	15-16	0°00	94	23-24	-0°07	57			

V.- COMPARISON OF THE PLACES OF CIRCUMPOLAR STARS AS OBSERVED ABOVE AND BELOW THE POLE FROM OBSERVATIONS MADE IN THE YEARS 1887-1891.

The following tables show the mean excess of R.A. and of N.P.D. above Pole for all stars in the Five-Year Catalogue, of which observations were made both above and below the Pole. The star is designated by its No. taken from the Five-Year Catalogue. The figures on the same line as the No. refer to the observations above the Pole, those on the next line to the observations below. The excess of R.A. is multiplied by $\sin N.P.D.$ in all cases, to reduce it to equatorial interval. The weights assigned to each star are computed as follows:—For R.A. if m and n be the number of observations above and below the Pole respectively, the weight assigned is $\frac{4mn}{m+n+\frac{1}{5}mn}$. The maximum weight for any star is thus 20, which corresponds to an infinite number of observations above and below the Pole, and the expression is equivalent to that for N.P.D. for stars at about 30° from the Pole. For N.P.D. the weights used are determined by use of the "Probable Errors of Greenwich Observations in Zenith Distance," given by Mr. Stone in the *Monthly Notices of the Royal Astronomical Society* for 1869 June 11, page 324. Putting n for the number of observations of a star above Pole, e for the probable error of one observation; n_1 and e_1 the similar quantities for the observations below Pole; e_0 the probable systematic error affecting all observations of the same star, and depending on outstanding division error, uncertainty in the constant of refraction, &c.; the formula employed to determine the

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weight to be given to that star is $\frac{2nn_1}{n_1e^2 + ne_1^2 + 2nn_1e_0^2}$, or assuming $e_0^2 = \frac{1}{10}e^2$, which would make $e_0 = 0''\cdot16$, the weight becomes $\frac{2nn_1}{n_1e^2 + ne_1^2 + \frac{1}{5}nn_1e^2}$, which has been adopted for use in this investigation.

TABLE OF THE EXCESS OF MEAN R.A. AND MEAN N.P.D. ABOVE POLE, ARRANGED IN ORDER OF RIGHT ASCENSION.

Star's No.	Mean R.A. 1890°.	Mean Date, 1800 +	No. of Obs.	Excess of R.A. above Pole $\times \sin$ N.P.D.	Weight.	Mean N.P.D. 1890°.	Mean Date, 1800 +	No. of Obs.	Excess of N.P.D. above Pole.	Weight.
	h m s			s		° ' "			"	
7	0. 34. 16'000	89'31	2	+ 0'033	4	34. 3. 58'28	89'81	3	- 0'79	5
	15'940	89'98	3			59'07	89'98	3		
12	0. 53. 48'194	89'83	34	+ 0'003	16	4. 20. 0'21	89'66	35	- 0'21	29
	48'153	90'13	38			0'42	90'25	34		
16	1. 18. 30'679	89'25	230	0'000	19	1. 16. 41'30	89'47	296	- 0'46	38
	30'680	89'48	224			41'76	89'53	330		
22	1. 46. 28'909	91'36	3	- 0'019	3	26. 52. 19'50	91'51	4	+ 1'04	6
	28'952	91'45	1			18'46	90'77	3		
37	3. 16. 28'097	91'00	2	- 0'068	2	40. 31. 51'36	91'00	2	- 0'15	1
	28'202	88'35	1			51'51	88'35	1		
46	4. 2. 13'562	90'24	34	+ 0'027	16	4. 44. 8'37	90'59	13	- 0'49	25
	13'233	90'35	47			8'86	90'35	47		
56	5. 8. 33'578	91'38	3	- 0'188	5	44. 6. 53'93	91'08	2	+ 0'06	2
	33'847	88'12	3			53'87	88'12	3		
76	6. 48. 46'624	89'84	25	+ 0'031	15	2. 46. 54'40	89'38	88	- 0'48	36
	46'016	89'10	46			54'88	89'49	177		
90	7. 46. 51'175	90'30	49	- 0'009	17	1. 2. 25'81	90'13	36	- 0'50	32
	51'670	90'48	104			26'31	90'56	79		
98	8. 51. 40'489	88'19	3	- 0'010	3	41. 31. 37'22	88'19	3	- 1'77	1
	40'504	87'64	1			38'99	87'64	1		
102	9. 21. 21'791	89'92	19	+ 0'016	13	8. 11. 17'96	89'97	23	+ 0'18	25
	21'678	90'88	15			17'78	90'90	22		
117	10. 56. 56'212	89'61	3	- 0'010	4	27. 39. 19'64	89'40	8	- 0'52	5
	56'233	89'80	2			20'16	89'80	2		
122	11. 24. 52'078	88'37	1	- 0'045	3	20. 3. 43'30	89'32	8	+ 0'67	14
	52'208	89'80	3			42'63	89'80	9		
126	11. 48. 2'563	90'31	5	- 0'025	4	35. 41. 37'28	90'31	5	0'00	4
	2'611	91'30	2			37'28	91'30	2		
131	12. 14. 22'157	90'07	48	+ 0'039	17	1. 41. 24'97	90'09	41	- 0'48	31
	20'815	89'96	54			25'45	89'89	44		
151	14. 1. 24'558	88'01	5	- 0'050	5	25. 5. 53'86	87'78	14	+ 0'03	15
	24'776	90'69	3			53'83	89'27	9		
159						15. 23. 41'61	89'40	17	- 0'53	11
						42'14	88'93	4		
164	15. 12. 50'203	90'24	53	+ 0'032	16	2. 20. 41'43	90'17	43	- 0'11	28
	49'427	90'47	30			41'54	90'45	22		
170	15. 47. 59'665	89'22	4	- 0'057	6	11. 52. 2'60	89'46	12	+ 0'27	15
	59'942	88'78	4			2'33	89'01	7		
175						28. 14. 12'29	88'36	3	+ 0'51	4
						11'78	90'88	2		

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TABLE OF THE EXCESS OF MEAN R.A. AND MEAN N.P.D., &c.—*continued*.

Star's No.	Mean R.A. 1890°.	Mean Date, 1800 +	No. of Obs.	Excess of R.A. above Pole $\times \sin$ N.P.D.	Weight.	Mean N.P.D. 1890°.	Mean Date, 1800 +	No. of Obs.	Excess of N.P.D. above Pole.	Weight.
182	^h 16. ^m 57. ^s 14.900	87.94	3	— 0.100	4	7. 46. 57.53	89.32	19		
	15.639	91.03	2			57.06	89.40	6	+ 0.47	16
187	17. 27. 56.806	88.53	8	+ 0.060	3	37. 37. 1.39	88.47	8	+ 0.01	2
	56.708	87.96	1			1.38	87.96	1		
195	18. 7. 47.598	88.98	59	+ 0.015	16	3. 23. 17.92	89.32	171	— 0.49	34
	47.321	90.03	30			18.41	89.26	61		
209	19. 33. 35.318	89.39	65	+ 0.029	15	1. 1. 59.02	89.29	145	— 0.49	35
	33.705	89.79	18			59.51	89.27	82		
220	20. 33. 44.984	90.04	59	— 0.044	15	8. 56. 24.06	89.97	65	— 0.12	28
	45.276	90.11	19			24.18	90.05	24		
230	21. 15. 57.172	89.21	10	+ 0.019	9	27. 52. 49.00	89.17	16	— 0.96	13
	57.131	88.71	8			49.96	88.83	8		
232	21. 21. 28.509	89.93	43	+ 0.030	11	3. 25. 9.19	89.92	28	— 0.75	17
	28.012	90.18	7			9.94	90.16	6		
234	21. 27. 14.281	88.92	2	— 0.059	4	19. 55. 19.51	88.77	6	+ 0.04	11
	14.455	89.82	3			19.47	90.09	6		
243	22. 21. 58.914	90.21	56	+ 0.006	16	4. 26. 45.09	89.94	36	— 0.52	25
	58.833	90.21	27			45.61	89.78	17		
253	23. 27. 49.643	90.23	56	+ 0.019	16	3. 17. 57.42	89.92	45	— 0.08	30
	49.315	89.94	35			57.50	89.75	35		
255	23. 34. 49.740	90.86	2	— 0.076	2	12. 58. 52.63	89.42	9	— 0.32	19
	50.078	87.34	1			52.95	88.90	15		

The weighted means for each 6^h of R.A. are shown in the following table, the corresponding numbers for the Ten-Year Catalogue, as found from the table on page 46 of its Introduction, being added for comparison.

Limits of R.A.	Mean Excess of R.A. above Pole $\times \sin$ N.P.D.		Mean Excess of N.P.D. above Pole.	
	Five-Year.	Ten-Year.	Five-Year.	Ten-Year.
^h 0—6	— .007	— .029	— 0.32	— 0.10
6—12	+ .004	— .003	— 0.21	— 0.05
12—18	+ .007	— .026	— 0.11	— 0.08
18—24	+ .005	— .009	— 0.39	— 0.18
Mean ...	+ .002	— .017	— 0.26	— 0.10

INTRODUCTION.

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These stars may also be arranged in order of N.P.D. as follows :—

Star's No.	Approximate R.A.	Excess of R.A. above Pole $\times \sin$ N.P.D.	Weight.	Approximate N.P.D.	Excess of N.P.D. above Pole.	Weight.
	h m	s		° '	"	
209	19. 34	+ 0'029	15	1. 2	— 0'49	35
90	7. 47	— 0'009	17	1. 2	— 0'50	32
16	1. 19	0'000	19	1. 17	— 0'46	38
131	12. 14	+ 0'039	17	1. 41	— 0'48	31
164	15. 13	+ 0'032	16	2. 21	— 0'11	28
76	6. 49	+ 0'031	15	2. 47	— 0'48	36
253	23. 28	+ 0'019	16	3. 18	— 0'08	30
195	18. 8	+ 0'015	16	3. 23	— 0'49	34
232	21. 21	+ 0'030	11	3. 25	— 0'75	17
12	0. 54	+ 0'003	16	4. 20	— 0'21	29
243	22. 22	+ 0'006	16	4. 27	— 0'52	25
46	4. 2	+ 0'027	16	4. 44	— 0'49	25
182	16. 57	— 0'100	4	7. 47	+ 0'47	16
102	9. 21	+ 0'016	13	8. 11	+ 0'18	25
220	20. 34	— 0'044	15	8. 56	— 0'12	28
170	15. 48	— 0'057	6	11. 52	+ 0'27	15
255	23. 35	— 0'076	2	12. 59	— 0'32	19
159	14. 51		...	15. 24	— 0'53	11
234	21. 27	— 0'059	4	19. 55	+ 0'04	11
122	11. 25	— 0'045	3	20. 4	+ 0'67	14
151	14. 1	— 0'050	5	25. 6	+ 0'03	15
22	1. 46	— 0'019	3	26. 52	+ 1'04	6
117	10. 57	— 0'010	4	27. 39	— 0'52	5
230	21. 16	+ 0'019	9	27. 53	— 0'96	13
175	16. 22		...	28. 14	+ 0'51	4
7	0. 34	+ 0'033	4	34. 4	— 0'79	5
126	11. 48	— 0'025	4	35. 42	0'00	4
187	17. 28	+ 0'060	3	37. 37	+ 0'01	2
37	3. 16	— 0'068	2	40. 32	— 0'15	1
98	8. 52	— 0'010	3	41. 32	— 1'77	1
56	5. 9	— 0'188	5	44. 7	+ 0'06	2

Taking the weighted means of the six groups we get the following numbers, corresponding quantities from the Ten-Year Catalogue being added for comparison on two methods. In columns marked (1.) the result is deduced by selecting actually the same stars as those of the Five-Year Catalogue from the table on pages 46-54 of the SO 11426. GREENWICH FIVE-YEAR CATALOGUE FOR 1890.

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Introduction to the Ten-Year Catalogue ; in the columns marked (2.) the result for the particular N.P.D. is inferred from the collected results on page 55 of that Introduction, except in the case of the first group.

