Mean colour equivalents of 834 bright stars, compiled by - (Errata: 10 146)

Hertzsprung, E.

BULLETIN OF THE ASTRONOMICAL INSTITUTES
OF THE NETHERLANDS

1940 May 18 Volume IX No. 329

COMMUNICATION FROM THE OBSERVATORY AT LEIDEN

Mean colour equivalents of 834 bright stars, compiled by *Ejnar Hertzsprung*.

Since the publication in 1922 of "Mean colour equivalents and hypothetical angular semi-diameters of 734 stars brighter than the fifth magnitude and within 95° of the north pole" [1]) so many series of accurate colour equivalents have appeared, that it seems desirable to include this new material, which increases the weight several times. Furthermore the extended photoelectric series by BOTTLINGER, BECKER and JOHN S. HALL make it possible to correct both the mean values contained in *Leiden Annals* XIV and the colour indices given in *B.A.N.* No. 35 for magnitude equation, of which the photoelectric colour equivalents are supposed to be practically free.

The new and improved scale of quasi c_2/T values, which has been adopted here and is designated by c_2/T', is similar to that of *Leiden Ann.* XIV. It has been adjusted in such a way that a linear relation to the colour indices of *B.A.N.* No. 35 is obtained. Furthermore the new scale has been freed of the magnitude equation, with which the c_2/T values of *Leiden Ann.* XIV are afflicted and which manifested itself mainly by exaggerated whiteness of the fainter white stars (l.c. pag. 14).

The corrections applied to the c_2/T values of *B.A.N.* No. 35 are as follows:

a. for magnitude: $c_2/T' = c_2/T - {\cdot}078\,(m-4)$
$\qquad\qquad\qquad\qquad\qquad\pm {\cdot}012$ (m.e.)

b. for declination:

δ	2°		6°		10°		14°		19°		24°		28.°		33.°		39°		45.°		53°		62.°		78°
corr.		7		6		5		4		3		2		1		0		−1		−2		−3		−4	

in units of ·01 in c_2/T. The mean values from which this table has been derived by comparison with the photoelectric measures are:

$$\delta = \quad 13^\circ \qquad 28^\circ \qquad 44^\circ \qquad 62^\circ.$$

$$\Delta\frac{c_2}{T} = +{\cdot}049 \quad +{\cdot}013 \quad -{\cdot}009 \quad -{\cdot}035$$

where $c_2/T' = c_2/T + \Delta\, c_2/T$. The mean value of $\Delta c_2/T$ for all the stars is zero.

c. for right ascension:

It is natural to let the co-efficient of the term $\sin(\alpha-\alpha_0)$ vary with $\cos\delta$. The formula then is

$$\text{correction} = A \sin\alpha \cos\delta + B \cos\alpha \cos\delta.$$

The values of $\sin\alpha\cos\delta$ and $\cos\alpha\cos\delta$ can be read off as rectangular co-ordinates if the polar co-ordinates α and $\cos\delta$ are drawn on paper ruled both ways. This reading has been done in the present case for each star. The result of the least squares solution is:

$$\Delta\frac{c_2}{T} = +{\cdot}010 - {\cdot}064 \sin\alpha\cos\delta - {\cdot}093 \cos\alpha\cos\delta$$
$$\qquad\qquad \pm{\cdot}023 \qquad\qquad \pm{\cdot}023 \text{ (m.e.)}$$

The co-efficient of $\sin(\alpha-\alpha_0)$ is therefore ·113/·023 or nearly 5 times its mean error.

The lines of equal correction on the diagram just described are thus straight and equidistant.

I do not expect that all the systematic errors of the c_2/T values given in *B.A.N.* No. 35 have been eliminated in this way, but only that some improvement has been achieved.

The correction for magnitude equation of the old mean values of c_2/T contained in *Leiden Ann.* XIV was effectuated in two steps. The one step was to apply a general correction for magnitude to c_2/T of all stars, viz. $-{\cdot}0683\,(m-3{\cdot}778)$ and the other to increase the c_2/T values for the faint white stars. This latter correction was after some trial adopted to be:

$$\Delta\, c_2/T = +{\cdot}146 \pm {\cdot}094\, m - {\cdot}23\, c_2/T$$
$$\pm{\cdot}007 \pm{\cdot}014 \quad \pm{\cdot}03 \text{ (m.e.)}$$

This correction was only applied in case $\Delta\, c_2/T > 0$, thus if $m = 5$ in case $c_2/T < 2{\cdot}65$ only.

Even after correction for magnitude these c_2/T values seemed to require a reduction of the weight as given in *Leiden Ann.* XIV. For further use these weights were therefore multiplied by ·7.

The colour equivalents determined photoelectrically by BOTTLINGER and BECKER [1]) were provisionally reduced to the c_2/T' scale by the aid of the formula:

$$c_2/T' \text{ prov.} = 2{\cdot}052 + 3{\cdot}011 \times c \quad \text{BECKER (68)}$$

It then proved that the relation between BECKER's c

[1]) *Leiden Ann.* XIV, part 1.

[1]) *Veroeffentl. der Univ. Sternwarte Berlin-Babelsberg* **10**, part 3, 25.

and c_2/T' was not quite linear and the following additional reductions to the c_2/T' scale were applied:

c_2/T' prov.	1·32	1·50	1·65	1·82	2·03	2·10	2·20	2·28	2·44	2·51	2·60	2·68	2·78	2·89	3·14	3·68	4·20
$c_2/T' - c_2/T'$ prov	+·06	+·08	+·10	+·12	+·15	+·16	+·18	+·19	+·19	+·18	+·16	+·14	+·12	+·11	+·10	+·08	+·06

JOHN S. HALL [1]) determined colour indices at long wavelengths using a caesium cell and two different filters designated by 87 and 89. The readings made with these two filters were compared with that observed without a filter. The two colour indices thus obtained are therefore not independent of each other and the question arises how to combine them. If the proportion between the two colour indices is n, the reading without filter in both cases being taken as zero point, their relative weight is as $2n - 1$ to $2n^{-1} - 1$.

On page 157 (l.c.) HALL states that the colours 89 have a range of ·9 magn. and the colours 87 of 1·6 magn. and on page 175 it is said that "It is interesting to note that the colours of each set are determined with very nearly the same accuracy".

Their relative weights are thus found to be as 20 to 1. That is to say that the addition of the colours 89 to those of 87 increases the weight by 5 percent only. However, a closer examination of the case leads to a different result. For the relation between the two colours 89 and 87 and the c_2/T values of *Leiden Ann.* XIV I find, disregarding stars of spectral class K2 and yellower:

$$\text{colour } 89 = -\ \cdot 649 + 1\cdot 294 \log \frac{c_2}{T}$$

$$\text{colour } 87 = -\ 1\cdot 661 + 1\cdot 661 \log \frac{c_2}{T}$$

This gives a scale proportion of 1·28. Then four readings were made without filter and also with filter 89 but only three with filter 87. The proportion between the weights of the colours 87 and 89 then comes out to be 1·9. Instead of 1·9 I have adopted 2, which is practically the same.

Finally the following reductions to the c_2/T' scale of the c_2/T values calculated by the aid of the above formulae were applied:

c_2/T	1·32	1·56	1·70	1·92	2·08	2·30	2·60	2·77	3·27	3·49	3·76	3·98	4·20	4·33
$c_2/T' - c_2/T$	+·16	+·13	+·11	+·08	+·06	+·03	·00	—·01	—·01	·00	+·02	+·04	+·06	+·07

The colour indices of G-stars later published by JOHN S. HALL [2]) are related to the c_2/T' scale by the formula: $c_2/T' = 3\cdot 100 + 4\cdot 154 \times c$ HALL (158).

The photoelectric colour indices determined by STEBBINS and HUFFER [1]) and by ELVEY [2]) deal merely with white stars. The formulae adopted are:

$$c_2/T' = 1\cdot 920 + 2\cdot 676 \times c \text{ STEBBINS and HUFFER } (174)$$
$$\pm\ \cdot 008 \pm\ \cdot 024 \text{ (m.e.)}$$

and

$$c_2/T' = 2\cdot 1895 + 1\cdot 0460 \times c \text{ ELVEY} \qquad (131)$$

The spectral photometric series which have been printed in detail are those of H. JENSEN [3]), KIENLE and his collaborators [4]) and STORER [5]).

With the exception of the Göttingen φ'_T series I have treated all these in practically the same way. For each star the gradient b, corresponding to the formula

TABLE I.