Group.	Approximate N.P.D.	Excess of R.A. above Pole $\times \sin$ N.P.D.			Excess of N.P.D. above Pole.		
		Five-Year.	Ten-Year.		Five-Year.	Ten-Year.	
			(1.)	(2.)		(1.)	(2.)
1	° 1. 29	+ ^s 017	+ ^s 010	(+ ^s 010)	— 0.42	— 0.48	(— 0.48)
2	3. 27	+ 019	+ 017	+ 015	— 0.64	— 0.42	— 0.37
3	6. 29	— 005	— 068	— 016	— 0.14	— 0.37	— 0.02
4	16. 3	— 057	+ 005	+ 005	+ 0.03	+ 0.09	+ 0.13
5	27. 9	— 008	— 008	— 007	— 0.15	— 0.36	— 0.26
6	38. 56	— 043	+ 005	— 025	— 0.38	— 0.51	— 0.57

The evidence, so far as it goes, seems to show that the Systematic Errors of the Five-Year Catalogue are nearly the same as those of the Ten-Year Catalogue, especially in N.P.D.

W. H. M. CHRISTIE.

Royal Observatory, Greenwich,
1893 August 10.

GREENWICH
FIVE-YEAR CATALOGUE
OF
258 FUNDAMENTAL STARS
FOR
1890·0
FROM OBSERVATIONS
MADE AT THE
ROYAL OBSERVATORY, GREENWICH,
1887 to 1891.

GREENWICH FIVE-YEAR CATALOGUE FOR 1890.

d

NOTE.

STAR'S NAME.

The "Star's Name" adopted in this Catalogue is taken from one of the following authorities, the order of preference being the order of mention of the authority below :—

1. Flamsteed's constellation No. and constellation, with Bayer's letter, taken from Baily's edition of Flamsteed, or from the British Association Catalogue. When the description in Baily's Flamsteed (B. F.) differs from that in the British Association Catalogue (B. A. C.) the difference is mentioned in the Notes.
2. The No. in Bessel's *Fundamenta Astronomiæ* deduced from Bradley's observations, referred to as "Bradley."
3. The Hour and No. in Piazzi's Catalogue, edition 1814.
4. The No. in Groombridge's Catalogue.

MAGNITUDE.

The magnitude is taken from the *Harvard Photometry* for stars contained in that work, and for other stars (marked *) from the *Bonn Durchmusterung*. For the few remaining stars (marked †) the authority for the magnitude is given in the Notes. The magnitude in the *Uranometria Nova Oxoniensis* is given in the Notes for all cases in which it differs by more than 0.2 magnitude from that in the *Harvard Photometry*.

The magnitudes of the components of double stars, taken from Struve's *Mensuræ Micrometricæ* or other authority, are given in the Notes.

In the case of variable stars the limits of magnitude and the period given in the Notes are taken from Mr. Chandler's Catalogue in the *Astronomical Journal*, Nos. 179, 180.

PROPER MOTIONS.

The proper motions are taken from Professor Auwers' "Neue Reduction der Bradleyschen Beobachtungen" or his "Catalog der Fundamental Sterne" for stars contained in either of those works. The authority for other proper motions is given in the Notes.

No.	Star's Name.	Mag.	Mean Date, 1890+		No. of Observations.	Seconds of Mean R.A. 1890+ deduced from		Adopted Mean R.A. 1890+.	Annual Precession. 1890+.	Secular Variation. 1890+.	Annual Proper Motion. 1890+.
			1887 to 1891.	10-Year Catalogue.		1887 to 1891.	10-Year Catalogue.				
1	21 Andromedae.....	2.1	89°06	82°06	36	69	47°077	48°082	0. 2. 447°077	+ 0°0810	+ 0°0095
2	28 Pegasi.....	7.0	89°50	82°08	16	38	34°215	0. 7. 34°215	+ 0°0830	+ 0°0101	+ 0°0007
3	8 Ceti.....	3.6	89°58	82°21	11	22	49°340	49°351	0. 13. 49°340	+ 0°0501	+ 0°0023
4	44 Piscium.....	1.8	89°44	83°32	13	30	45°793	45°793	0. 19. 45°793	+ 0°0752	+ 0°0037
5	12 Ceti.....	6.2	89°69	83°17	23	28	25°458	25°453	0. 24. 25°458	+ 0°0611	+ 0°0009
6	30 Andromedae.....	4.6	89°70	82°77	25	51	44°533	44°534	0. 32. 44°533	+ 0°0309	+ 0°0184
7	18 Cassiopeiae.....	Var.	89°31	82°63	3	33	16°000	15°956	0. 34. 15°959	+ 0°0370	+ 0°0555
8	16 Ceti.....	2.1	89°29	82°38	16	42	4°055	4°035	0. 38. 4°055	+ 0°0982	+ 0°0014
9	63 Piscium.....	4.6	89°39	82°46	26	48	58°459	58°458	0. 42. 58°459	+ 0°1030	+ 0°0079
10	20 Ceti.....	5.0	89°57	83°26	17	30	23°123	23°101	0. 47. 23°123	+ 0°0642	+ 0°0062
11	37 Andromedae.....	1.9	89°05	82°86	15	28	38°795	38°752	0. 50. 38°795	+ 0°0307	+ 0°0305
12	2 Ursa Minoris.....	89°83	84°72	34	48	18°194	47°688	0. 53. 48°173	+ 0°1772	+ 1°4116	+ 0°0686
13	71 Piscium.....	4.5	89°40	82°57	20	58	13°999	14°005	0. 57. 13°999	+ 0°1148	+ 0°0087
14	43 Andromedae.....	2.2	89°66	82°63	39	91	34°361	34°353	1. 3. 34°361	+ 0°0286	+ 0°0144
15	86 Piscium.....	2.1	89°11	84°31	27	40	58°966	58°986	1. 7. 58°966	+ 0°1204	+ 0°0091
16	1 Ursa Minoris.....	2.2	89°25	82°26	230	30	67°679	29°878	1. 18. 30°680	+ 0°21993	+ 1°7772
17	45 Ceti.....	3.8	90°75	80°90	11	24	31°443	31°444	1. 18. 31°453	+ 0°0034	+ 0°0019
18	99 Piscium.....	3.7	89°65	81°83	30	78	35°771	35°761	1. 25. 35°771	+ 0°0142	+ 0°0002
19	106 Piscium.....	4.7	89°56	82°43	44	71	42°347	42°350	1. 26. 42°347	+ 0°1193	+ 0°0091
20	110 Piscium.....	4.4	89°08	81°70	23	45	35°032	35°032	1. 39. 35°032	+ 0°1576	+ 0°0111
21	55 Ceti.....	3.9	89°08	79°91	5	6	1°781	1°830	1. 46. 1°795	+ 0°0528	+ 0°0003
22	45 Cassiopeiae.....	3.6	91°36	80°86	3	10	28°909	29°015	1. 46. 28°973	+ 0°0994	+ 0°0036
23	6 Arietis.....	2.8	89°13	81°80	21	69	33°745	33°745	1. 48. 33°745	+ 0°0277	+ 0°0183
24	57 Andromedae.....	7.0	90°43	80°77	4	33	8°763	8°796	1. 57. 8°789	+ 0°0512	+ 0°0303
25	13 Arietis.....	2.0	89°52	81°28	39	80	58°312	58°302	1. 58. 58°312	+ 0°0254	+ 0°0203
26	65 Ceti.....	4.5	89°57	81°51	19	28	10°102	10°127	2. 7. 10°102	+ 0°0116	+ 0°0015
27	67 Ceti.....	5.5	90°88	82°29	6	34	29°778	29°753	2. 11. 29°765	+ 0°0943	+ 0°0030
28	73 Ceti.....	4.4	89°64	82°07	20	40	18°565	18°573	2. 22. 18°565	+ 0°1814	+ 0°0116
29	75 Ceti.....	4.9	88°73	82°24	15	33	6°045	6°030	2. 30. 6°045	+ 0°1453	+ 0°0103
30	77 Ceti.....	4.7	89°48	81°87	16	36	50°607	50°607	2. 33. 50°607	+ 0°0744	+ 0°0081
31	35 Ceti.....	7.0	89°88	81°64	12	3	35°989	35°978	2. 37. 35°989	+ 0°1135	+ 0°0104
32	43 Arietis.....	5.5	89°34	82°86	9	39	25°109	25°103	2. 45. 25°106	+ 0°1021	+ 0°0002

Mean Date. 1890+		No. of Observations.		Seconds of Mean N.P.D. 1890+ deduced from		Adopted Mean N.P.D.	Annual Precession.	Secular Variation.	Annual Proper Motion.	Star's Name.	No.
1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1890°0.	1890°0.	1890°0.	1890°0.		
89°41	81°65	34	42	0°61	0°86	61. 31. 0°61	-20°052	+ 0°013	+ 0°156	21 Andromedæ.....	1
90°58	82°72	19	32	40°96	41°35	75. 25. 40°96	-20°043	+ 0°022	+ 0°013	88 Pegasi.....	2
89°74	83°20	14	20	1°82	2°20	99. 26. 1°82	-20°016	+ 0°035	+ 0°032	8 Ceti.....	3
90°02	84°19	10	30	10°83	10°86	88. 40. 10°83	-19°979	+ 0°046	+ 0°011	44 Piscium.....	4
89°95	83°91	23	26	55°24	55°07	94. 33. 55°24	-19°933	+ 0°055	+ 0°009	12 Ceti.....	5
90°03	81°45	15	25	7°84	8°54	61. 17. 7°84	-19°819	+ 0°073	+ 0°251	30 Andromedæ.....	6
89°81	82°44	3	31	59°07	58°30	34. 3. 58°43	-19°830	+ 0°080	+ 0°038	15 Cassiopeiæ.....	7
89°81	83°22	14	25	26°38	26°17	108. 35. 26°38	-19°778	+ 0°080	+ 0°034	16 Ceti.....	8
90°11	82°35	14	39	49°86	49°75	83. 0. 49°86	-19°702	+ 0°092	+ 0°037	63 Piscium.....	9
89°40	83°63	18	29	30°43	30°39	91. 44. 30°43	-19°666	+ 0°099	+ 0°009	20 Ceti.....	10
89°50	82°72	9	28	50°61	50°56	52. 5. 50°69	-19°666	+ 0°113	+ 0°049	37 Andromedæ.....	11
89°66	85°19	35	27	0°21	0°42	4. 20. 0°31	-19°504	+ 0°252	+ 0°010	2 Ursa Minoris.....	12
90°25	82°89	10	47	8°97	8°54	82. 42. 8°97	-19°431	+ 0°120	+ 0°039	71 Piscium.....	13
88°96	82°21	22	52	46°19	45°89	54. 57. 46°19	-19°287	+ 0°140	+ 0°081	43 Andromedæ.....	14
88°91	84°23	13	30	24°16	23°78	83. 0. 24°16	-19°178	+ 0°140	+ 0°051	86 Piscium.....	15
89°47	81°98	390	1433	41°30	41°63	1. 16. 41°54	-18°889	+ 1°146	+ 0°002	1 Ursa Minoris.....	16
89°53	81°08	4	11	4°74	4°41	98. 45. 4°54	-18°889	+ 0°154	+ 0°196	45 Cassiopeiæ.....	17
90°87	81°03	14	34	17°38	17°52	75. 13. 17°38	-18°671	+ 0°177	+ 0°003	99 Piscium.....	18
89°57	84°08	42	42	9°58	9°42	85. 4. 9°58	-18°630	+ 0°191	+ 0°005	106 Piscium.....	19
89°72	83°49	25	28	46°11	46°52	81. 23. 46°11	-18°590	+ 0°200	+ 0°058	110 Piscium.....	20
89°02	80°62	7	8	43°69	43°97	100. 52. 43°75	-17°945	+ 0°202	+ 0°028	55 Ceti.....	21
91°51	81°33	4	40	19°50	19°81	26. 52. 19°54	-17°929	+ 0°283	+ 0°022	45 Cassiopeiæ.....	22
89°31	82°57	26	66	47°80	48°11	69. 45. 47°80	-17°845	+ 0°255	+ 0°102	5 Arietis.....	23
90°43	80°66	4	32	54°16	54°16	48. 11. 54°14	-17°400	+ 0°257	+ 0°051	57 Andromedæ.....	24
89°48	82°46	25	72	29°03	29°20	67. 3. 29°02	-17°324	+ 0°253	+ 0°134	13 Arietis.....	25
89°29	83°60	18	23	11°20	10°65	81. 40. 11°20	-17°045	+ 0°250	+ 0°001	65 Ceti.....	26
91°02	82°54	12	15	46°30	46°04	96. 55. 46°30	-16°842	+ 0°243	+ 0°109	67 Ceti.....	27
89°62	83°03	19	25	0°33	0°17	82. 2. 0°33	-16°309	+ 0°276	+ 0°021	73 Ceti.....	28
89°72	82°44	15	17	13°53	14°08	84. 3. 13°53	-15°903	+ 0°285	+ 0°038	23 Ceti.....	29
89°80	80°67	13	19	46°52	47°33	90. 8. 46°52	-15°702	+ 0°285	+ 0°007	86 Ceti.....	30
90°00	82°57	13	14	41°35	41°84	87. 13. 41°35	-15°466	+ 0°294	+ 0°136	92 Ceti.....	31
89°97	83°08	12	28	17°93	18°08	75. 22. 17°93	-15°053	+ 0°324	+ 0°039	43 Arietis.....	32

2. The magnitude given in the *Uranometria Nova Oxoniensis* is 2.5.
 7. The limits of magnitude are 2.2 and 2.8; the period irregular.
 9. The magnitude given in the *Uranometria Nova Oxoniensis* is 4.3.
 15. The magnitude given in the *Uranometria Nova Oxoniensis* is 4.2.