H. R.	P. G. C.		b + ·0344 JENSEN	b KIENLE	red. to $\frac{c_2}{T'}$ JENSEN	red. to $\frac{c_2}{T'}$ KIENLE
1899	1366	ι Ori	— ·0134		1·35	
1903	1370	ε Ori	— 84		1·48	
5191	3566	η UMa	— 86	— 70	1·48	1·50
3982	2698	α Leo	— 71		1·52	
1791	1304	β Tau		— 46		1·56
1220	910	ε Per		— 37		1·58
15	10	α And		— 29		1·60
5793	3961	α CrB	— 4	— 25	1·69	1·61
2095	1482	ϑ Aur		— 14		1·64
1122	838	δ Per		— 12		1·65
4905	3363	ε UMa		— 5		1·66
7001	4722	α Lyr	— 8	— 2	1·68	1·67
4295	2930	β UMa		6		1·69
7528	5048	δ Cyg		11		1·70
4554	3117	γ UMa		17		1·72
2088	1478	β Aur		31		1·76
264	199	γ Cas	83	62	1·93	1·83
7924	5320	α Cyg	93	95	1·95	1·92
7557	5062	α Aql	108		1·99	
403	314	δ Cas		108		1·95
1203	894	ζ Per		121		1·99
8162	5480	α Cep		155		2·07
21	12	β Cas		226		2·25
2943	2008	α CMi	246		2·36	
1017	772	α Per		305		2·45
424	325	α UMi	344		2·62	
7796	5229	γ Cyg		413		2·73
6212	4246	ζ Her		427		2·76
1708	1246	α Aur	482	503	2·99	2·96
6132	4192	η Dra	570	580	3·22	3·15
6536	4443	β Dra		625		3·27
2990	2031	β Gem		639		3·30
7949	5336	ε Cyg		656		3·35
4301	2933	α UMa		675		3·40
168	135	α Cas		761		3·62
5340	3662	α Boo	806	789	3·85	3·69
5563	3809	β UMi	989	996	4·34	4·21
1457	1077	α Tau	1013		4·40	
6705	4541	γ Dra		1052		4·36
337	259	β And		1110		4·50
8775	5940	β Peg		1132		4·54
2061	1468	α Ori	1190		4·61	

1) *Ap. J.* **79**, 164.
2) *Ap. J.* **88**, 340.

1) *Publ. Washburn Obs.* **15**, part 5.
2) *Ap. J.* **74**, 304.
3) *Astron. Nachr.* No. 5940-41, **248**, 217. See also *B.A.N.* No. 258.
4) *Zeitschr. f. Astrophysik* **16**, 265, Table 15 and 271, Table 17.
5) *Lick Bulletin* No. 410, **14**, 51, Table IV (the Sun: Table II).

$\Delta m_\lambda = \alpha + b\lambda^{-4}$, was determined and the linear relation between b and c_2/T' computed for each system, in which computations γ Cas was excluded. The formulae found are:

TABLE 2.

H. R.	P. G. C.		b + const. STORER	red. to $\frac{c_2}{T'}$
8622	5844	10 Lac	—·0282	1·34
7852	5272	ε Del	— 230	1·52
8539	5777	π Aqr	— 201	1·62
,,	,,	,,	— 123	1·88
7178	4824	γ Lyr	— 162	1·75
,,	,,	,,	— 218	1·57
6556	4459	α Oph	— 80	2·02
8130	5460	τ Cyg	2	2·28
6987	4713	— Oph	— 5	2·26*
7495	5031	— Cyg	— 1	2·27
8084	5432	— Cyg	127	2·65*
8615	5838	31 Cep	18	2·33
8131	5461	α Equ	43	2·40
544	421	α Tri	72	2·49
7165	4817	— Aql	107	2·59
7479	5023	α Sge	226	2·92
5889	4024	δ CrB	172	2·78
,,	,,	,,	252	2·99
7133	4797	113 Her	223	2·92
6183	4228	— Her	421	3·41*
7606	5096	— Cyg	222	2·91*
8650	5865	η Peg	293	3·10
,,	,,	,,	318	3·16
6902	4660	— Oph	328	3·19
7488	5027	β Sge	418	3·41
7921	5319	49 Cyg	331	3·20*
6228	4264	43 Her	794	4·17*
6108	4175	ν_2 CrB	821	4·21*
6418	4381	π Her	762	4·11
6695	4535	ϑ Her	658	3·92
6868	4636	106 Her	862	4·28
6860	4629	105 Her	748	4·09
45	31	χ Peg	829	4·23
6815	4606	104 Her	867	4·29
6337	4336	32 Her	857	4·27*
7566	5069	19 Cyg	937	4·40
8830	5975	7 And	— 139	1·83*
8220	5519	— Cyg	— 93	1·98
114	89	28 And	— 64	2·07
413	318	ρ Psc	1	2·28
7386	4961	3 Vul	— 3	2·27*
7061	4753	110 Her	16	2·32
7469	5014	ϑ Cyg	29	2·36
8665	5874	ξ Peg	50	2·43
,,	,,	,,	87	2·53
5933	4055	γ Ser	55	2·44
5868	4010	λ Ser	121	2·63
7672	5146	15 Sge	138	2·68*
9088	6172	85 Peg	155	2·73
8729	5917	51 Peg	162	2·75
5	3	— Cas	162	2·75*
8631	5851	— Peg	205	2·87*
5544	3798	ξ Boo	193	2·83
7670	5144	— Cyg	220	2·91*
7602	5093	β Aql	280	3·07
,,	,,	,,	256	3·00
7373	4950	— Aql	204	2·87*
6752	4571	70 Oph A	282	3·07
7689	5157	27 Cyg	301	3·12*
8085	5433	61 Cyg A	521	3·64
8086	5434	61 Cyg B	635	3·88

$c_2/T' = 1{\cdot}706 + 26{\cdot}61\,(b + {\cdot}0344)$, JENSEN, range of wavelength ·4004 to ·6080 μ. (98)

$c_2/T' = 1{\cdot}677 + 25{\cdot}47 \times b$, KIENLE S-series, range of wavelength ·4023 to ·6293 μ. (132)

$c_2/T' = 2{\cdot}275 + 30{\cdot}69\,b - 86\,b^2$, STORER, range of wavelength ·4004 to ·6120 μ. (267)

For the φ_T' values of KIENLE (l.c. Table 17, page 271) the relation $c_2/T' = 1{\cdot}666 + {\cdot}656\,\varphi'_T$ was found and this formula has been used for the reduction of φ_T' to c_2/T'. (254)

Individual values for the stars investigated by JENSEN at KIEL and by KIENLE at Göttingen are given in Table 1, while a similar list of STORER's results obtained at the Lick Observatory is contained in Table 2.

The results of other spectral photometries have only been given in the form of gradients.

The gradients G derived at Greenwich [1]) are reduced to the c_2/T'-scale by the aid of the formula

$$c_2/T' = 1{\cdot}6 + {\cdot}96\,G \qquad (126)$$

This formula was derived from stars, practically free from reddening by selective extinction in space.

For the gradients g derived at Edinburgh by SAMPSON [2]) I find: $c_2/T' = 2{\cdot}668 + {\cdot}918\,g$ (118).

The gradation φ_1 determined at the Jungfraujoch by ARNULF, BARBIER, CHALONGE et Mlle CARNAVAGGIA [3]) (l.c. Table XI, p. 172) in the visual part of the spectrum is reduced to the scale of c_2/T' by the aid of the formula $c_2/T' = {\cdot}3335 + {\cdot}9782\,\varphi_1$ (36), the later independent values given in *Annales d'Astrophysique* I, 306, Table VI by the formula $c_2/T' = {\cdot}6756 + {\cdot}8452\,\varphi_1$ (103), and l.c. II, 482, Table II by the formula $c_2/T' = {\cdot}8618 + {\cdot}7827\,\varphi_1$ (100).

The gradient c indicated by YÜ [4]) is connected with c_2/T' by the relation $c_2/T' = 2{\cdot}149 - {\cdot}370\,c$ (50).

Other formulae for the reduction of various colour equivalents to the c_2/T'-scale are:

$c_2/T' = 1{\cdot}5268 + 1{\cdot}2604\,c$, COLLMANN (blue-red) [5]) (44)

$c_2/T' = 1{\cdot}5339 - {\cdot}4677\,c$, GERASIMOVITCH [6]) (143)

$c_2/T' = {\cdot}3438 + {\cdot}8596\,c$, Miss WILLIAMS [7]) (50)

$c_2/T' = 2{\cdot}625 + 1{\cdot}673\,c$, NÖBEL [8]) (55, 25)

$c_2/T' = 1{\cdot}033 + {\cdot}1\,c + {\cdot}133\,c^2$, THÜRING [9]) (88 to 0)

---

1) *Monthly Notices* **100**, 189.
2) *Monthly Notices* **90**, 656, Table IX.
3) *Journal des Observateurs* **19**, 172, Table XI.
4) *Lick Bulletin* No. 422, **15**, 7, Table I.
5) *Zeitschr. f. Astrophysik* **9**, 196, Table 5.
6) *H.C.* No. 339.
7) *H.C.* No. 348, Table I, col. 13.
8) *Inaugural-Dissertation Leipzig*, 1934; Fundamentalsterne: Table X, weight 55, Programmsterne: Table XI, weight 25.
9) *Astron. Nachr.* **269**, 298. The whitest stars have been given the weight 88, decreasing to 80, 40 and 10 for $c_2/T' =$ 2, 3 and 4 respectively.

Some of the colour equivalents used depend partly on the same visual magnitudes and are therefore not strictly independent of each other, but these correlations are so weak that they may practically be considered as harmless.

There are several determinations of colour equivalents, which have not been taken into account in the present note mainly because of their small weight and the difficulty to determine their systematic errors.