6. The magnitude given in the *Uranometria Nova Oxoniensis* is 4.3.
 8. The magnitude given in the *Uranometria Nova Oxoniensis* is 2.4.
 11. Authority for proper motion in R.A.: *Mem. R.A.S., Vol. XIX.*

15. The magnitude given is taken from Struve's *Messure Micrometrica*.
 21. The magnitude is taken from Struve's *Messure Micrometrica*.
 31. The magnitude given is taken from Struve's *Messure Micrometrica*.

21. The magnitude given in the *Uranometria Nova Oxoniensis* is 3.5.
 27. The magnitude given in the *Uranometria Nova Oxoniensis* is 3.8.

No.	Star's Name.	Mag.	Mean Date, 1890-		No. of Observations.	Seconds of Mean R.A. 1890- deduced from		Adopted Mean R.A. 1890-.	Annual Precession, 1890-0.	Secular Variation, 1890-0.	Annual Proper Motion, 1890-0.	
			1887 to 1891.	10-Year Catalogue.		1887 to 1891.	10-Year Catalogue.					
33	48 Arietis.....	4.6	88-81	81-43	12	34	55-773	h m s				
34	92 Octi.....	7.7	81-31	82-13	11	34	51-718	2. 52. 55-773	+ 3'-4221	+ 0-0018	+ 0-0005	
35	57 Arietis.....	4.5	89-35	82-28	13	41	31-718	2. 56. 31-718	+ 3'-1330	+ 0-0008	+ 0-0009	
36	61 Arietis.....	5.2	90-39	83-74	9	34	52-512	3. 5. 20-387	+ 3'-4114	+ 0-0017	+ 0-0005	
37	33 Persei.....	1.9	91-00	81-97	2	19	28-097	3. 14. 52-512	+ 3'-4531	+ 0-0015	+ 0-0008	
	" S.P.....		88-35		1	19	28-202	28-156	3. 16. 28-150	+ 4'-2545	+ 0-0483	+ 0-0015
38	1 Tauri.....	3.8	89-69	83-28	14	35	53-550	53-567	3. 18. 53-550	+ 3'-2275	+ 0-0115	+ 0-0052
39	5 Tauri.....	4.3	88-80	82-77	16	41	47-942	47-928	3. 24. 47-942	+ 3'-3046	+ 0-0130	+ 0-0002
40	18 Eridani.....	4.7	90-23	82-50	8	35	44-809	44-826	3. 27. 44-818	+ 2'-8901	+ 0-0055	+ 0-0075
41	11 Tauri.....	6.7*	89-62	83-33	9	25	12-074	12-057	3. 34. 12-057	+ 3'-5733	+ 0-0189	+ 0-0002
42	23 Eridani.....	3.7	89-54	81-84	9	25	58-665	58-691	3. 37. 58-675	+ 2'-8778	+ 0-0054	+ 0-0081
43	25 Tauri.....	3.0	88-56	81-88	16	32	56-704	56-695	3. 40. 56-704	+ 3'-5560	+ 0-0177	+ 0-0004
44	34 Eridani.....	3.1	89-82	82-53	21	24	53-773	53-802	3. 52. 53-773	+ 2'-7959	+ 0-0047	+ 0-0009
45	37 Tauri.....	4.5	89-67	81-94	27	23	11-483	11-485	3. 58. 11-485	+ 3'-5330	+ 0-0153	+ 0-0053
46	Groombridge 750.....	6.7	90-24	85-04	34	6	13-562	13-184	4. 2. 13-563	+ 17'-1263	+ 1-7996	+ 0-0032
	" S.P.....		90-35		47		13-233					
47	43 Tauri.....	5.8	89-38	83-65	15	22	45-395	45-415	4. 2. 45-395	+ 3'-4811	+ 0-0138	+ 0-0061
48	38 Eridani.....	4.1	89-34	82-00	17	12	29-709	29-683	4. 6. 29-709	+ 2'-9355	+ 0-0058	+ 0-0006
49	54 Tauri.....	7.9	89-54	82-11	27	20	31-927	31-923	4. 13. 31-927	+ 3'-4000	+ 0-0111	+ 0-0073
50	7 Tauri.....	3.7	89-64	83-20	16	27	12-565	11-534	4. 22. 11-534	+ 3'-4900	+ 0-0120	+ 0-0070
51	87 Tauri.....	1.0	89-29	81-99	40	68	36-469	36-473	4. 29. 36-469	+ 3'-4333	+ 0-0105	+ 0-0035
52	94 Tauri.....	4.4	90-04	82-48	17	29	38-530	38-530	4. 35. 38-530	+ 3'-5954	+ 0-0121	+ 0-0010
53	57 Eridani.....	4.8	89-50	82-40	10	16	0-096	0-086	4. 40. 0-096	+ 2'-9960	+ 0-0055	+ 0-0002
54	3 Aurigæ.....	2.7	89-81	81-86	22	16	49-707	49-751	4. 49. 49-707	+ 3'-9999	+ 0-0142	+ 0-0006
55	2 Leporis.....	5.2	89-83	81-61	7	20	48-242	48-230	5. 0. 48-237	+ 2'-5560	+ 0-0093	+ 0-0004
56	13 Aurigæ.....	0.3	91-38	81-69	3	30	33-578	33-721	5. 8. 33-718	+ 4'-4168	+ 0-0172	+ 0-0079
	" S.P.....		88-12		3		33-447					
57	19 Orionis.....	1.0	89-47	82-32	21	65	15-057	15-054	5. 9. 15-057	+ 2'-8815	+ 0-0039	+ 0-0012
58	112 Tauri.....	1.9	88-79	82-36	19	63	20-773	20-765	5. 19. 20-773	+ 2'-9814	+ 0-0082	+ 0-0013
59	34 Orionis.....	Var.	90-07	82-09	5	33	23-109	23-140	5. 26. 23-128	+ 3'-0631	+ 0-0058	+ 0-0014
60	11 Leporis.....	2.7	91-01	80-64	4	25	52-662	52-666	5. 27. 52-668	+ 2'-5440	+ 0-0009	+ 0-0011
61	46 Orionis.....	1.8	89-04	83-34	11	25	37-880	37-855	5. 30. 37-880	+ 3'-0431	+ 0-0035	+ 0-0018
62	Columbe.....	2.7	91-15	82-47	1	15	39-934	39-986	5. 35. 39-979	+ 2'-1713	+ 0-0008	+ 0-0050
63	53 Orionis.....	2.2	88-79	81-94	9	24	32-248	32-231	5. 42. 32-241	+ 2'-8445	+ 0-0007	+ 0-0037
64	58 Orionis.....	Var.	89-24	82-28	3	65	12-969	12-967	5. 49. 12-969	+ 3'-7456	+ 0-0007	+ 0-0008
65	34 Aurigæ.....	2.1	...	80-57	...	12	...	27-586	5. 51. 27-586	+ 4'-4055	+ 0-0041	+ 0-0005
66	1 Geminorum.....	4.3	90-23	82-87	9	27	25-980	25-964	5. 57. 25-973	+ 3'-6473	+ 0-0001	+ 0-0010

53. A close double observed as one mass. The magnitude given in the *Uranometria Nova Oenensis* is 4.2. The magnitudes of the components given in Struve's *Messure Micrometricæ* are 6.0 and 5.7.

44. The designation in B. F. and the B. A. C. is γ Eridani.

49. The magnitude given in the *Uranometria Nova Oenensis* is 3.6.

45. The magnitude given in the *Uranometria Nova Oenensis* is 4.8.

57. The magnitude given is taken from Struve's *Messure Micrometricæ*.

Mean Date, 1890-0		No. of Observations.		Seconds of Mean R.P.D. 1890-0 deduced from		Adopted Mean R.P.D.		Annual Precession.	Secular Variation.	Annual Proper Motion.	Star's Name.	No.
1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1890-0.	1890-0.					
89-66	82-09	9	31	0-22	0-60	69. 6. 0-40	-14-511	+ 0-347	+ 0-006	48 Arietis.....	33	
89-80	82-54	10	31	33-18	33-15	86. 20. 33-18	-14-504	+ 0-313	+ 0-073	92 Oeti.....	34	
89-55	82-26	19	24	31-18	31-70	70. 41. 31-18	-13-846	+ 0-365	+ 0-003	57 Arietis.....	35	
90-79	82-33	12	26	59-53	60-41	69. 14. 59-53	-13-811	+ 0-383	+ 0-030	61 Arietis.....	36	
91-00		2		51-36						33 Persei.....	37	
88-35	81-73	1	20	51-51	51-92	70. 31. 51-80	-13-125	+ 0-473	+ 0-033	" S.P.....		
89-89	83-14	11	22	31-88	31-75	81. 21. 31-88	-12-965	+ 0-364	+ 0-068	1 Tauri.....	38	
88-90	83-34	21	21	27-02	27-16	77. 26. 27-02	-12-566	+ 0-380	+ 0-011	5 Tauri.....	39	
90-79	83-35	7	20	51-35	52-33	72. 45. 51-76	-12-361	+ 0-357	+ 0-011	18 Eridani.....	40	
89-43	83-83	6	15	36-95	36-65	61. 1. 36-83	-11-915	+ 0-423	+ 0-011	11 Tauri.....	41	
90-24	81-18	8	15	10-81	11-10	100. 8. 10-91	-11-646	+ 0-346	+ 0-743	23 Eridani.....	42	
87-90	81-29	14	33	8-23	8-46	66. 14. 8-23	-11-435	+ 0-430	+ 0-040	25 Tauri.....	43	
89-23	82-64	14	13	18-02	19-51	62. 46. 18-92	-10-560	+ 0-350	+ 0-106	34 Eridani.....	44	
89-13	81-95	12	24	9-39	9-23	103. 13. 9-39	-10-163	+ 0-448	+ 0-058	37 Tauri.....	45	
90-59	84-73	13	12	8-37	8-74	4. 44. 8-75	-9-857	+ 2-179	+ 0-015	Groombridge 750.....	46	
90-35		47		8-86						" S.P.....		
89-55	82-17	10	21	56-66	56-33	70. 40. 56-66	-9-818	+ 0-446	+ 0-033	43 Tauri.....	47	
89-24	83-02	8	13	29-53	30-48	77. 7. 29-79	-9-531	+ 0-379	+ 0-085	38 Eridani.....	48	
89-27	82-87	12	23	18-96	19-04	74. 38. 18-96	-9-818	+ 0-447	+ 0-030	54 Tauri.....	49	
89-32	80-66	12	13	50-71	51-76	71. 2. 50-71	-8-700	+ 0-466	+ 0-028	74 Tauri.....	50	
89-43	81-93	35	53	45-00	45-07	73. 41. 45-00	-8-706	+ 0-465	+ 0-184	87 Tauri.....	51	
90-12	81-32	9	28	17-89	17-41	67. 15. 17-68	-7-215	+ 0-492	+ 0-009	94 Tauri.....	52	
89-87	81-84	10	11	24-82	25-13	93. 27. 24-82	-6-859	+ 0-413	+ 0-002	57 Eridani.....	53	
88-46	81-24	7	16	31-35	31-51	57. 0. 31-41	-6-045	+ 0-544	+ 0-003	3 Aurigæ.....	54	
89-56	80-76	4	25	10-04	10-28	112. 31. 10-22	-5-122	+ 0-360	+ 0-068	2 Leporis.....	55	
91-08	80-97	2	18	53-93	53-28	44. 6. 53-40	-4-464	+ 0-639	+ 0-474	13 Aurigæ.....	56	
88-12		3		53-87						" S.P.....		
89-26	82-48	11	36	44-98	45-68	98. 19. 44-98	-4-495	+ 0-412	+ 0-005	19 Orionis.....	57	
89-79	80-74	19	46	9-93	10-51	61. 29. 9-93	-3-539	+ 0-545	+ 0-180	112 Tauri.....	58	
89-18	83-37	11	24	52-42	52-40	90. 22. 52-42	-3-909	+ 0-413	+ 0-025	34 Orionis.....	59	
91-23	79-91	3	25	6-08	6-47	107. 54. 6-30	-3-802	+ 0-388	+ 0-010	11 Leporis.....	60	
88-11	82-75	7	17	22-19	21-74	91. 16. 22-03	-2-564	+ 0-411	+ 0-006	46 Orionis.....	61	
91-15	82-87	1	15	4-70	0-67	124. 8. 1-12	-2-125	+ 0-316	+ 0-030	Columbe.....	62	
89-79	82-54	7	16	33-48	33-92	99. 42. 33-64	-1-527	+ 0-407	+ 0-024	53 Orionis.....	63	
89-22	82-61	26	43	50-79	51-13	82. 36. 50-79	-0-944	+ 0-473	+ 0-004	34 Orionis.....	64	
88-01	80-70	1	9	51-44	52-66	65. 45. 52-46	-0-747	+ 0-512	+ 0-011	31 Aurigæ.....	65	
88-96	83-38	5	27	53-94	53-59	46. 43. 53-74	-0-224	+ 0-533	+ 0-023	1 Geminorum.....	66	

59. The magnitude given in H. P. is 3.4; in the *Uranometria Nova Oenensis* 3.0. The limits of magnitude are 2.2 and 2.7. Auwers found a 106 period, Schiefel held a slight variation but no period, Chandler and Sawyer no fluctuation of light.

62. Authority for Proper Motion: Cape Catalogue 1880.

64. The magnitude given in H.P. is 0.9. The limits of magnitude are 1 and 1.4; Argelander found period 196^d, Schiefel holds periodicity questionable.

No.	Star's Name.	Mag.	Mean Date. 1890-1		No. of Observations.	Seconds of Mean R.A. 1890 deduced from		Adopted Mean R.A. 1890-0	Annual Precession. 1890-0	Secular Variation. 1890-0	Annual Proper Motion. 1890-0	Star's Name.	No.
			1887 to 1891.	10-Year Catalogue.		1887 to 1891.	10-Year Catalogue.						
100	76 Cancri.....	5.0	88.79	81.68	16	20	47.349	47.317	9. 1.47.349	+ 0.0094	+ 0.0028	76 Cancri.....	100
101	83 Cancri.....	6.6	88.67	82.29	17	27	50.473	50.505	9. 12. 50.473	+ 0.0134	+ 0.0090	83 Cancri.....	101
102	Piazzi IX. 37 " S.P.	4.6	89.92	84.19	19	10	21.791	21.626	9. 21. 21.791	+ 0.0019	+ 0.0173	Piazzi IX. 37 " S.P.	102
103	30 Hydre.....	2.0	89.88	82.66	14	20	21.678	20.883	9. 22. 10.878	+ 0.0014	+ 0.0019	30 Hydre.....	103
104	5 Leonis.....	5.2	89.33	81.57	11	18	0.953	0.978	9. 26. 0.953	+ 0.0100	+ 0.0076	5 Leonis.....	104
105	14 Leonis.....	3.8	89.29	82.16	11	28	16.745	16.762	9. 35. 16.745	+ 0.0092	+ 0.0043	14 Leonis.....	105
106	17 Leonis.....	3.1	89.14	81.66	15	31	36.408	36.447	9. 39. 36.408	+ 0.0102	+ 0.0043	17 Leonis.....	106
107	24 Leonis.....	4.1	89.31	82.44	12	24	30.390	30.420	9. 46. 30.390	+ 0.0197	+ 0.0185	24 Leonis.....	107
108	29 Leonis.....	5.0	89.44	82.72	8	28	23.931	24.006	9. 54. 24.000	+ 0.0175	+ 0.0040	29 Leonis.....	108
109	32 Leonis.....	1.4	89.45	81.16	38	66	30.824	30.800	10. 2. 30.804	+ 0.0101	+ 0.0018	32 Leonis.....	109
110	41 Leonis.....	2.3	89.74	83.35	28	55	54.435	54.445	10. 13. 54.451	+ 0.0143	+ 0.0028	41 Leonis.....	110
111	41 Leonis.....	2.2	90.29	80.71	6	8	54.683	54.694	10. 13. 54.686	+ 0.0148	+ 0.0028	41 Leonis.....	111
112	42 Hydre.....	4.1	89.31	83.02	3	22	46.152	46.184	10. 20. 46.177	+ 0.0088	+ 0.0040	42 Hydre.....	112
113	47 Leonis.....	4.0	89.27	82.20	9	33	1.135	1.110	10. 27. 1.124	+ 0.0163	+ 0.0012	47 Leonis.....	113
114	34 Sextantis.....	7.7	89.42	82.21	11	22	56.661	56.631	10. 36. 56.661	+ 0.0106	+ 0.0090	34 Sextantis.....	114
115	53 Leonis.....	5.3	89.57	81.77	9	29	28.504	28.483	10. 43. 28.495	+ 0.0189	+ 0.0015	53 Leonis.....	115
116	58 Leonis.....	5.0	89.12	83.22	12	25	52.756	52.744	10. 54. 52.756	+ 0.0100	+ 0.0018	58 Leonis.....	116
117	50 Ursa Majoris.....	2.0	89.61	82.49	3	51	56.213	56.113	10. 56. 56.143	+ 0.0155	+ 0.0180	50 Ursa Majoris.....	117
118	" S.P.	5.0	89.80		2		56.233	56.113	10. 56. 56.143	+ 0.0155	+ 0.0180	" S.P.	118
119	63 Leonis.....	4.7	89.32	82.98	13	26	20.540	20.570	10. 59. 20.540	+ 0.0112	+ 0.0055	63 Leonis.....	119
120	68 Leonis.....	2.8	89.28	81.73	16	43	15.482	15.485	11. 8. 15.482	+ 0.0132	+ 0.0102	68 Leonis.....	120
121	1 Crateris.....	3.9	89.00	81.86	9	26	50.415	50.428	11. 13. 50.421	+ 0.0049	+ 0.0064	1 Crateris.....	121
122	84 Leonis.....	5.0	89.14	81.47	11	33	16.793	16.797	11. 22. 16.793	+ 0.0051	+ 0.0010	84 Leonis.....	122
123	1 Draconis.....	4.1	88.37	82.25	3	32	52.078	52.090	11. 24. 52.107	+ 0.0115	+ 0.0085	1 Draconis.....	123
124	" S.P.	4.1	89.80		3		52.208	52.090	11. 24. 52.107	+ 0.0115	+ 0.0085	" S.P.	124
125	91 Leonis.....	4.5	89.01	82.39	7	32	18.928	18.959	11. 31. 18.945	+ 0.0218	+ 0.0003	91 Leonis.....	125
126	94 Leonis.....	2.2	89.33	82.36	22	73	26.905	26.907	11. 43. 26.905	+ 0.0087	+ 0.0036	94 Leonis.....	126
127	5 Virginis.....	3.7	90.02	83.04	7	26	57.868	57.911	11. 44. 57.890	+ 0.0063	+ 0.0081	5 Virginis.....	127
128	64 Ursa Majoris.....	2.6	90.31	82.31	5	34	2.658	2.611	11. 48. 2.586	+ 0.0165	+ 0.0098	64 Ursa Majoris.....	128
129	" S.P.	2.6	91.30		2		2.611	2.590	11. 48. 2.586	+ 0.0165	+ 0.0098	" S.P.	129
130	8 Virginis.....	4.4	89.50	82.46	15	27	14.145	14.121	11. 55. 14.145	+ 0.0062	+ 0.0028	8 Virginis.....	130
131	9 Virginis.....	4.3	89.15	82.61	8	25	36.332	36.318	11. 59. 36.320	+ 0.0079	+ 0.0031	9 Virginis.....	131
132	2 Corvi.....	3.1	89.35	82.73	4	31	27.999	28.009	12. 4. 28.007	+ 0.0080	+ 0.0042	2 Corvi.....	132
133	15 Virginis.....	4.1	89.41	83.00	9	21	16.611	16.635	12. 14. 16.633	+ 0.0076	+ 0.0037	15 Virginis.....	133
134	Bradley 1672.....	6.3	89.07	79.75	48	2	21.157	21.812	12. 14. 21.446	+ 0.0341	+ 0.0861	Bradley 1672.....	134
135	" S.P.	6.3	89.06		54		20.815	21.812	12. 14. 21.446	+ 0.0341	+ 0.0861	" S.P.	135

110, 111. The magnitudes given in Struve's *Messure Micrometricæ* are 2.0 and 3.5.

No.	Star's Name.	Annual Proper Motion. 1890-0.	Secular Variation.	Annual Precession.	Adopted Mean N.P.D. 1890-0.	Seconds of Mean N.P.D. 1890-0 deduced from		No. of Observations.		Mean Date. 1890-1		
						1890-0.	1890-1.	10-Year Catalogue.	1890-1.	10-Year Catalogue.	1890-1.	10-Year Catalogue.
89.55	83.04	17	37	22.68	22.66	78. 53. 22.68	+14.290	+ 0.338	+ 0.009	76 Cancri.....	100	
89.32	82.16	12	31	43.63	43.29	71. 49. 43.63	+14.953	+ 0.332	+ 0.019	83 Cancri.....	101	
89.97	84.78	23	13	17.96	17.96	8. 11. 17.87	+15.439	+ 0.831	+ 0.020	Piazzi IX. 37 " S.P.	102	
90.90	82.23	11	30	55.73	56.01	98. 10. 55.73	+15.484	+ 0.268	+ 0.053	30 Hydre.....	103	
88.84	82.86	8	15	48.80	48.27	78. 12. 48.64	+15.695	+ 0.289	+ 0.060	5 Leonis.....	104	
89.17	82.72	14	28	27.50	27.63	79. 36. 27.50	+16.187	+ 0.271	+ 0.018	14 Leonis.....	105	
89.03	81.51	8	27	10.67	10.71	65. 43. 10.69	+16.407	+ 0.281	+ 0.008	17 Leonis.....	106	
88.92	82.29	29	39	31.13	31.25	63. 28. 31.13	+16.747	+ 0.270	+ 0.015	24 Leonis.....	107	
88.95	82.46	14	21	42.07	42.49	81. 25. 42.07	+17.117	+ 0.235	+ 0.011	29 Leonis.....	108	
89.36	80.88	29	81	43.56	44.09	77. 29. 43.56	+17.476	+ 0.224	+ 0.018	32 Leonis.....	109	
89.87	83.01	15	50	8.61	8.80	69. 36. 8.61	+17.943	+ 0.203	+ 0.016	41 Leonis.....	110	
90.26	81.63	5	11	10.80	10.24	69. 36. 10.59	+17.941	+ 0.203	+ 0.016	41 Leonis.....	111	
90.27	82.02	8	21	30.62	30.29	106. 10. 30.49	+18.205	+ 0.171	+ 0.051	42 Hydre.....	112	
89.29	81.99	9	29	39.45	39.41	80. 7. 39.43	+18.426	+ 0.175	+ 0.011	47 Leonis.....	113	
89.35	83.21	10	29	32.27	32.49	85. 50. 32.27	+18.751	+ 0.154	+ 0.033	34 Sextantis.....	114	
88.93	83.83	14	41	23.25	23.58	78. 56. 23.25	+18.946	+ 0.144	+ 0.020	53 Leonis.....	115	
88.98	82.83	7	36	31.68	31.57	85. 47. 31.61	+19.150	+ 0.119	+ 0.012	58 Leonis.....	116	
89.26	82.15	8	101	19.64	19.40	27. 39. 19.67	+19.299	+ 0.143	+ 0.071	50 Ursa Majoris.....	117	
89.80		2		20.16						" S.P.	118	
89.87	83.79	14	23	10.16	10.32	82. 4. 10.16	+19.355	+ 0.112	+ 0.022	63 Leonis.....	119	
89.28	81.74	21	64	25.38	25.44	68. 52. 25.38	+19.545	+ 0.097	+ 0.015	68 Leonis.....	120	
89.57	82.94	9	21	0.44	0.44	104. 11. 0.25	+19.748	+ 0.080	+ 0.009	1 Crateri.....	121	
89.76	82.33	20	44	17.11	17.15	86. 33. 17.14	+19.783	+ 0.066	+ 0.005	84 Leonis.....	122	
89.25	82.00	8	60	43.30	42.63	42.95	20. 3. 43.12	+19.818	+ 0.074	+ 0.027	1 Draconis.....	123
89.13	81.71	12	47	59.40	59.52	90. 12. 59.40	+19.897	+ 0.048	+ 0.047	91 Leonis.....	124	
89.21	82.24	24	52	47.29	47.40	74. 48. 47.29	+20.002	+ 0.045	+ 0.008	94 Leonis.....	125	
90.31	83.64	10	32	55.69	55.63	87. 36. 55.69	+20.010	+ 0.022	+ 0.062	5 Virginis.....	126	
90.31	82.19	5	35	37.28	37.10	35. 41. 37.18	+20.027	+ 0.017	+ 0.008	64 Ursa Majoris.....	127	
91.30		2		37.28						" S.P.	128	
89.62	82.92	30	22	20.61	20.30	82. 46. 20.61	+20.049	+ 0.002	+ 0.017	8 Virginis.....	129	
88.44	83.11	18	22	22.41	21.97	80. 39. 22.41	+20.053	+ 0.007	+ 0.009	9 Virginis.....	130	
89.65	82.88	6	20	29.49	29.08	112. 0. 29.30	+20.049	+ 0.016	+ 0.021	2 Corvi.....	131	
89.37	83.53	10	33	19.63	19.54	80. 3. 19.63	+20.014	+ 0.036	+ 0.002	15 Virginis.....	132	
90.09		41	2	24.97	24.76	1. 41. 25.22	+20.015	+ 0.011	+ 0.076	Bradley 1672.....	133	
89.89		44		25.45						" S.P.	134	