Another compilation of all the available material has been made by Boris W. Kukarkin [1]). His general catalogue contains 1207 stars. The formula for the reduction of the mean c_2/T values of Kukarkin, K, to the scale of c^2/T' is found to be:

$$\frac{c_2}{T'} = 1{\cdot}0715 + {\cdot}7117\,K + {\cdot}0356\,K^2$$

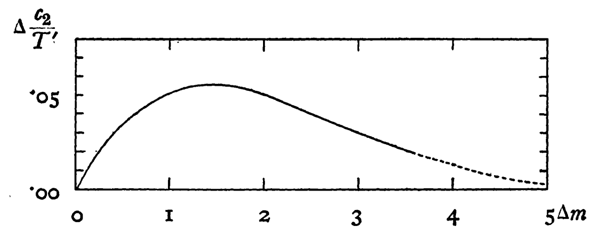
The weight, i.e. the reciprocal square of the mean error, which has been assigned to the different colour equivalents converted to the c_2/T' scale is added in parentheses behind each formula for the relation between colour equivalent and c_2/T'.

This weight is no exact measure of the accuracy of the colour equivalents used, as the character of the quantity measured by the different observers varies considerably from case to case and may be only approximately related to the adopted scale of c_2/T'. In some cases the colour equivalent measured depends predominantly on the shorter wavelengths, where the absorption of the Balmer series seriously disturbs the "normal" spectral distribution of energy. It should also be remembered that a few of the results included in the present note have been made for special purposes, in which case the colour equivalents are merely to be considered as a byproduct.

In the new General Catalogue given in the present paper all stars contained in *Leiden Annals* XIV have been included with the exception of ζ Aur and β Cyg, in which cases the colour of the integrated light means too little. Other similar cases are e.g. ε Boo, δ Sge and 95 Her. In addition about one hundred fainter stars with well determined colour have been included. Fifteen other stars not repeated in the General Catalogue are to be found in Table 2, where they have been marked with an asterisk. The sum of the weights of these 15 stars is $15 \times 267 = 4005$, which added to the weight of the General Catalogue (331965) gives a total of 335970. Further particulars about the duplicity of individual objects are to be found in the *Yale Catalogue of Bright Stars*.

In the great majority of double stars the fainter component belongs to the main series. In case the brighter component also does so its colour determines with good approximation the colour of the companion, if the difference in magnitude between the two components, Δm, is known. It is then easy to indicate the difference in colour to be expected between the total light of the double star and that of the brighter component alone. Evidently this difference is zero both for $\Delta m = 0$ and for $\Delta m = \infty$. If e.g. the brighter component is like our sun the difference $\Delta\, c_2/T'$ mentioned has a maximum of ·055 at about $\Delta m = 1^{m}{\cdot}5$. The character of the relation between Δm and $\Delta\ c_2/T'$ is shown in Figure 1.

Figure 1.



It is well known that only the white stars radiate with fair approximation like black bodies outside the hydrogen absorption. Concerning the yellow stars the approximation is unsatisfactory as a different effective temperature is derived for different parts of the spectrum.

An empirical and somewhat better representation of the relative distribution of energy in the visible part of star spectra is obtained by the use of λ^{-4} instead of λ^{-1} as argument, but the values of O–C left in doing so still show a systematic character.

Another way to arrive at a fixed scale of colour equivalents, which practically fits ordinary stars, would be to abandon all formulae and to establish a series of standard star spectra (each of which may as well represent the mean of several stars as that of individual objects) and for each star to indicate its place in that series. For this purpose the spectrum of the star in question should be compared with three standard spectra and the sum of the squares of the deviations from each of the standard spectra computed. These three sums determine the place of the star in question in the adopted series. An example will illustrate this procedure.

In Storer's paper (l.c. Table IV) individual values of Δm_λ are given for each star investigated. Out of this table I have prepared three fictive standard stars A, B and C. They are respectively represented by the mean values of Δm_λ for H.R. 6556 and 114, H.R. 8131 and 544 and H.R. 8650 and 7602. For convenience the sum of the used values of Δm_λ has been made zero for each star. The procedure just described is shown by Table 3.

[1]) *Publ. of the Sternberg State Astronomical Institute* **10**, part 2.

TABLE 3.

λ	S	A	S—A	B	S—B	C	S—C
	m	m	m	m	m	m	m
3780	— ·47	— ·19	— ·28	— ·48	— ·01	— ·90	·43
4004	— 3	28	— 31	8	— 11	— 32	29
4184	5	36	— 31	17	— 12	— 17	22
4380	16	34	— 18	27	— 11	8	8
4595	24	31	— 7	28	— 4	19	5
4807	24	18	6	20	4	23	1
4990	15	14	1	0	15	24	— 9
5190	1	— 1	2	7	— 6	18	— 17
5400	— 1	— 14	13	— 2	1	15	— 16
5780	— 3	— 23	20	— 7	4	19	— 22
6120	— 9	— 41	32	— 16	7	8	— 17
6540	— 20	— 63	43	— 32	12	7	— 27
sum of squares:			·6562		·0890		·5392

comparison star S_c	adopted scale	$\Sigma(S\text{-}S_c)^2$	Δ	$\Delta_1 + \Delta_2$	$\Delta_1 - \Delta_2$
		m^2	m^2	m^2	m^2
A	2·0	·6562	·5672		
B	2·5	·0890		·1170	1·0174
C	3·0	·5392	— ·4502		
S	2·53	·0575			

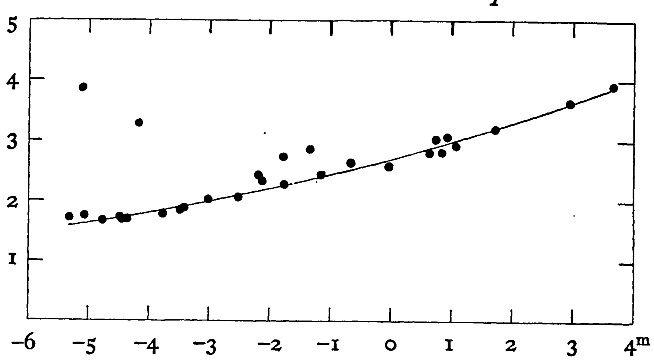
The result is that the scale value of the star S (H.R. 5868) taken as an example is

$$2{\cdot}5 + \tfrac{1}{2}\cdot\frac{{\cdot}1170}{1{\cdot}0174} \times {\cdot}5 = 2{\cdot}53$$

It is of special interest to compare these accurate colours with the absolute magnitudes of stars, as far as they are well known. This has been done in Table 4 [1]) and in Figure 2. It is readily seen that a smooth curve can be drawn which represents the

FIGURE 2.

Abscissa : $m + 5 \log p$, Ordinate : $\frac{c_2}{T'}$



main series in such a way that practically no star in the present list deviates more to the white side of that curve than may be explained by observational errors. The main series is well represented by the formula

$$\frac{c_2}{T'} = 2{\cdot}7 \times 1{\cdot}105^{\,m + 5 \log p}$$

as far as the stars of Table 4 go, but the formula is not recommended for extrapolation outside the interval $-5{\cdot}3 < m + 5 \log p < 3{\cdot}6$, though it gives $c_2/T' = 0$ for $m + 5 \log p = -\infty$. There are indications that the reddening of the colour for $m + 5 \log p > +4$ does not go on at the rate required by the formula. In fact the effective wavelengths of such absolutely faint stars do not show any further increase with decreasing brightness (*Ap. J.* **42**, 349; 1915).

TABLE 4.

P.G.C.		c_2/T'			
		$m+5\log p$	O	C	O—C
		m			
3363	ε UMa	— 5·32	1·70	1·59	+ ·11
3662	α Boo	— 5·11	3·83	1·62	+ 2·21
1478	β Aur [1])	— 5·08 [2])	1·75	1·63 [2])	+ ·12:[2])
3961	α CrB	— 4·77	1·67	1·68	— 1
3117	γ UMa	— 4·49	1·71	1·72	— 1
4722	α Lyr	— 4·45	1·69	1·73	— 4
2930	β UMa	— 4·37	1·70	1·75	— 5
	[3])	— 4·19	3·29	1·77	+ 1·52
3474	ζ UMa [1])	— 3·77	1·78	1·85	— 7
3190	δ UMa	— 3·49	1·84	1·92	— 8
	[4])	— 3·41	1·89	1·92	— 3
3480	80 UMa	— 3·02	2·02	2·00	+ 2
5062	α Aql	— 2·52	2·06	2·10	— 4
2008	α CMi	— 2·20	2·42	2·17	+ 25
3382	78 UMa	— 2·12	2·34	2·18	+ 16
4246	ζ Her	— 1·79	2·74	2·26	+ 48
2813	37 UMa	— 1·78	2·27[5])	2·26	+ 1:[5])
4497	μ Her	— 1·33	2·87	2·36	+ 51
1140	π_3 Ori	— 1·15	2·44	2·41	+ 3
4010	λ Ser	— ·67	2·64	2·53	+ 11
168	η Cas A	— ·03	2·59	2·69	— 10
3798	ξ Boo A	·64	2·81	2·88	— 7
4571	70 Oph A	·74	3·03	2·91	+ 12
244	μ Cas	·83	2·83	2·93	— 10
382	107 Psc	·92	3·06	2·96	+ 10
5009	σ Dra	1·07	2·94	3·00	— 6
588	H.R. 753	1·71	3·20[5])	3·20	0:[5])
5433	61 Cyg A	2·95	3·64	3·62	+ 2
5434	61 Cyg B	3·66	3·93	3·89	+ 4

The new Greenwich gradients published in *M. N.* **100**, 190 just came in time to be included in the present paper. It is now evident that stars affected by selective extinction of light in space do not fit into the normal sequence of colours as the place assigned to such stars in that sequence is shifted towards the red with increasing wavelength of the light used. The distribution of energy in the spectra of these stars is therefore not, as in the case of ordinary stars, properly indicated by a single figure.

[1]) The absolute magnitudes of stars belonging to the U Ma group have been taken from W. M. SMART's paper in *Monthly Notices* **99**, 448.

[1]) each of two equal components.
[2]) β Aur may not be a member of the UMa group.
[3]) mean of 4 yellow Hyades.
[4]) mean of 10 white Hyades.
[5]) weight of c_2/T' relatively small ($^1/(\text{m.e.})^2 = 68$).

General Catalogue.

H.R.	P.G.C.		m_H	Leiden XIV red. to c_2/T'	B.A.N. 35 red. to c_2/T'	mean $\frac{c_2}{T'}$	weight $\frac{1}{(m.e.)^2}$
			m				
15	10	α And	2·15	1·58	1·48	1·54	1918
21	12	β Cas	2·42	2·27	2·39	2·26	1549
39	27	γ Peg	2·87	1·39	1·18	1·32	1142
45	31	χ Peg	4·94	4·41	4·23	4·25	539
63	43	ϑ And	4·44	1·92	1·93	1·83	264
65	46	AO Cas	6·12			1·38	242
68	50	σ And	4·51	1·67	1·76	1·73	232
114	89	28 And	5·26			2·06	335
123	97	λ Cas	4·88	1·34	1·52	1·41	265
130	103	κ Cas	4·24	2·13	1·89	1·82	847
144	118	— Cas	5·14		1·41	1·39	217
153	122	ζ Cas	3·72	1·58	1·14	1·37	1125
154	123	π And	4·44	1·41	1·43	1·44	628
163	130	ε And	4·52	2·75	3·03	3·01	461
165	132	δ And	3·49	3·78	3·78	3·76	568
168	135	α Cas	2·47	3·44		3·55	544
179	141	ξ Cas	4·85	1·72	1·28	1·49	628
189	149	— Cas	5·55			1·44	242
193	152	ο Cas	4·70	1·85	1·47	1·58	585
215	164	ρ And	4·30	3·42	3·38	3·46	279
219	168	η Cas	3·64	2·70	2·59	2·60	438
224	173	δ Psc	4·55	4·33	4·09	4·31	272
226	175	ν And	4·42	1·44	1·26	1·40	391
244	189	— Cas	4·93	2·59	2·49	2·50	87
248	191	20 Cet	4·92	3·99		3·99	40
253	193	υ_1 Cas	4·95	3·56	3·65	3·68	190
264	199	γ Cas	2·25	1·58		1·65	1640
265	200	υ_2 Cas	4·83	3·43	3·21	3·28	190
269	203	μ And	3·94	1·83	1·82	1·86	421
271	206	η And	4·62	3·03	3·16	3·11	122
285	218	2 UMi	4·52	3·92		3·92	54
294	226	ε Psc	4·45	3·22	2·93	3·14	272
321	244	μ Cas	5·26			2·83	226
335	257	φ And	4·28	1·77	1·48	1·63	321
337	259	β And	2·37	4·33	4·33	4·44	678
343	264	ϑ Cas	4·25	2·07	1·89	1·96	190
351	270	χ Psc	4·89	3·03	3·48	3·25	195
352	271	τ Psc	4·70	3·33	3·54	3·50	190
360	281	φ Psc	4·64	3·16	3·37	3·35	195
383	300	υ Psc	4·67	1·39	1·49	1·60	353
390	304	ξ And	4·99	3·19	3·28	3·24	122
399	310	ψ Cas	4·96	3·69	3·33	3·45	190
403	314	δ Cas	2·80	1·95	1·95	1·91	1387
413	318	ρ Psc	5·32			2·27	335
417	321	ω And	4·96	2·35	2·19	2·24	106
424	325	α UMi	2·12	2·64		2·64	878
434	332	μ Psc	5·12			4·07	242
437	335	η Psc	3·72	3·28	2·94	3·21	619
442	338	χ Cas	4·88	3·03	3·37	3·28	102
458	350	υ And	4·18	2·61	2·53	2·56	479
464	357	υ Per	3·77	3·87	3·76	3·85	480
477	369	τ And	4·90	1·53	1·37	1·42	106
483	372	— And	5·10			2·68	226
489	378	ν Psc	4·68	3·97	3·78	3·97	199
493	382	107 Psc	5·32			3·06	226
496	384	φ Per	4·15	1·71	1·67	1·68	666
510	393	ο Psc	4·50	3·08	3·02	3·12	215
542	419	ε Cas	3·44	1·56	1·56	1·50	1599
544	421	α Tri	3·58	2·43	2·47	2·46	1009
545	422	γ Ari	4·04	1·42	1·38	1·53	224
			m				
549	426	ξ Psc	4·84	3·14	3·03	3·05	199
553	428	β Ari	2·72	1·94	1·89	1·90	1092
569	441	λ Ari	4·83	2·00	2·02	2·07	285
575	446	48 Cas	4·61	2·04	2·01	2·02	111
580	449	50 Cas	4·06	1·90	1·92	1·83	263
590	459	4 Per	4·99	1·68	1·45	1·50	174
596	463	α Psc	3·94	1·75		1·70	276
603	468	γ_1 And	2·28	4·14		3·91	339
617	477	α Ari	2·23	3·73	3·73	3·70	554
620	480	58 And	4·77	1·94	1·83	1·85	91
622	482	β Tri	3·c8	1·93	1·85	1·90	961
649	505	ξ_1 Cet	4·54	3·09	2·78	2·91	131
664	517	γ Tri	4·07	1·73	1·58	1·68	389
699	545	65 And	4·86	4·57	4·31	4·50	170
707	550	ι Cas	4·59	2·08	1·82	1·96	229
718	560	ξ_2 Cet	4·34	1·56	1·61	1·61	261
779	604	δ Cet	4·04	1·48		1·29	505
788	610	12 Per	4·99	2·39	2·30	2·33	106
799	617	ϑ Per	4·22	2·47	2·40	2·48	288
800	619	14 Per	5·58			3·02	226
801	620	35 Ari	4·58	1·47	1·34	1·45	364
804	622	γ Cet	3·58	1·95	1·68	1·79	354
813	629	μ Cet	4·36	2·27	2·23	2·21	272
824	634	39 Ari	4·62	3·86	3·27	3·50	122
834	639	η Per	3·93	4·71	4·52	4·47	301
838	643	41 Ari	3·68	1·67	1·79	1·61	701
840	644	16 Per	4·27	2·31	2·03	2·19	358
843	646	17 Per	4·67	4·49	4·33	4·42	190
854	653	τ Per	4·06	2·92	2·87	2·91	276
879	668	π Per	4·62	1·60	1·66	1·64	106
882	670	24 Per	4·97	3·51	3·62	3·64	190
887	674	ε Ari	4·64	1·77	1·83	1·76	285
890	678	— Per	5·15			1·62	242
896	679	λ Cet	4·69	1·47	1·51	1·49	131
911	691	α Cet	2·82	4·37	4·36	4·45	490
915	694	γ Per	3·08	2·82	2·87	2·87	684
921	698	ρ Per	3·2	4·50		4·44	212
932	705	— Cas	4·89	1·53	1·67	1·63	103
936	708	β Per	2·2	1·76		1·66	647
937	710	ι Per	4·17	2·57	2·58	2·64	640
941	713	κ Per	4·00	3·55	3·21	3·33	392
947	717	ω Per	4·82	3·16	3·58	3·43	117
951	718	δ Ari	4·53	3·46	3·15	3·34	199
972	730	ζ Ari	4·95	1·53	1·60	1·62	296
982	740	30 Per	5·38			1·63	242
985	741	— Cam	4·76	1·50	1·43	1·45	431
987	742	29 Per	5·30			1·49	373
989	744	31 Per	5·08			1·53	373
991	746	— Per	4·92	4·39	4·22	4·28	114
996	752	κ Cet	4·96	2·70	2·46	2·70	357
999	755	— Ari	4·72	4·12	4·29	4·23	119
1002	757	32 Per	4·98	1·66	1·65	1·65	106
1011	767	— Per	5·30			1·54	242
1017	772	α Per	1·90	2·58	2·41	2·50	1179
1030	778	ο Tau	3·80	3·12	3·10	3·08	364
1034	780	— Per	4·94	1·91	1·39	1·60	329
1035	781	— Cam	4·42	2·20	2·19	2·10	376
1037	783	— Per	5·64			1·63	242
1038	784	ξ Tau	3·75	1·62	1·75	1·59	747
1040	786	— Cam	4·76	2·48	2·35	2·36	383