122. The magnitude given in the *Uranometria Nova* *Comitatus* is 3.8.126. The magnitude given in the *Uranometria Nova* *Comitatus* is 2.3.

No.	Star's Name.	Mag.	Mean Date. 1890-0		No. of Observations.	Seconds of Mean R.A. 1890-0 deduced from		Adopted Mean R.A.	Annual Precession.	Secular Variation.	Annual Proper Motion.	
			1887 to 1891.	10-Year Catalogue.		1887 to 1891.	10-Year Catalogue.					
132	7 Corvi..... ²	3.1	89:28	82:03	18	20	10:332	10:332	12.24.10:332	+ 3'.1126	+ 0'.0119	- 0'.0142
133	9 Corvi..... ²	2.8	88:01	82:79	8	18	36:519	36:514	12.28.36:517	+ 3'.1424	+ 0'.0164	- 0'.0043
134	29 Virginis..... ²	2.8	88:23	81:27	5	16	5:013	5:047	12.36.5:028	+ 3'.0756	+ 0'.0043	- 0'.0385
135	29 Virginis..... ²	2.8	89:30	81:22	2	9	5:157	5:221	12.36.5:103	+ 3'.0756	+ 0'.0043	- 0'.0385
136	30 Virginis..... ²	5.1	89:35	82:57	17	19	18:985	18:983	12.36.18:985	+ 3'.0240	- 0'.0016	+ 0'.0033
137	35 Virginis..... ²	6.7*	88:28	81:72	11	27	15:324	15:314	12.42.15:324	+ 3'.0546	+ 0'.0021	- 0'.0030
138	31 Comae..... ²	5.0	89:55	81:81	7	33	20:408	20:420	12.46.20:420	+ 2'.9289	- 0'.0097	- 0'.0027
139	41 Virginis..... ²	3.7	89:18	82:52	16	36	3:728	3:709	12.50.3:728	+ 3'.0543	+ 0'.0046	- 0'.0336
140	12 Canum Venaticum..... ²	3.2	89:31	78:93	4	22	52:895	52:907	12.50.52:904	+ 2'.8348	- 0'.0152	- 0'.0020
141	47 Virginis..... ²	3.0	88:32	81:96	17	69	42:056	42:038	12.56.42:056	+ 3'.0055	- 0'.0007	- 0'.0192
142	51 Virginis..... ²	4.4	89:25	82:63	21	49	15:216	15:246	13.4.15:216	+ 3'.1046	+ 0'.0078	- 0'.0043
143	67 Virginis..... ²	1.2	89:88	81:51	39	162	23:845	23:820	13.19.23:845	+ 3'.1574	+ 0'.0116	- 0'.0044
144	79 Virginis..... ²	3.5	89:54	82:60	40	77	5:233	5:238	13.29.5:233	+ 3'.0727	+ 0'.0064	- 0'.0005
145	82 Virginis..... ²	5.3	89:29	82:87	21	32	50:250	50:255	13.35.50:250	+ 3'.1502	+ 0'.0107	- 0'.0085
146	4 Boötis..... ²	4.5	89:64	81:52	18	26	2:057	2:071	13.42.2:057	+ 2'.8853	- 0'.0007	- 0'.0346
147	85 Ursae Majoris..... ²	2.0	90:08	82:09	3	39	12:347	12:368	13.43.12:361	+ 2'.3824	+ 0'.0104	- 0'.0115
148	8 Boötis..... ²	2.9	89:34	81:11	16	50	26:804	26:797	13.49.26:804	+ 2'.8615	- 0'.0006	- 0'.0049
149	93 Virginis..... ²	4.4	90:14	82:32	10	24	2:851	2:865	13.56.2:851	+ 3'.0490	+ 0'.0065	- 0'.0005
150	94 Virginis..... ²	6.8	89:48	80:68	6	13	25:125	25:244	14.0.25:125	+ 3'.7112	+ 0'.0115	- 0'.0032
151	11 Draconis..... ²	3.6	88:01	83:27	5	34	24:658	24:648	14.1.24:673	+ 1'.6303	+ 0'.0048	- 0'.0092
	" S.P.....		90:69	83:27	5	34	24:776	24:648	14.1.24:673	+ 1'.6303	+ 0'.0048	- 0'.0092
152	98 Virginis..... ²	4.3	88:35	83:12	7	19	1:606	1:631	14.7.1:617	+ 3'.1935	+ 0'.0122	- 0'.0004
153	16 Boötis..... ²	0.0	89:53	82:59	59	141	38:619	38:619	14.10.38:619	+ 2'.9132	+ 0'.0004	- 0'.0079
154	22 Boötis..... ²	5.4	88:68	82:41	6	26	26:335	26:324	14.21.26:347	+ 2'.7953	+ 0'.0109	- 0'.0057
155	25 Boötis..... ²	3.6	88:81	82:94	7	29	5:339	5:338	14.27.5:334	+ 2'.9944	- 0'.0016	- 0'.0085
156	36 Boötis..... ²	3.0	89:59	82:20	21	55	10:955	10:954	14.40.10:955	+ 2'.6639	- 0'.0000	- 0'.0043
157	9 Libræ..... ²	3.0	89:27	81:21	5	25	47:561	47:550	14.44.47:556	+ 3'.1811	+ 0'.0155	- 0'.0093
158	15 Libræ..... ²	5.8	89:22	81:59	7	14	47:939	47:916	14.50.47:931	+ 3'.2481	+ 0'.0130	- 0'.0019
159	7 Ursæ Minoris..... ²	2.1	81:56	...	54	...	1:812	1:812	14.51.1:789	- 0'.2327	+ 0'.0118	- 0'.0077
160	41 Boötis..... ²	3.6	90:43	80:07	3	7	48:133	48:141	14.57.48:137	+ 2'.2656	- 0'.0000	- 0'.0048
161	43 Boötis..... ²	4.5	89:30	81:84	12	20	43:937	43:884	14.59.43:937	+ 2'.5835	+ 0'.0011	- 0'.0145
162	24 Libræ..... ²	4.7	89:71	83:46	6	25	57:008	57:034	15.5.57:021	+ 3'.4134	+ 0'.0171	- 0'.0037
163	27 Libræ..... ²	7.9	89:51	82:16	8	25	5:183	5:214	15.11.5:196	+ 3'.2789	+ 0'.0118	- 0'.0079
164	Groombridge 2283..... ²	7.1	90:24	86:81	53	30	30:203	30:203	15.12.49:023	- 2'.1094	+ 7'.3606	...
	" S.P.....		90:47	86:81	30	3	49:427	49:534	15.12.49:023	- 2'.1094	+ 7'.3606	...

134, 135. The magnitude of each star in Struve's *Messura Micrometrica* is 3.0.135. The magnitude given in the *Uranometria Nova Occidentalis* is 3.5.140. The magnitude given is taken from Struve's *Messura Micrometrica*.

Mean Date 1890-+		No. of Observations.		Seconds of Mean S.P.D. 1890-0 deduced from		Adopted Mean S.P.D.	Annual Precession.	Secular Variation.	Annual Proper Motion.	Star's Name.	No.
1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1890-0.	1890-0.	1890-0.	1890-0.		
89:06	82:30	19	27	11:11	11:08	105.54.11:14	+19:942	- 0'.0555	+ 0'.0165	7 Corvi..... ²	132
88:69	81:13	8	15	18:20	18:81	112.47.18:40	+19:937	- 0'.0065	+ 0'.0052	9 Corvi..... ²	133
89:12	83:20	7	32	43:60	43:15	90.50.43:36	+19:805	- 0'.0078	- 0'.0105	29 Virginis..... ²	134
89:33	81:79	4	14	48:91	48:52	90.50.48:46	+19:805	- 0'.0078	- 0'.0105	29 Virginis..... ²	135
89:54	81:35	14	13	29:21	29:35	79.9.29:21	+19:802	- 0'.0077	- 0'.0088	30 Virginis..... ²	136
89:09	82:49	9	18	35:42	35:39	85.49.35:41	+19:715	- 0'.0089	+ 0'.0065	35 Virginis.....	137
89:06	81:20	8	22	38:27	38:25	61.51.38:25	+19:743	- 0'.0093	+ 0'.0118	31 Comæ.....	138
89:68	82:07	21	19	16:83	17:01	86.0.16:83	+19:577	- 0'.0104	+ 0'.0447	41 Virginis..... ²	139
88:64	79:07	6	40	14:91	15:04	51.14:59	+19:561	- 0'.0099	- 0'.0066	12 Canum Venaticum..... ²	140
88:23	82:40	9	53	58:24	58:50	78.26.58:39	+19:442	- 0'.0115	- 0'.0229	47 Virginis..... ²	141
89:32	83:43	25	25	5:92	6:22	94.57.5:92	+19:271	- 0'.1333	+ 0'.0337	51 Virginis..... ²	142
90:05	80:56	19	86	13:42	13:42	100.35.13:42	+18:361	- 0'.1063	+ 0'.0118	67 Virginis..... ²	143
89:85	83:22	30	36	59:87	59:63	90.1.59:87	+18:557	- 0'.1177	- 0'.0576	79 Virginis..... ²	144
90:18	81:77	15	29	52:00	51:74	98.8.52:00	+18:365	- 0'.1193	- 0'.0466	82 Virginis..... ²	145
88:90	82:45	17	21	41:49	41:47	71.59.41:49	+18:098	- 0'.1188	- 0'.0440	4 Boötis..... ²	146
89:44	82:08	2	42	15:61	15:30	40.8.15:33	+18:054	- 0'.1159	+ 0'.0114	85 Ursæ Majoris..... ²	147
89:32	81:92	33	59	2:71	2:28	71.3.2:71	+17:810	- 0'.1199	+ 0'.0344	8 Boötis..... ²	148
89:67	83:62	18	33	22:29	22:39	98.25.22:29	+17:538	- 0'.1222	+ 0'.0333	93 Virginis..... ²	149
89:55	80:69	7	17	50:06	50:19	87.51.50:45	+17:346	- 0'.1239	- 0'.0112	94 Virginis..... ²	150
87:78	82:89	14	77	53:86	53:82	75.5.53:85	+17:305	- 0'.1127	- 0'.0166	11 Draconis..... ²	151
89:27	81:12	9	77	53:83	53:82	75.5.53:85	+17:305	- 0'.1127	- 0'.0166	" S.P.....	151
89:43	83:64	26	34	41:32	41:14	99.45.41:32	+17:051	- 0'.1252	- 0'.141	98 Virginis..... ²	152
89:12	81:06	62	184	40:83	40:80	74.14.40:83	+16:882	- 0'.1228	+ 1'.077	16 Boötis..... ²	153
88:23	82:09	21	28	41:82	41:74	70.16.41:82	+16:360	- 0'.1242	- 0'.1069	22 Boötis..... ²	154
90:14	81:72	9	27	43:82	43:67	59.8.43:75	+16:064	- 0'.1245	- 0'.1215	25 Boötis..... ²	155
89:22	82:22	19	71	43:30	42:40	62.27.42:30	+15:352	- 0'.1258	- 0'.001	36 Boötis..... ²	156
88:73	82:79	15	47	3:88	3:79	105.35.3:88	+15:089	- 0'.1324	+ 0'.072	9 Libræ..... ²	157
88:69	82:02	11	12	55:13	55:21	100.57.55:12	+14:728	- 0'.1327	- 0'.0066	15 Libræ..... ²	158
89:40	81:02	17	41	41:66	41:66	51.41:66	+14:728	+ 0'.0107	+ 0'.0005	7 Ursæ Minoris..... ²	159
88:93	82:70	4	9	31:81	30:50	49.10.31:08	+14:314	- 0'.1237	+ 0'.0336	41 Boötis..... ²	160
89:21	82:22	14	21	23:48	23:65	62.37.23:48	+14:197	- 0'.1272	+ 0'.0008	43 Boötis..... ²	161
89:44	82:05	14	27	30:26	29:97	109.22.30:26	+13:807	- 0'.1366	+ 0'.042	24 Libræ..... ²	162
87:93	82:86	6	22	36:10	36:10	98.58.36:20	+13:478	- 0'.1354	+ 0'.017	27 Libræ..... ²	163
90:17	86:93	43	5	41:43	41:65	21.50.41:47	+13:365	+ 2'.318	...	Groombridge 2283..... ²	164
90:45	86:93	22	5	41:54	41:54	21.50.41:47	+13:365	+ 2'.318	...	" S.P.....	164