H.R.	P.G.C.		m_H	Leiden XIV red. to c_2/T'	B.A.N. 35 red. to c_2/T'	mean $\frac{c_2}{T'}$	weight $\frac{1}{(m.e.)^2}$
			m				
1044	790	34 Per	4·67	1·49	1·51	1·53	488
1046	791	— Cam	4·98	1·50	1·66	1·67	171
1052	795	σ Per	4·55	4·08	3·98	4·03	206
1066	804	5 Tau	4·28	3·26	3·29	3·45	272
1087	817	ψ Per	4·26	1·89	1·39	1·57	559
1101	825	10 Tau	4·40	2·49		2·55	274
1122	838	δ Per	3·10	1·74	1·50	1·55	1521
1129	842	— Cam	4·96	3·04	2·94	2·95	87
1131	844	ο Per	3·94	1·85	2·09	1·74	1099
1135	847	ν Per	3·93	2·58	2·41	2·37	530
1140	851	16 Tau	5·43		1·30	1·48	205
1142	852	17 Tau	3·81	1·65	1·53	1·53	866
1145	856	19 Tau	4·37	1·61	1·45	1·47	499
1148	858	— Cam	4·67	1·59	1·73	1·79	171
1149	860	20 Tau	4·02	1·63	1·60	1·60	823
1155	864	— Cam	4·71	4·70	4·88	4·84	182
1156	865	23 Tau	4·25	1·76	1·75	1·65	340
1165	869	η Tau	2·96	1·63	1·74	1·59	1143
1178	877	27 Tau	3·80	1·75	1·63	1·59	433
1180	879	28 Tau	5·18		1·45	1·51	205
1203	894	ζ Per	2·91	1·87	1·96	1·84	1701
1204	896	— Cam	4·87	1·84	1·50	1·63	218
1212	901	32 Eri	4·68	2·94		2·94	38
1220	910	ε Per	2·96	1·57	1·54	1·45	1948
1228	913	ξ Per	4·05	1·79	1·81	1·69	1050
1239	920	λ Tau	3·77	1·71		1·53	648
1251	932	ν Tau	3·94	1·85		1·71	408
1256	936	37 Tau	4·50	3·16	3·63	3·45	119
1261	938	λ Per	4·33	1·82	1·77	1·79	190
1273	947	48 Per	4·03	1·81	1·73	1·65	1070
1303	967	μ Per	4·28	3·35	3·33	3·29	321
1306	970	52 Per	4·89	3·71	3·39	3·51	117
1311	972	47 Tau	4·98	3·36	2·93	3·12	131
1320	981	μ Tau	4·32	1·56	1·62	1·61	572
1324	986	b Per	4·57	1·92	1·66	1·75	111
1329	989	ω Tau	4·80	2·19	2·02	2·06	96
1343	999	54 Per	5·10			3·11	226
1346	1000	γ Tau	3·86	3·15	3·16	3·20	352
1350	1003	53 Per	4·89	1·77	1·66	1·57	617
1373	1017	δ_1 Tau	3·93	3·38	3·10	3·29	333
1380	1022	δ_2 Tau	4·84	1·75	1·79	1·77	131
1387	1026	κ Tau	4·36	1·92	1·76	1·87	337
1389	1029	δ_3 Tau	4·24	1·77	1·73	1·75	204
1392	1033	υ Tau	4·40	2·15	2·06	2·12	195
1394	1034	71 Tau	4·60	1·88	1·91	1·90	131
1396	1036	π Tau	4·94	3·06	3·09	3·08	131
1409	1044	ε Tau	3·63	3·42	3·16	3·36	358
1411	1045	ϑ_1 Tau	4·04	3·52	3·46	3·32	326
1412	1046	ϑ_2 Tau	3·62	1·78	2·01	1·97	340
1427	1054	— Tau	4·84	1·92	1·83	1·87	131
1437	1063	45 Eri	4·97	3·44		3·44	24
1444	1067	ρ Tau	4·75	2·05	2·08	2·07	131
1454	1074	58 Per	4·46	3·94	3·85	3·71	185
1458	1076	88 Tau	4·38	1·94	2·06	1·98	204
1457	1077	α Tau	1·06	4·61	4·67	4·45	590
1463	1079	ν Eri	4·12	1·46		1·36	466
1473	1087	90 Tau	4·30	1·76	1·66	1·75	190
1479	1090	σ_2 Tau	4·85	1·81	1·89	1·86	131
1497	1107	τ Tau	4·33	1·47	1·54	1·48	563
1520	1123	μ Eri	4·18	1·36		1·52	274
			m				
1542	1139	9 Cam	4·38	1·87	1·48	1·63	866
1543	1140	π_3 Ori	3·31	2·47		2·44	438
1544	1141	π_2 Ori	4·35	1·76	1·66	1·71	204
1552	1147	π_4 Ori	3·78	1·43		1·38	649
1567	1159	π_5 Ori	3·87	1·38		1·36	627
1568	1161	7 Cam	4·44	1·76	1·59	1·66	330
1570	1163	π_1 Ori	4·74	1·84	1·64	1·72	120
1577	1167	ι Aur	2·90	4·22	4·42	4·23	484
1580	1169	o_2 Ori	4·28	3·78	3·69	3·70	204
1592	1178	4 Aur	4·99	1·58	1·80	1·75	96
1601	1181	π_6 Ori	4·73	4·19		4·19	57
1603	1185	10 Cam	4·22	3·10	3·16	3·09	753
1605	1187	ε Aur	3·26	2·66		2·67	351
1620	1194	ι Tau	4·70	1·95	1·81	1·93	190
1622	1195	11 Cam	5·31			1·56	373
1637	1202	9 Aur	4·99	2·51	2·23	2·28	91
1638	1203	11 Ori	4·65	1·42	1·39	1·40	120
1641	1204	η Aur	3·28	1·38	1·52	1·45	1322
1660	1215	105 Tau	5·95			1·78	242
1666	1220	β Eri	2·92			1·82	202
1676	1227	15 Ori	4·86	2·25	1·92	2·06	131
1689	1236	μ Aur	4·78	1·94	1·99	2·02	190
1698	1240	ρ Ori	4·64	3·78		3·78	54
1708	1246	α Aur	·21	2·95	3·07	3·06	1499
1713	1250	β Ori	·34			1·56	581
1719	1253	15 Cam	6·23			1·66	242
1726	1258	16 Aur	4·81	3·82	3·93	3·89	117
1729	1259	λ Aur	4·85	2·63	2·65	2·65	355
1749	1274	ρ Aur	5·12			1·47	242
1765	1284	ο Ori	4·65	1·56		1·44	217
1770	1289	23 Ori	4·99	1·38		1·38	57
1788	1301	η Ori	3·44	1·45		1·35	621
1789	1302	25 Ori	4·73	1·45		1·45	57
1790	1303	γ Ori	1·70	1·42		1·35	1089
1791	1304	β Tau	1·78	1·54	1·57	1·53	1767
1808	1313	115 Tau	5·31			1·55	242
1811	1314	ψ Ori	4·66	1·26		1·35	299
1810	1315	ο Tau	4·83	1·63	1·48	1·45	460
1834	1327	31 Ori	4·97	4·53		4·53	43
1839	1331	32 Ori	4·32	1·48		1·47	256
1843	1333	χ Aur	4·88	2·01	2·09	2·05	621
1845	1335	119 Tau	4·73	5·16	5·10	5·05	224
1852	1339	δ Ori	2·48	1·39		1·35	1110
1858	1345	120 Tau	5·50			1·63	242
1876	1353	φ_1 Ori	4·53	1·47	1·39	1·40	773
1879	1357	λ Ori	3·49	1·46		1·38	993
1895	1363	ϑ Ori	4·85			2·01	373
1892	1364	42 Ori	4·65	1·61		1·45	217
1899	1366	ι Ori	2·87			1·31	735
1903	1370	ε Ori	1·75	1·44		1·40	1208
1907	1373	φ_2 Ori	4·39	3·57	3·35	3·31	453
1910	1375	ζ Tau	3·00	1·48	1·40	1·41	1125
1928	1388	125 Tau	5·00			1·38	242
1931	1389	σ Ori	3·78	1·60		1·40	572
1934	1391	ω Ori	4·54	1·61		1·61	57
1946	1396	126 Tau	4·87	1·43	1·41	1·42	131
1948	1398	ζ Ori	2·05	1·36		1·33	816
1952	1399	— Ori	5·00	1·55		1·35	194
1995	1429	τ Aur	4·64	3·04	2·97	3·00	117
2004	1435	κ Ori	2·20			1·39	682