143. The magnitude given in the *Uranometria Nova Occidentalis* is 1.0.145. The magnitude given in the *Uranometria Nova Occidentalis* is 0.5.156. The magnitude given is taken from Struve's *Messura Micrometrica*.

No.	Star's Name.	Mag.	Mean Date. 1880-1		No. of Observations.	Seconds of Mean R.A. 1890-0 deduced from		Adopted Mean R.A. 1890-0.	Annual Precession.	Secular Variation.	Annual Proper Motion.	
			1887 to 1891.	10-Year Catalogue.		1887 to 1891.	10-Year Catalogue.					1887 to 1891.
						a	a	b m s.	1890-0.	1890-0.	a	
165	30 Libra	6.3*	89°19'	83°04'	5	14	53°603	15.16	53°610	+ 0.0142	—	
166	33 Libra	6.2	89°18'	82°71'	10	17	3°134	15.22	3°134	+ 0.0148	—	
167	5 Corvæ	2.4	89°13'	82°19'	41	59	1°797	15.30	1°797	+ 0.0024	—	
168	24 Serpente	2.7	89°66'	82°75'	16	34	50°965	15.38	50°965	+ 0.0002	—	
169	37 Serpente	3.7	89°31'	82°94'	15	31	19°929	15.45	19°939	+ 0.0066	+ 0.0068	
170	16 Ursa Minoris	4.5	89°22'	82°82'	4	16	59°665	15.47	59°747	— 2°657	+ 0.3027	
171	41 Serpente	4.0	89°13'	82°00'	15	31	22°321	15.51	22°321	+ 2°745	+ 0.0043	
172	8 Scorpis	2.0	89°05'	83°37'	12	25	2°346	15.59	2°346	+ 3°481	+ 0.0142	
173	1 Ophiuchi	2.8	89°08'	82°10'	19	25	34°789	16.8	34°789	+ 3°142	+ 0.0081	
174	20 Herculis	3.8	89°10'	82°41'	18	39	4°007	16.17	4°007	+ 2°648	+ 0.0039	
175	14 Draconis	2.8	89°31'	82°31'	1	30	29°920	16.22	30°070	+ 0.8050	+ 0.0187	
176	21 Scorpis	1.1	89°69'	81°84'	11	28	39°722	16.22	39°722	+ 3°6715	+ 0.0150	
177	10 Ophiuchi	4.0	89°36'	83°38'	9	17	21°868	16.25	21°875	+ 3°0249	+ 0.0063	
178	13 Ophiuchi	2.8	89°43'	81°07'	12	30	6°053	16.31	6°053	+ 3°298	+ 0.0087	
179	40 Herculis	3.1	89°35'	80°87'	17	48	8°325	16.37	8°335	+ 3°927	+ 0.0007	
180	27 Ophiuchi	3.4	88°54'	82°26'	11	47	27°654	16.54	27°654	+ 2°823	+ 0.0044	
181	58 Herculis	4.0	89°31'	82°33'	8	32	4°707	16.56	4°813	+ 2°925	+ 0.0032	
182	23 Ursa Minoris	4.5	87°94'	83°46'	3	13	14°900	15.207	16.57	15°200	— 6°3448	+ 0.5092
183	35 Ophiuchi	2.6	89°22'	82°54'	16	25	4°097	17.4	4°097	+ 3°4344	+ 0.0073	
184	64 Herculis	Var.	89°42'	82°48'	20	35	37°864	17.9	37°864	+ 2°727	+ 0.0035	
185	41 Ophiuchi	3.4	89°16'	80°73'	8	22	15°142	17.15	17°172	+ 2°6809	+ 0.0080	
186	40 Ophiuchi	4.0	89°60'	82°60'	18	34	3°364	17.21	3°364	+ 2°9749	+ 0.0038	
187	23 Draconis	3.0	88°53'	82°73'	8	26	56°806	17.27	56°792	+ 1°3545	+ 0.0051	
188	55 Ophiuchi	2.2	89°37'	82°26'	32	77	49°661	17.29	49°662	+ 2°7753	+ 0.0029	
189	60 Ophiuchi	3	89°64'	82°38'	19	59	2°268	17.38	2°268	+ 2°9651	+ 0.0030	
190	86 Herculis	3.5	89°65'	82°38'	15	61	9°165	17.42	9°165	+ 2°3702	+ 0.0025	
191	89 Herculis	5.6	88°93'	82°07'	9	19	58°889	17.50	58°904	+ 2°4190	+ 0.0024	
192	33 Draconis	2.4	90°69'	81°09'	12	48	3°039	17.54	3°039	+ 1°3933	+ 0.0031	
193	72 Ophiuchi	3.9	89°17'	82°30'	36	85	8°047	18.2	8°047	+ 2°826	+ 0.0019	
194	13 Sagittarii	4.1	90°51'	82°09'	7	23	11°052	18.7	11°051	+ 1°5878	+ 0.0009	
195	23 Ursa Minoris	4.3	88°58'	82°35'	30	198	47°321	18.7	47°505	— 19°4956	— 0.2230	
196	38 Serpente	3.4	89°47'	83°55'	34	49	37°022	18.15	37°022	+ 3°1406	+ 0.0009	

172. The magnitude given is taken from Struve's *Messure Micrometrica*.174. The magnitude given is the *Transmittance* in 5.6.179. The magnitude given is the *Transmittance* in 5.6.

Mean Date. 1890-1	No. of Observations.		Seconds of Mean N.P.D. 1890-0 deduced from		Adopted Mean N.P.D.	Annual Precession.	Secular Variation.	Annual Proper Motion.	Star's Name.	No.	
1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1890-0.	1890-0.	1890-0.	1890-0.		
90°08'	83°74'	5	21	28°21'	27°32'	101.44, 27°38'	+11°038'	— 0°373	— 0°013	30 Libertas..... ^a	165
89°41'	82°74'	9	22	57°05'	57°38'	106.10, 57°18'	+12°753'	— 0°384	+ 0°016	32 Libertas..... ^a	166
89°50'	82°16'	38	71	53°05'	53°79'	62.54, 53°05'	+12°206'	— 0°208	+ 0°004	5 Corcora..... ^a	167
90°35'	81°96'	35	29	40°63'	40°54'	82.13, 40°63'	+11°585'	— 0°355	+ 0°056	24 Serpentina..... ^a	168
89°56'	83°52'	22	25	26°79'	26°71'	85.11, 26°79'	+11°117'	— 0°366	— 0°059	37 Serpentina..... ^a	169
89°46'	82°86'	12	28	2°60'	2°60'	11.52, 2°50'	+10°923'	+ 0°275	+ 0°004	16 Ursa Minoris..... ^a	170
89°01'	82°86'	7	28	2°33'	2°60'	11.52, 2°50'	+10°923'	+ 0°275	+ 0°004	 ^a S.P.	
89°09'	81°68'	15	14	44°24'	44°79'	73.58, 44°24'	+10°073'	— 0°313	+ 1°386	41 Serpentina..... ^a	171
90°23'	83°47'	16	25	13°64'	13°88'	109.30, 13°64'	+10°099'	— 0°412	+ 0°027	8 Scorpis..... ^a	172
88°77'	81°00'	24	37	38°49'	38°26'	93.24, 38°49'	+ 9°370	— 0°409	+ 0°137	1 Ophiuchi..... ^a	173
88°49'	81°68'	12	41	17°58'	17°37'	70.35, 17°58'	+ 8°706	— 0°351	— 0°048	20 Herculis..... ^a	174
88°36'	81°62'	3	45	12°29'	12°31'	12.29, 12°25'	+ 8°276	— 0°110	— 0°050	14 Draconis..... ^a	175
90°88'	81°79'	9	37	15°09'	14°14'	116.11, 14°64'	+ 8°263	— 0°491	+ 0°028	21 Scorpis..... ^a	176
89°59'	83°58'	10	21	29°18'	29°03'	87.46, 29°18'	+ 8°017	— 0°407	+ 0°065	10 Ophiuchi..... ^a	177
89°45'	82°82'	23	23	37°55'	37°06'	100.20, 37°55'	+ 7°585	— 0°448	— 0°055	13 Ophiuchi..... ^a	178
89°27'	81°33'	16	56	52°10'	51°36'	58.11, 52°10'	+ 7°092	— 0°316	— 0°410	40 Herculis..... ^a	179
89°21'	81°62'	24	44	12°08'	12°13'	80.27, 12°08'	+ 5°825	— 0°401	— 0°015	27 Ophiuchi..... ^a	180
88°56'	80°91'	11	38	40°44'	40°58'	58.54, 40°44'	+ 5°521	— 0°344	— 0°032	58 Herculis..... ^a	181
89°33'	82°17'	9	21	57°53'	57°09'	7.46, 57°42'	+ 5°433	+ 0°894	+ 0°003	23 Ursa Minoris..... ^a	182
89°40'	82°17'	6	21	57°06'	57°09'	7.46, 57°42'	+ 5°433	+ 0°894	+ 0°003	 ^a S.P.	
89°65'	82°84'	35	24	17°34'	17°40'	105.35, 17°34'	+ 4°845	— 0°488	— 0°097	35 Ophiuchi..... ^a	183
89°50'	80°90'	29	38	1°86'	2°10'	79.29, 1°86'	+ 4°371	— 0°391	— 0°030	64 Herculis..... ^a	184
89°30'	81°59'	13	24	21°05'	20°62'	114.53, 21°05'	+ 3°891	— 0°528	+ 0°035	42 Ophiuchi..... ^a	185
89°36'	82°80'	35	26	48°63'	48°56'	85.45, 48°63'	+ 3°392	— 0°439	— 0°015	49 Ophiuchi..... ^a	186
88°47'	82°31'	8	1	1°39'	1°17'	37.37, 1°30'	+ 2°796	— 0°197	— 0°004	23 Draconis..... ^a	187
87°96'	82°31'	1	25	1°38'	1°17'	37.37, 1°30'	+ 2°796	— 0°197	— 0°004	 ^a S.P.	
89°39'	82°27'	65	79	34°10'	34°40'	77.21, 34°10'	+ 2°633	— 0°402	+ 0°217	55 Ophiuchi..... ^a	188
89°86'	82°55'	42	45	10°37'	10°89'	85.23, 10°37'	+ 1°918	— 0°431	+ 0°065	60 Ophiuchi..... ^a	189
89°13'	82°47'	21	49	52°58'	52°63'	62.12, 52°58'	+ 1°559	— 0°345	+ 0°715	86 Herculis..... ^a	190
89°21'	82°78'	5	20	55°61'	55°84'	93.55, 55°73'	+ 0°789	— 0°353	— 0°009	89 Herculis..... ^a	191
90°72'	81°95'	13	46	52°68'	52°49'	38.29, 52°68'	+ 0°521	— 0°203	+ 0°028	33 Draconis..... ^a	192
88°80'	83°14'	27	37	5°00'	5°30'	80.27, 5°00'	— 0°188	— 0°415	— 0°080	72 Ophiuchi..... ^a	193
90°82'	82°29'	11	19	13°59'	13°53'	111.5, 13°59'	— 0°628	— 0°523	— 0°001	13 Sagittarii..... ^a	194
89°32'	81°89'	171	589	17°92'	18°46'	3.23, 18°05'	— 0°681	+ 2°841	— 0°040	23 Ursa Minoris..... ^a	195
89°26'	81°89'	64	64	18°41'	18°41'	3.23, 18°05'	— 0°681	+ 2°841	— 0°040	 ^a S.P.	
89°41'	84°53'	30	38	36°98'	36°77'	92.55, 36°98'	— 1°366	— 0°456	+ 0°677	38 Serpentina..... ^a	196