H.R.	P.G.C.		m_H	Leiden XIV red. to c_2/T'	B.A.N. 35 red. to c_2/T'	mean $\frac{c_2}{T'}$	weight $\frac{1}{(m.e.)^2}$
			m				
2010	1438	134 Tau	4·92	1·46	1·56	1·59	262
2011	1439	υ Aur	4·99	4·48	4·37	4·41	117
2012	1442	ν Aur	4·18	3·50	3·51	3·53	279
2029	1453	ξ Aur	4·92	1·69	1·70	1·74	190
2034	1457	136 Tau	4·54	1·87	1·65	1·70	96
2047	1461	χ_1 Ori	4·62	2·78	2·54	2·63	206
2052	1464	57 Ori	5·89			1·46	242
2061	1468	α Ori	·92	4·75		4·71	479
2077	1472	δ Aur	3·88	3·32	3·35	3·36	340
2084	1475	139 Tau	4·90	1·77	1·54	1·56	464
2088	1478	β Aur	2·07	1·69	1·85	1·75	1727
2091	1479	π Aur	4·59	4·50	4·73	4·50	231
2095	1482	ϑ Aur	2·71	1·62	1·78	1·63	1432
2113	1494	— Ori	4·68	3·40		3·40	20
2124	1501	μ Ori	4·19	2·06	2·03	2·04	204
2135	1507	χ_2 Ori	4·71	2·38	2·14	2·01	621
2134	1508	1 Gem	4·30	3·18	3·09	3·03	263
2159	1525	ν Ori	4·40	1·54	1·52	1·40	577
2173	1534	3 Gem	5·76			1·76	242
2199	1548	ξ Ori	4·35	1·53	1·56	1·53	272
2198	1550	69 Ori	4·92	1·72	1·40	1·51	112
2209	1556	— Cam	4·73	1·55	1·54	1·62	176
2216	1561	η Gem	3·2	4·71		4·51	223
2219	1565	$\varkappa$ Aur	4·45	3·18	3·18	3·18	122
2238	1575	2 Lyn	4·42	1·45	1·59	1·63	179
2286	1604	μ Gem	3·19	4·46	4·55	4·49	345
2298	1611	8 Mon	4·48	2·03		2·03	187
2344	1634	10 Mon	4·98			1·43	242
2343	1635	ν Gem	4·06	1·70	1·42	1·50	501
2370		— Mon	5·83			1·55	242
2385	1657	13 Mon	4·50	1·77		1·77	401
2421	1690	γ Gem	1·93	1·77	1·70	1·72	960
2422		— Mon	6·06			1·63	242
2456	1706	15 Mon	4·68	1·48		1·34	633
2467		— Mon	6·20			1·50	242
2470	1716	12 Lyn	4·89	1·65	1·75	1·72	106
2473	1717	ε Gem	3·18	4·02	4·12	4·02	580
2478	1721	30 Gem	4·65	3·72	3·81	3·77	131
2483	1724	ψ_5 Aur	5·34			2·52	226
2484	1725	ξ Gem	3·40	2·44	2·36	2·42	519
2490	1730	42 Cam	5·04			1·43	242
2491	1732	α CMa	-1·58			1·63	203
2506	1740	18 Mon	4·70	3·50		3·47	120
2511	1744	43 Cam	5·13			1·53	242
2527	1758	— Cam	4·75	3·98	3·97	4·01	187
2540	1763	ϑ Gem	3·61	1·72	1·83	1·86	538
2560	1776	15 Lyn	4·54	3·10	3·01	3·04	490
2564	1778	38 Gem	4·70	2·22	2·36	2·30	131
2585	1786	ψ_{10} Aur	4·80	1·56	1·62	1·60	114
2648	1812	19 Mon	4·89	1·49		1·49	28
2650	1815	ζ Gem	4·0	2·97		2·95	304
2697	1840	τ Gem	4·48	3·92	3·80	3·85	296
2714	1853	22 Mon	4·09	1·71		1·81	124
2751	1879	— Lyn	4·80	1·88	1·85	1·85	87
2763	1886	λ Gem	3·65	1·85	2·01	1·90	398
2777	1898	δ Gem	3·51	2·25	2·28	2·23	748
2818	1928	21 Lyn	4·45	1·58	1·65	1·64	229
2821	1931	ι Gem	3·89	3·31	3·38	3·36	554
2845	1944	β CMi	3·09	1·56	1·56	1·55	783
2852	1952	ρ Gem	4·18	2·30	2·16	2·18	275

H.R.	P.G.C.		m_H	Leiden XIV red. to c_2/T'	B.A.N. 35 red. to c_2/T'	mean $\frac{c_2}{T'}$	weight $\frac{1}{(m.e.)^2}$
			m				
2854	1953	γ CMi	4·60	4·32	4·27	4·29	131
2864	1962	6 CMi	4·85	3·86	3·63	3·83	305
2891	1979	α Gem	1·58	1·78		1·76	1186
2905	1987	υ Gem	4·22	4·32	4·29	4·39	369
2930	2001	o Gem	4·92	2·24	2·21	2·28	333
2943	2008	α CMi	·48	2·44		2·42	828
2946	2010	24 Lyn	4·96	1·96	1·66	1·76	155
2973	2023	σ Gem	4·26	3·61	3·41	3·47	279
2985	2029	$\varkappa$ Gem	3·68	3·15	3·19	3·24	562
2990	2031	β Gem	1·21	3·54	3·26	3·37	813
3067	2078	φ Gem	4·99	1·58	1·62	1·61	111
3141	2126	28 Mon	4·88	3·63		3·63	28
3145	2130	13 CMi	4·52	3·94		3·87	231
3149	2131	χ Gem	5·04			3·60	242
3173	2145	27 Lyn	4·87	1·65	1·56	1·67	187
3188	2155	29 Mon	4·41	3·29		3·20	108
3208	2168	ζ Cnc	4·71	2·68		2·68	52
3216	2174	— Cam	5·73			3·09	226
3249	2195	β Cnc	3·76	4·09	4·20	4·26	498
3275	2208	31 Lyn	4·43	4·52	4·42	4·42	437
3314	2237	30 Mon	3·95	1·81		1·72	211
3323	2247	o UMa	3·47	3·19	3·14	3·08	858
3403	2290	π_2 UMa	4·76	3·62	3·61	3·61	119
3410	2295	δ Hya	4·18	1·55		1·68	198
3418	2302	σ Hya	4·54	3·91		3·83	299
3449	2327	γ Cnc	4·73	1·44	1·55	1·65	190
3454	2330	η Hya	4·32	1·21		1·36	498
3461	2336	δ Cnc	4·17	3·46	3·60	3·47	326
3475	2348	ι Cnc	4·20	3·49	3·31	3·23	451
3482	2354	ε Hya	3·48	3·03		2·81	688
3492	2361	ρ Hya	4·42	1·51		1·69	198
3547	2393	ζ Hya	3·30	3·40		3·35	487
3569	2404	ι UMa	3·12	2·04	2·02	2·01	790
3572	2407	α Cnc	4·27	1·84	1·90	1·94	498
3576	2411	ρ UMa	4·99	4·27	4·28	4·27	182
3579	2413	10 UMa	4·09	2·28	2·36	2·37	327
3594	2424	$\varkappa$ UMa	3·68	1·69	1·74	1·69	566
3612	2437	— UMa	4·71	3·48	3·39	3·31	522
3616	2441	σ_2 UMa	4·87	2·30	2·35	2·37	182
3619	2443	15 UMa	4·54	2·21	2·10	2·17	224
3624	2446	τ UMa	4·74	2·29	2·34	2·32	114
3662	2476	18 UMa	4·89	2·00	1·95	1·99	179
3665	2479	ϑ Hya	3·84	1·64		1·62	543
3690	2495	38 Lyn	3·82	1·76	2·00	1·84	793
3705	2507	40 Lyn	3·30	4·41	4·36	4·43	556
3731	2524	$\varkappa$ Leo	4·61	3·79	3·77	3·80	190
3751	2536	— Dra	4·58	4·11	4·32	4·23	201
3757	2540	23 UMa	3·75	2·16	2·21	2·22	626
3759	2541	τ_1 Hya	4·78	2·34		2·34	43
3771	2549	24 UMa	4·57	2·87	2·90	2·95	345
3773	2550	λ Leo	4·48	4·44	4·37	4·42	364
3775	2552	ϑ UMa	3·26	2·44	2·47	2·47	844
3787	2559	τ_2 Hya	4·50	1·79		1·79	50
3799	2565	26 UMa	4·65	1·64	1·60	1·67	280
3800	2566	10 LMi	4·62	3·13	3·16	3·13	522
3809	2570	— Lyn	4·99	3·23	3·42	3·37	98
3815	2573	11 LMi	5·48			2·89	226
3834	2589	2 Sex	4·78	3·87	3·85	3·86	128
3845	2595	ι Hya	4·10	3·91		3·91	43
3852	2602	o Leo	3·76	2·41	2·58	2·44	596

H.R.	P.G.C.		m_H	Leiden XIV red. to c_2/T'	B.A.N. 35 red. to c_2/T'	mean $\frac{c_2}{T'}$	weight $\frac{1}{(m.e.)^2}$
			m				
3873	2618	ε Leo	3·12	2·96	3·22	2·99	1188
3881	2626	15 LMi	5·20			2·60	226
3888	2632	υ UMa	3·89	2·24	2·20	2·15	637
3894	2637	φ UMa	4·54	1·79	1·76	1·76	190
3905	2648	μ Leo	4·10	3·74	3·86	3·78	320
3950	2680	π Leo	4·89	4·72	4·60	4·55	398
3974	2692	21 LMi	4·47	1·90	1·99	1·96	479
3975	2694	η Leo	3·58	1·55	1·84	1·70	812
3980	2696	31 Leo	4·58	4·43	4·32	4·33	305
3981	2697	15 Sex	4·50	1·49		1·49	57
3982	2698	α Leo	1·34	1·65	1·83	1·61	1560
4033	2729	λ UMa	3·52	1·76	1·91	1·80	550
4031	2730	ζ Leo	3·65	2·06	2·25	2·15	667
4054	2741	40 Leo	4·97	2·55	2·31	2·43	344
4057	2742	γ Leo	2·30	3·58		3·62	371
4069	2751	μ UMa	3·21	4·55	4·45	4·51	581
4072	2754	— UMa	4·92	1·54	1·56	1·56	185
4090	2768	30 LMi	4·83	2·01	2·07	2·07	190
4100	2776	31 LMi	4·41	3·07	3·23	3·16	364
4112	2785	36 UMa	4·84	2·68	2·42	2·51	190
4119	2792	30 Sex	4·95	1·14		1·14	43
4132	2802	— UMa	4·84	1·93	1·91	1·96	174
4133	2804	ρ Leo	3·85	1·38	1·74	1·54	709
4166	2829	37 LMi	4·77	3·09	2·91	3·00	474
4203	2866	42 LMi	5·37			1·56	242
4247	2899	46 LMi	3·92	3·18	3·51	3·44	352
4248	2900	ω UMa	4·84	1·48	1·45	1·46	111
4259	2909	54 Leo	4·51	1·51		1·74	299
4277	2920	47 UMa	5·14			2·65	400
4295	2930	β UMa	2·44	1·64	1·80	1·70	1784
4299	2931	61 Leo	4·97	4·85		4·85	43
4300	2932	60 Leo	4·42	1·66	1·77	1·79	190
4301	2933	α UMa	1·95	3·52	3·67	3·50	645
4310	2942	χ Leo	4·66	2·23	2·23	2·18	380
4335	2958	ψ UMa	3·15	3·52	3·55	3·58	370
4357	2972	δ Leo	2·58	1·88	2·05	1·90	1267
4359	2974	ϑ Leo	3·41	1·70	1·96	1·77	587
4362	2976	72 Leo	4·87	4·23	4·60	4·49	296
4368	2982	φ Leo	4·58	1·98		1·98	32
4375	2984	ξ UMa	3·86	2·39	2·77	2·63	497
4377	2985	ν UMa	3·71	3·92	4·24	4·06	540
4380	2987	55 UMa	4·78	1·76	1·79	1·78	146
4386	2990	σ Leo	4·13	1·58		1·60	184
4392	2995	56 UMa	5·06			3·33	226
4399	2999	ι Leo	4·03	2·31	2·29	2·31	525
4434	3031	λ Dra	4·06	4·39	4·70	4·53	315
4471	3058	υ Leo	4·47	3·02		3·14	111
4496	3075	61 UMa	5·46			2·91	226
4517	3089	ν Vrg	4·20	4·36	4·36	4·37	391
4518	3090	χ UMa	3·85	3·52	3·72	3·66	319
4527	3098	93 Leo	4·54	2·36	2·52	2·52	215
4534	3101	β Leo	2·23	1·82	1·76	1·82	1039
4540	3105	β Vrg	3·80	2·54		2·53	488
4554	3117	γ UMa	2·54	1·61	1·90	1·71	1500
4589	3139	π Vrg	4·57	1·77	1·91	1·84	147
4608	3155	ο Vrg	4·24	3·10	3·45	3·28	455
4660	3190	δ UMa	3·44	1·67	1·95	1·84	703
4689	3210	η Vrg	4·00	1·73		1·74	161
4697	3216	11 Com	4·91	3·09	3·46	3·32	199
4707	3224	12 Com	4·78	2·49	2·44	2·46	253
			m				
4716	3230	5 CVn	4·97	2·91	3·06	3·03	91
4737	3242	15 Com	4·56	3·30	3·64	3·55	190
4785	3279	8 CVn	4·32	2·82	2·56	2·65	607
4787	3281	ϰ Dra	3·88	1·41	1·47	1·52	1150
4789	3283	23 Com	4·78	1·64	1·64	1·72	379
4792	3285	24 Com	5·18		3·60	3·61	142
4825	3307	γ Vrg	2·91	2·21		2·16	358
4828	3309	ρ Vrg	4·95	1·56	1·88	1·77	246
4905	3363	ε UMa	1·68	1·87	1·76	1·70	1619
4910	3367	δ Vrg	3·66	4·22		4·30	311
4915	3371	12 CVn	2·90	1·79		1·66	865
4920	3374	36 Com	4·96	4·38	4·60	4·50	131
4931	3382	78 UMa	4·89	2·64	2·25	2·34	416
4932	3383	ε Vrg	2·95	3·43	3·42	3·32	360
4954	3401	41 Com	4·90	4·08	4·25	4·20	187
4963	3409	ϑ Vrg	4·44	1·51		1·63	111
4968	3412	42 Com	4·47	2·28	2·55	2·43	131
4983	3424	43 Com	4·32	2·33	2·65	2·60	569
5011	3443	59 Vrg	5·22			2·63	226
5017	3447	20 CVn	4·66	2·27	2·05	2·18	436
5054	3474	ζ UMa	2·17	1·73		1·78	1174
5062	3480	80 UMa	4·02	1·97	2·10	2·02	520
5105	3506	σ Vrg	4·93	1·53		1·76	175
5107	3508	ζ Vrg	3·44	2·01		1·91	314
5110	3511	— CVn	4·96	2·77	2·40	2·36	412
5112	3512	24 CVn	4·63	1·96	1·91	1·97	374
5127	3518	25 CVn	4·92	2·09	2·09	2·14	428
5154	3536	83 UMa	4·75	4·66	4·63	4·63	170
5185	3558	τ Boo	4·51	2·32	2·40	2·38	224
5191	3566	η UMa	1·91	1·44	1·47	1·47	2060
5200	3572	υ Boo	4·28	4·07	4·60	4·40	279
5219	3584	— CVn	4·96	4·24	4·39	4·35	98
5226	3589	10 Dra	4·77	4·48	4·19	4·24	215
5235	3596	η Boo	2·80	2·65	2·50	2·61	959
5264	3612	τ Vrg	4·34	1·70		1·84	198
5291	3626	α Dra	3·64	1·56	1·66	1·71	785
5304	3635	12 Boo	4·82	2·11	2·36	2·35	187
5313	3639	— Vrg	4·90	1·41		1·56	233
5321	3649	4 UMi	5·00		3·91	3·96	142
5329	3654	ϰ Boo	4·44	2·03		2·07	311
5340	3662	α Boo	·24	3·83	3·89	3·83	706
5351	3666	λ Boo	4·26	1·73	1·85	1·83	536
5350	3667	ι Boo	4·78	2·20	1·95	2·07	316
5361	3673	— Boo	4·83	3·10	3·50	3·35	117
5370	3681	20 Boo	4·97	3·63	3·84	3·75	128
5386	3692	A Boo	4·87	1·55		1·74	167
5404	3704	ϑ Boo	4·06	2·69	2·30	2·49	404
5409	3710	φ Vrg	4·97	2·59		2·90	111
5429	3717	ρ Boo	3·78	3·61	3·88	3·80	334
5430	3718	5 UMi	4·37	4·08	4·12	4·08	195
5435	3722	γ Boo	3·00	1·99	1·88	2·02	1251
5447	3729	σ Boo	4·48	1·94	2·15	2·29	321
5475	3749	π Boo	4·54	1·54		1·62	178
5477	3752	ζ Boo	3·86	1·59	1·92	1·74	500
5490	3761	34 Boo	4·93	4·21	4·47	4·35	135
5502	3770	ο Boo	4·69	3·22	3·20	3·21	131
5506	3771	ε Boo	2·59	3·02	3·24	3·17	401
5511	3772	109 Vrg	3·76	1·68		1·69	335
5544	3798	ξ Boo	4·80	2·95	2·92	2·86	466
5563	3809	β UMi	2·24	4·28	4·27	4·25	760