184. The limits of magnitude are 3.1 and 3.9; the period irregular.

185. The magnitude given is the *Transmittance* in 2.8.

No.	Star's Name.	Mag.	Mean Date, 1890-0		No. of Observations.		Seconds of Mean R.A. 1890-0 deduced from		Adopted Mean R.A.	Annual Procession.	Secular Variation.	Annual Proper Motion.
			1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.				
197	22 Sagittarii	3.1	89°50	82°56	11	37	10°867	18. 21. 10°867	+ 2°7070	- 0°0013	+ 0°0052	
198	1 Lyra	0.2	86°38	82°23	75	190	12°821	12. 33. 12°821	+ 2°0135	+ 0°0167	- 0°0121	
199	2 Aquarii	4.8	89°47	83°07	13	78	14°994	18. 36. 14°994	+ 2°2553	- 0°0010	- 0°0007	
200	10 Lyra	Var.	90°19	81°65	12	26	1°107	18. 46. 1°107	+ 2°2143	+ 0°0015	- 0°0007	
201	13 Aquile	4.1	89°13	82°88	28	60	37°761	18. 54. 37°761	+ 2°7264	+ 0°0005	- 0°0049	
202	17 Aquile	3.1	89°75	82°05	28	54	21°231	19. 0. 21°231	+ 2°7528	+ 0°0003	- 0°0036	
203	47 Sagittarii	5.2	89°81	82°62	9	26	47°708	19. 8. 47°708	+ 2°6801	- 0°0008	- 0°0004	
204	25 Aquile	5.1	89°28	82°82	24	40	39°157	19. 12. 39°157	+ 2°8164	- 0°0003	- 0°0014	
205	30 Aquile	3.5	89°18	82°55	33	47	57°101	19. 57. 57°101	+ 2°0089	- 0°0017	+ 0°0153	
206	6 Vulpeculae	4.7	89°40	82°60	19	58	7°675	19. 24. 7°675	+ 2°5054	+ 0°0009	- 0°0108	
207	38 Aquarii	4.7	89°81	82°31	13	34	42°919	19. 28. 42°919	+ 2°9173	- 0°0101	+ 0°0139	
208	51 Sagittarii	4.6	90°30	82°21	10	21	0°788	19. 30. 0°788	+ 3°6518	- 0°0103	+ 0°0016	
209	Ursæ Minoris	6.5	89°39	82°21	65	174	33°318	19. 33. 34°968	- 64°4949	- 28°4562	- 0°0523	
	" S.P.		89°79	82°21	18		33°705					
210	54 Sagittarii	5.5*	90°73	81°48	11	19	25°239	19. 34. 25°239	+ 3°4365	- 0°0074	+ 0°0026	
211	50 Aquile	2.8	89°97	81°40	20	46	1°764	19. 41. 1°764	+ 2°8517	- 0°0010	- 0°0005	
212	53 Aquile	1.0	86°42	81°77	41	85	24°937	19. 45. 24°937	+ 2°8919	- 0°0014	+ 0°0351	
213	60 Aquarii	4.0	88°88	83°19	19	35	54°544	19. 49. 54°544	+ 2°9450	- 0°0010	+ 0°0007	
214	62 Sagittarii	4.7	89°41	81°06	10	23	53°616	19. 55. 53°616	+ 3°0647	- 0°0147	+ 0°0004	
215	65 Aquile	3.4	89°66	81°87	30	57	37°713	20. 5. 37°713	+ 3°0954	- 0°0041	- 0°0001	
216	6 Capricorni	3.8	90°02	80°87	19	38	57°066	20. 11. 57°066	+ 3°3289	- 0°0085	+ 0°0022	
217	9 Capricorni	3.4	90°05	80°73	9	31	49°797	20. 14. 49°797	+ 3°2731	- 0°0006	- 0°0008	
218	11 Capricorni	5.0	90°33	82°10	12	28	35°164	20. 22. 35°164	+ 3°4993	- 0°0114	- 0°0006	
219	2 Delphini	4.1	89°59	80°05	35	53	57°438	20. 27. 57°438	+ 3°8665	- 0°0112	- 0°0006	
220	Bradley 2701	7.5*	90°04	83°32	19	4	44°984	20. 33. 45°054	- 3°5841	- 0°3949	- 0°0183	
	" S.P.		90°11	83°32	19		45°276					
221	9 Delphini	4.0	89°47	81°98	9	32	31°687	20. 34. 31°692	+ 2°7824	- 0°0001	+ 0°0031	
222	50 Cygni	1.5	89°51	81°25	5	26	40°995	20. 36. 40°995	+ 2°0437	- 0°0002	- 0°0003	
223	2 Aquarii	3.8	89°89	82°08	20	24	43°249	20. 41. 43°249	+ 3°3921	- 0°0004	- 0°0002	
224	6 Aquarii	4.8	89°87	82°44	18	26	43°210	20. 47. 43°210	+ 3°2227	- 0°0008	- 0°0003	
225	31 Vulpeculae	5.1	89°50	82°94	20	19	52°295	20. 49. 52°295	+ 2°5560	+ 0°0026	- 0°0016	
226	23 Capricorni	4.3	89°14	82°95	12	24	45°803	20. 59. 45°803	+ 3°3739	- 0°0128	+ 0°0040	
227	61 Cygni (1st Star)	5.0*	90°72	83°63	3	14	57°970	21. 1. 57°970	+ 3°3268	+ 0°0004	+ 0°3444	
228	61 Cygni	5.1	89°82	82°47	27	59	15°265	21. 8. 15°265	+ 2°5515	+ 0°0004	- 0°0003	
229	8 Borealis	4.1	89°40	82°74	13	15	19°480	21. 10. 19°480	+ 2°9969	- 0°0028	+ 0°0011	
230	5 Cephei	2.6	89°21	81°90	10	39	57°172	21. 15. 57°172	+ 3°4443	- 0°0072	+ 0°0231	
	" S.P.		88°71		8		57°131		+ 1°4443	- 0°0072	+ 0°0231	

200. The limits of magnitude are 3.4 and 4.5; the period about 124-224.

206. The letter α was added in the R.A.C.207. The magnitude given in the *Uranometria Nova Oxoniensis* is 5.1.215. The magnitude given in the *Uranometria Nova Oxoniensis* is 3.7.

Mean Date. 1890-+		No. of Observations.		Seconds of Mean N.P.D. 1890-0 deduced from		Adopted Mean N.P.D.		Annual Precession.		Secular Variation.		Annual Proper Motion.		Star's Name.	No.
1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1890-0.	1890-0.	1890-0.	1890-0.	1890-0.	1890-0.				
<i>h</i>	<i>m</i>	<i>s</i>	<i>c</i>	<i>h</i>	<i>m</i>	<i>s</i>	<i>c</i>	<i>h</i>	<i>m</i>	<i>s</i>	<i>c</i>	<i>h</i>	<i>m</i>		
89°53	82°44	9	35	54°96	54°77	115. 28. 54°86	- 1°851	- 0°538	+ 0°198	22 Sagittarii				197	
89°22	81°30	26	217	6°44	6°40	51. 19. 6°44	- 5°897	- 0°289	- 0°395	3 Lyra				198	
89°72	84°40	27	80	26°00	25°89	99. 9. 26°00	- 2°158	- 0°472	- 0°005	2 Aquarii				199	
90°35	80°89	11	33	53°13	52°71	58. 45. 53°13	- 0°000	- 0°315	- 0°017	10 Lyra				200	
89°60	81°81	24	58	51°02	50°49	75. 4. 51°02	- 4°735	- 0°385	+ 0°080	13 Aquile				201	
89°62	82°79	48	73	58°76	59°10	76. 17. 58°76	- 5°221	- 0°386	+ 0°089	17 Aquile				202	
89°71	83°00	9	32	44°75	44°59	115. 26. 44°59	- 5°930	- 0°311	- 0°039	47 Sagittarii				203	
89°24	83°01	27	25	9°36	9°57	78. 36. 9°36	- 0°221	- 0°388	- 0°010	15 Aquile				204	
89°31	82°31	34	36	14°87	14°64	87. 6. 14°87	- 6°855	- 0°410	- 0°091	30 Aquile				205	
89°03	82°13	28	40	27°20	27°23	66. 33. 27°20	- 7°198	- 0°338	+ 0°102	6 Vulpeculae				206	
89°37	83°38	24	22	15°05	15°33	82. 51. 15°05	- 7°570	- 0°391	+ 0°133	38 Aquile				207	
90°28	81°62	10	30	37°87	37°34	115. 7. 37°87	- 7°675	- 0°489	+ 0°010	53 Sagittarii				208	
89°29	82°34	145	489	59°02	59°37	1. 1. 59°19	- 7°963	+ 0°702	- 0°005	Ursæ Minoris				209	
91°04	82°37	11	22	41°92	42°10	206. 32. 41°92	- 8°031	- 0°456	+ 0°039	54 Sagittarii			S.P.	210	
89°91	81°52	10	24	16°31	16°42	79. 29. 16°31	- 8°556	- 0°373	- 0°034	50 Aquile				211	
89°41	82°25	30	59	19°12	19°47	105. 75. 19°12	- 8°903	- 0°375	- 0°384	53 Aquile				212	
89°43	83°81	13	28	3°32	3°08	82. 55. 3°32	- 9°253	- 0°378	- 0°473	60 Aquile				213	
89°45	80°67	8	12	55°18	54°81	118. 0. 55°18	- 9°715	- 0°468	- 0°074	64 Sagittarii				214	
89°55	83°18	33	52	50°35	50°20	91. 8. 50°35	- 10°450	- 0°381	- 0°014	65 Aquile				215	
89°48	82°28	13	19	8°04	7°45	102. 53. 8°04	- 10°918	- 0°403	- 0°017	6 Capricorni				216	
88°76	83°05	9	33	41°43	42°41	105. 75. 41°41	- 11°129	- 0°405	- 0°023	9 Capricorni				217	
89°57	82°50	6	23	37°11	36°79	108. 10. 36°95	- 11°687	- 0°402	- 0°009	11 Capricorni				218	
90°05	83°09	23	23	13°43	13°66	79. 4. 13°43	- 12°066	- 0°329	+ 0°002	2 Delphini				219	
89°97	83°26	65	24	24°06	24°76	8. 56. 24°09	- 12°468	+ 0°415	- 0°000	Bradley 2701				220	
90°05		24	7	24°18	24°76					" S.P.					
88°43	81°68	5	25	33°55	33°04	74. 28. 33°82	- 12°520	- 0°312	+ 0°002	9 Delphini				221	
90°21	81°85	3	27	45°03	45°65	6. 45. 45°54	- 12°734	- 0°225	- 0°003	50 Cygni				222	
90°31	83°68	13	26	53°49	53°30	99. 53. 53°49	- 13°006	- 0°356	- 0°027	2 Aquarii				223	
89°57	83°55	15	26	44°44	45°08	99. 29. 44°44	- 13°335	- 0°348	- 0°031	6 Aquarii				224	
89°10	83°33	17	27	37°82	38°05	62. 21. 37°82	- 13°540	- 0°270	- 0°000	31 Vulpeculae				225	
88°60	82°59	12	22	10°58	10°97	107. 40. 10°58	- 14°165	- 0°343	+ 0°054	23 Capricorni				226	
90°50	83°65	4	15	29°18	29°23	51. 47. 29°21	- 14°297	- 0°233	+ 3°330	61 Cygni (1st Star)				227	
89°71	82°05	27	51	26°58	26°84	60. 12. 26°58	- 14°682	- 0°248	- 0°066	64 Cygni				228	
89°29	83°11	9	18	23°80	24°15	81. 12. 23°93	- 14°804	- 0°289	- 0°078	8 Aquarii				229	
89°17	81°81	16	66	49°00	49°27	27. 52. 49°25	- 15°132	- 0°129	- 0°025	5 Cephei				230	
88°83		8	77	49°56	49°92					" S.P.					

219. The magnitude given in the *Uranometria Nova Oxoniensis* is 3.6.228. The magnitude given in the *Uranometria Nova Oxoniensis* is 3.1.

No.	Star's Name.	Mag.	Mean Date, 1890-0.		No. of Observations.	Seconds of Mean R.A. 1890-0 deduced from		Adopted Mean R.A.	Annual Precession.	Secular Variation.	Annual Proper Motion.	
			1887 to 1891.	10-Year Catalogue.		1887 to 1891.	10-Year Catalogue.					
			1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1890-0.	1890-0.	1890-0.	1890-0.
231	32 Capricorni	4.4	89° 39	82° 06	18	22	7° 265	7° 275	21. 16. 7° 265	+ 3° 3455	- 0° 0130	- 0° 0003
232	Groombridge 3548	7.4	89° 53	86° 83	43	3	28° 509	28° 512	21. 21. 28° 439	+ 1° 1979	+ 3° 1894	...
233	22 Aquarii	3.1	90° 46	83° 23	13	41	46° 056	46° 041	21. 25. 46° 056	+ 3° 1609	- 0° 0071	- 0° 0006
234	8 Cephei	3.0	88° 92	81° 96	3	39	14° 281	14° 263	21. 27. 14° 304	+ 0° 7918	- 0° 0346	- 0° 0012
	S.P.		89° 82		2		14° 455					
235	23 Aquarii	4.8	89° 20	83° 43	17	38	53° 731	53° 742	21. 31. 53° 731	+ 3° 1906	- 0° 0082	+ 0° 0038
236	8 Pegasi	2.4	89° 14	82° 64	19	39	46° 944	46° 071	21. 38. 46° 944	+ 2° 9450	- 0° 0005	+ 0° 0166
237	49 Capricorni	3.0	89° 46	81° 07	13	14	58° 117	58° 112	21. 46. 58° 117	+ 3° 3501	- 0° 0107	- 0° 0008
238	16 Pegasi	5.0	89° 52	82° 54	16	46	3° 365	3° 396	21. 48. 3° 365	+ 2° 7267	+ 0° 0053	- 0° 0005
239	34 Aquarii	3.2	89° 44	82° 05	32	36	7° 996	8° 018	22. 0. 7° 996	+ 3° 0825	- 0° 0041	- 0° 0008
240	24 Pegasi	4.0	89° 42	81° 07	14	25	53° 372	53° 391	22. 1. 53° 372	+ 2° 7679	+ 0° 0060	+ 0° 0109
241	43 Aquarii	4.3	89° 55	82° 09	20	35	1° 706	1° 717	22. 11. 1° 706	+ 3° 1621	- 0° 0076	+ 0° 0057
242	48 Aquarii	4.1	89° 46	81° 52	18	27	58° 429	58° 436	22. 15. 58° 429	+ 3° 0924	- 0° 0042	- 0° 0068
243	Bradley 2993	5.4	90° 21	85° 85	27	5	58° 914	58° 932	22. 21. 58° 888	- 4° 0597	- 1° 2729	+ 0° 0130
	S.P.		90° 21		27		58° 833					
244	57 Aquarii	4.8	88° 93	81° 02	6	22	49° 498	49° 546	22. 24. 49° 522	+ 3° 1797	- 0° 0088	- 0° 0011
245	62 Aquarii	4.7	89° 58	82° 55	19	32	42° 170	42° 182	22. 29. 42° 170	+ 3° 0786	- 0° 0021	+ 0° 0044
246	42 Pegasi	3.6	89° 46	81° 12	23	27	58° 506	58° 532	22. 35. 58° 506	+ 3° 1857	+ 0° 0003	+ 0° 0004
247	48 Pegasi	3.7	89° 68	82° 17	19	54	41° 612	41° 624	22. 44. 41° 612	+ 3° 2802	- 0° 0090	+ 0° 0066
248	73 Aquarii	3.8	89° 42	81° 51	15	42	52° 507	52° 519	22. 46. 52° 507	+ 3° 1137	- 0° 0063	- 0° 0016
249	24 Pisces Australes	1.3	89° 32	83° 08	7	26	54° 288	54° 261	22. 51. 54° 275	+ 3° 3014	- 0° 0310	+ 0° 0322
250	54 Pegasi	2.6	90° 08	82° 13	21	46	16° 850	16° 862	22. 59. 16° 850	+ 3° 2812	+ 0° 0057	+ 0° 0028
251	6 Pisces	3.8	89° 65	82° 84	23	38	27° 730	27° 740	23. 11. 27° 730	+ 3° 0594	+ 0° 0005	+ 0° 0047
252	8 Pisces	5.0	89° 51	82° 19	17	44	17° 574	17° 582	23. 21. 17° 574	+ 3° 0699	- 0° 0000	+ 0° 0041
253	Bradley 3147	5.6	90° 23	85° 18	35	6	49° 643	48° 884	23. 27. 49° 517	- 0° 1737	- 0° 5978	+ 0° 0836
	S.P.		89° 94		35		49° 315					
254	17 Pisces	4.3	89° 80	82° 76	29	40	17° 479	17° 496	23. 34. 17° 479	+ 3° 0593	+ 0° 0030	+ 0° 0334
255	35 Cephei	3.4	90° 86	82° 66	1	37	49° 740	50° 119	23. 34. 50° 083	+ 2° 4370	+ 0° 0753	- 0° 0109
	S.P.		87° 34				50° 078					
256	Sculptoris	4.6	89° 54	81° 46	8	20	11° 777	11° 761	23. 43. 11° 771	+ 3° 1262	- 0° 0161	- 0° 0099
257	28 Pisces	4.2	89° 59	82° 02	28	47	39° 707	39° 707	23. 53. 39° 707	+ 3° 0685	+ 0° 0047	+ 0° 0087
258	2 Ceti	4.6	89° 30	82° 71	19	28	6° 269	6° 233	23. 58. 6° 269	+ 3° 0761	- 0° 0080	- 0° 0001

254. The magnitude given is taken from Struve's *Messure Micrometrica*.
246. The magnitude given in the *Uranometria Nova Oxoniensis* is 3.5.

Mean Date, 1890-0.		No. of Observations.		Seconds of Mean N.P.D. 1890-0 deduced from		Adopted Mean N.P.D.	Annual Precession.	Secular Variation.	Annual Proper Motion.	Star's Name.	No.
1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1887 to 1891.	10-Year Catalogue.	1890-0.	1890-0.	1890-0.	1890-0.		
89° 56	81° 74	15	19	10° 07	10° 11	107. 18. 10° 07	-15° 141	- 0° 314	- 0° 013	32 Capricorni.....	231
89° 92	86° 48	28	7	9° 19	9° 47	3. 25. 9° 32	-15° 446	+ 1° 048	...	Groombridge 3548.....	232
90° 16	86° 48	6	7	9° 94	9° 47	3. 25. 9° 32	-15° 446	+ 1° 048	...	" " S.P.	232
89° 50	83° 54	9	36	17° 74	17° 51	96. 3. 17° 62	-15° 681	- 0° 281	+ 0° 001	22 Aquarii.....	233
88° 77	82° 07	6	74	19° 51	20° 10	19. 55. 19° 49	-15° 760	- 0° 065	+ 0° 012	8 Cephei.....	234
90° 09	82° 07	6	74	19° 47	20° 10	19. 55. 19° 49	-15° 760	- 0° 065	+ 0° 012	" " S.P.	234
89° 83	84° 02	15	38	49° 94	50° 28	98. 20. 49° 94	-16° 010	- 0° 274	+ 0° 022	23 Aquarii.....	235
89° 99	80° 68	21	37	45° 18	45° 21	80. 37. 45° 18	-16° 366	- 0° 242	- 0° 011	8 Pegasi.....	236
88° 95	80° 68	9	10	34° 32	34° 36	106. 37. 34° 68	-16° 475	- 0° 268	+ 0° 297	49 Capricorni.....	237
89° 45	83° 31	14	52	31° 92	32° 26	64. 35. 31° 92	-16° 821	- 0° 210	+ 0° 002	16 Pegasi.....	238
89° 37	83° 85	24	34	14° 45	14° 29	90. 51. 14° 45	-17° 373	- 0° 218	- 0° 002	24 Aquarii.....	239
89° 41	81° 26	13	33	30° 56	31° 76	65. 11. 30° 56	-17° 448	- 0° 192	- 0° 020	24 Pegasi.....	240
89° 86	82° 08	22	33	51° 44	51° 29	98. 19. 51° 44	-17° 829	- 0° 204	+ 0° 019	43 Aquarii.....	241
90° 12	81° 80	16	13	29° 10	29° 25	91. 56. 29° 10	-18° 013	- 0° 191	- 0° 017	48 Aquarii.....	242
89° 94	85° 59	36	9	45° 09	45° 51	4. 26. 45° 26	-18° 248	+ 0° 553	- 0° 044	Bradley 2993.....	243
89° 78	85° 59	17	9	45° 61	45° 51	4. 26. 45° 26	-18° 248	+ 0° 553	- 0° 044	" " S.P.	243
88° 94	81° 95	10	17	26° 36	27° 12	101. 14. 26° 36	-18° 349	- 0° 180	+ 0° 037	57 Aquarii.....	244
89° 43	82° 12	20	15	3° 57	3° 56	90. 41. 3° 57	-18° 517	- 0° 165	+ 0° 053	62 Aquarii.....	245
89° 67	82° 21	25	15	34° 12	34° 52	79. 44. 34° 12	-18° 721	- 0° 149	+ 0° 018	42 Pegasi.....	246
89° 94	82° 51	13	41	44° 61	45° 30	65. 58. 44° 61	-18° 981	- 0° 128	+ 0° 042	48 Pegasi.....	247
89° 54	82° 40	14	42	53° 96	53° 62	98. 9. 52° 96	-19° 042	- 0° 136	- 0° 040	73 Aquarii.....	248
89° 97	82° 68	7	29	19° 44	19° 07	120. 12. 19° 25	-19° 167	- 0° 135	+ 0° 159	24 Pisces Australes.....	249
89° 51	83° 18	14	30	11° 47	11° 83	75. 23. 11° 47	-19° 354	- 0° 106	+ 0° 030	54 Pegasi.....	250
89° 37	83° 08	14	44	7° 73	7° 62	87. 19. 7° 73	-19° 666	- 0° 086	- 0° 017	6 Pisces.....	251
89° 28	82° 53	15	37	47° 66	48° 00	89. 20. 47° 66	-19° 768	- 0° 068	+ 0° 102	8 Pisces.....	252
89° 92	85° 24	45	18	57° 42	58° 07	3. 17. 57° 46	-19° 857	- 0° 012	- 0° 003	Bradley 3147.....	253
89° 75	85° 24	35	18	57° 30	58° 07	3. 17. 57° 46	-19° 857	- 0° 012	- 0° 003	" " S.P.	253
89° 40	83° 42	14	27	12° 04	11° 90	84. 58. 12° 04	-19° 927	- 0° 042	+ 0° 443	17 Pisces.....	254
89° 42	82° 41	9	68	52° 63	53° 69	12. 58. 52° 80	-19° 953	- 0° 031	- 0° 135	55 Cephei.....	255
88° 90	82° 41	15	38	52° 95	53° 05	12. 58. 52° 80	-19° 953	- 0° 031	- 0° 135	" " S.P.	255
89° 70	83° 19	8	14	19° 38	20° 31	118. 44. 20° 02	-20° 000	- 0° 026	+ 0° 092	Sculptoris.....	256
89° 16	81° 88	24	38	44° 42	44° 83	83. 44. 44° 42	-20° 046	- 0° 005	+ 0° 108	28 Pisces.....	257
89° 33	82° 76	8	20	55° 12	54° 43	107. 56. 54° 58	-20° 053	+ 0° 004	- 0° 005	2 Ceti.....	258

250. The magnitude given in the *Uranometria Nova Oxoniensis* is 2.3.
256. Authority for Proper Motion: Cape Catalogue, 1886.