H.R.	P.G.C.		m_H	Leiden XIV red. to c_2/T'	B.A.N. 35 red. to c_2/T'	mean $\frac{c_2}{T'}$	weight $\frac{1}{(m.e.)^2}$
			m				
5570	3814	16 Lib	4·59	1·91		1·91	43
5589	3827	— UMi	4·86	4·43	4·20	4·05	185
5600	3834	ω Boo	4·93	3·95	4·11	4·05	122
5601	3835	110 Vrg	4·62	3·29		3·29	57
5602	3836	β Boo	3·63	3·11	3·17	3·18	326
5616	3842	ψ Boo	4·67	3·46	3·85	3·71	190
5618	3847	44 Boo	4·86	2·72	2·69	2·70	117
5681	3887	δ Boo	3·54	3·08	3·32	3·20	352
5691	3893	— UMi	5·23			2·52	226
5733	3926	μ Boo	4·47	2·05	2·08	2·11	171
5735	3928	γ UMi	3·14	1·75	1·76	1·78	946
5744	3936	ι Dra	3·47	3·70	3·59	3·66	311
5747	3940	β CrB	3·72	1·97	2·09	2·13	440
5774	3949	ν_2 Boo	4·98	1·63	1·72	1·73	252
5778	3953	ϑ CrB	4·17	1·60	1·40	1·49	389
5789	3960	δ Ser	3·85	2·03		2·05	111
5793	3961	α CrB	2·31	1·57	1·66	1·67	1948
5823	3979	φ Boo	5·41			3·07	226
5834	3988	ζ CrB	4·69	1·48		1·51	169
5842	3994	ι Ser	4·49	1·46	1·57	1·64	237
5849	3998	γ CrB	3·93	1·75	1·80	1·70	557
5854	4001	α Ser	2·75	3·61	3·76	3·65	458
5867	4009	β Ser	3·74	1·68	1·92	1·87	644
5868	4010	λ Ser	4·42	2·63	2·71	2·64	624
5879	4015	κ Ser	4·28	4·53	4·75	4·57	279
5881	4016	μ Ser	3·63	1·61		1·66	247
5889	4024	δ CrB	4·73	2·89	2·96	2·91	615
5892	4026	ε Ser	3·75	1·82		1·93	443
5899	4031	ρ Ser	4·88	4·14	4·12	4·13	122
5901	4032	κ CrB	4·77	3·55	3·30	3·40	122
5903	4035	ζ UMi	4·34	1·53	1·75	1·77	489
5914	4042	χ Her	4·61	2·72	2·57	2·66	390
5933	4055	γ Ser	3·86	2·46	2·45	2·44	635
5947	4063	ε CrB	4·22	3·63	3·79	3·73	288
5960	4072	— Dra	4·96	2·15	1·99	2·11	297
5971	4080	ι CrB	4·91	1·45	1·43	1·54	243
5972	4081	π Ser	4·82	1·64	1·56	1·68	237
5982	4089	υ Her	4·64	1·64	1·46	1·57	403
5986	4090	ϑ Dra	4·11	2·47	2·67	2·53	304
6018	4108	τ CrB	4·94	3·33	3·22	3·26	117
6023	4112	φ Her	4·26	1·56	1·55	1·63	565
6056	4134	δ Oph	3·03	4·40		4·32	187
6075	4147	ε Oph	3·34	3·29		3·30	156
6092	4162	τ Her	3·91	1·48	1·34	1·48	1024
6093	4163	σ Ser	3·91	2·20	2·35	2·28	131
6095	4165	γ Her	3·79	2·17	2·07	2·14	404
6103	4169	ξ CrB	4·72	3·24	3·31	3·28	122
6117	4182	ω Her	4·53	1·67	1·63	1·71	375
6132	4192	η Dra	2·89	3·25	3·20	3·18	1146
6149	4203	λ Oph	3·85	1·62		1·72	291
6148	4204	β Her	2·81	3·24	3·32	3·27	489
6159	4212	29 Her	4·92	4·33	4·39	4·36	131
6161	4213	15 Dra	4·98	1·55	1·56	1·65	366
6168	4220	σ Her	4·25	1·67	1·62	1·68	389
6212	4246	ζ Her	3·00	2·75	2·62	2·74	1187
6220	4255	η Her	3·61	3·22	3·11	3·19	359
6223	4259	18 Dra	5·00	3·56	3·67	3·63	122
6228	4264	43 Her	5·38			4·17	335
6237	4270	— Dra	4·88	2·35	2·21	2·26	185
6254	4284	52 Her	4·86	1·72	1·81	1·81	298
			m				
6281	4302	ι Oph	4·29	1·40	1·67	1·58	316
6299	4315	κ Oph	3·42	3·65	3·91	3·66	362
6315	4322	19 Dra	4·82	2·28	2·59	2·42	190
6318	4323	30 Oph	5·00	3·88		3·88	43
6322	4327	ε UMi	4·40	3·13		3·11	130
6324	4328	ε Her	3·92	1·58	1·71	1·60	586
6355	4346	60 Her	4·91	1·72	2·15	1·94	246
6396	4368	ζ Dra	3·22	1·47	1·47	1·53	673
6406	4373	α Her	3·31		4·48	4·52	172
6410	4376	δ Her	3·16	1·87	1·64	1·80	519
6415	4379	41 Oph	4·82	3·50		3·50	43
6418	4381	π Her	3·36	3·94	4·09	4·07	605
6431	4388	68 Her	4·61	1·11		1·38	403
6436	4391	69 Her	4·80	1·43	1·59	1·62	305
6485	4419	ρ Her	4·14	1·50		1·60	169
6493	4423	— Oph	4·61	2·15		2·23	108
6498	4425	σ Oph	4·44	4·08		4·08	57
6526	4438	λ Her	4·48	3·97	3·83	3·89	122
6536	4443	β Dra	2·99	3·16	3·13	3·20	1197
6554	4458	ν Dra	4·21	1·92	1·92	2·09	311
6556	4459	α Oph	2·15	1·96	1·85	1·95	1237
6588	4479	ι Her	3·79	1·47	1·36	1·45	994
6596	4483	ω Dra	4·87	2·49	2·15	2·31	190
6603	4487	β Oph	2·94	3·65		3·61	283
6623	4497	μ Her	3·48	2·77	2·81	2·87	519
6629	4500	γ Oph	3·74	1·58		1·69	390
6636	4504	ψ Dra	4·58	2·25		2·25	32
6688	4531	ξ Dra	3·90	3·70	3·66	3·61	327
6695	4535	ϑ Her	3·99	3·59	3·81	3·86	571
6703	4538	ξ Her	3·82	3·21	3·15	3·20	339
6705	4541	γ Dra	2·42	4·46	4·38	4·34	632
6707	4542	ν Her	4·48	2·15	2·02	2·13	190
6710	4544	ζ Ser	4·60	2·23		2·23	43
6712	4545	66 Oph	4·81	1·53		1·55	425
6713	4547	93 Her	4·71	3·61	3·82	3·74	117
6714	4548	67 Oph	3·92	1·69		1·70	1070
6723	4552	68 Oph	4·44	1·71		1·71	46
6729	4556	95 Her	4·42	2·20		2·21	97
6752	4571	70 Oph	4·07	3·03		3·08	504
6770	4580	71 Oph	4·73	3·29	3·39	3·24	289
6771	4581	72 Oph	3·73	1·88	2·07	1·93	535
6779	4584	ο Her	3·83	1·74	1·62	1·71	614
6787	4590	102 Her	4·32	1·28	1·35	1·41	694
6789	4591	δ UMi	4·44	1·63		1·64	274
6815	4606	104 Her	5·02			4·28	335
6860	4629	105 Her	5·49			4·12	335
6866	4635	74 Oph	4·92	3·13		3·12	215
6868	4636	106 Her	4·98	3·68	4·31	4·27	442
6869	4638	η Ser	3·42	3·38		3·26	152
6872	4639	κ Lyr	4·34	3·42	3·54	3·54	195
6895	4656	109 Her	3·92	3·43	3·60	3·63	288
6902	4660	— Oph	5·69			3·22	408
6920	4670	φ Dra	4·24	1·46	1·51	1·59	423
6923	4671	39 Dra	4·85	1·70	1·71	1·77	305
6927	4672	χ Dra	3·69	2·55	2·60	2·56	429
6945	4686	42 Dra	4·99	3·40	3·60	3·55	98
6978	4707	45 Dra	4·95	2·75	2·51	2·63	199
7001	4722	α Lyr	·14	1·78	1·76	1·69	1732
7051	4747	4 Lyr	4·68	1·64	1·81	1·85	248
7053	4749	5 Lyr	4·50	1·71	1·76	1·91	248

H.R.	P.G.C.		m_H	Leiden XIV red. to c_2/T'	B.A.N. 35 red. to c_2/T'	mean $\frac{c_2}{T'}$	weight $\frac{1}{(m.e.)^2}$
			m				
7056	4752	ζ Lyr	4·06	2·21	1·86	1·99	316
7061	4753	110 Her	4·26	2·30	2·28	2·35	571
7063	4756	6 Aql	4·47	3·17		3·42	111
7064	4758	— Lyr	4·92	3·27	3·46	3·39	117
7069	4761	111 Her	4·37	1·81	1·98	1·84	346
7106	4776	β Lyr	3·4	1·98		1·67	381
7125	4790	ο Dra	4·78	3·68	3·70	3·66	190
7131	4794	δ_1 Lyr	5·51			1·31	316
7133	4797	113 Her	4·56	2·83	2·90	2·95	457
7137	4799	— Dra	4·97	3·23	2·95	3·07	249
7139	4800	δ_2 Lyr	4·52	4·34	4·45	4·33	251
7141	4802	ϑ Ser	4·10	1·92		1·90	134
7157	4814	R Lyr	4·3	3·89		4·11	204
7162	4815	— Lyr	5·21			2·69	226
7165	4817	— Aql	5·37			2·66	335
7176	4823	ε Aql	4·21	3·43	3·25	3·41	288
7178	4824	γ Lyr	3·30	1·73	1·56	1·64	993
7180	4825	υ Dra	4·91	3·62	3·34	3·53	190
7235	4858	ζ Aql	3·02	1·76	1·61	1·74	903
7236	4859	λ Aql	3·55	1·77		1·57	584
7262	4873	ι Lyr	5·13			1·46	242
7298	4897	η Lyr	4·46	1·36	1·06	1·40	764
7306	4906	1 Vul	4·60	1·47	1·50	1·54	565
7310	4909	δ Dra	3·24	3·30	3·20	3·32	323
7314	4912	ϑ Lyr	4·46	3·83	3·64	3·74	215
7318	4917	2 Vul	5·40			1·61	242
7328	4923	κ Cyg	3·98	3·29	3·22	3·23	300
7352	4940	τ Dra	4·63	3·64	3·96	3·81	190
7358	4942	3 Vul	4·92	1·48	1·38	1·46	376
7371	4948	π Dra	4·63	1·32	1·73	1·67	233
7372	4949	2 Cyg	4·86	1·33	1·49	1·47	618
7377	4953	δ Aql	3·44	2·23		2·21	522
7387	4962	ν Aql	4·86	2·60		2·60	57
7405	4976	6 Vul	4·63	4·19	4·30	4·26	122
7420	4988	ι Cyg	3·94	1·96	1·96	1·92	555
7426	4992	8 Cyg	4·85	1·39	1·37	1·42	502
7429	4995	μ Aql	4·65	3·74		3·74	57
7437	4998	9 Vul	4·88	1·51	1·44	1·51	231
7447	5004	ι Aql	4·28	1·78		1·62	317
7462	5009	σ Dra	4·78	3·04	2·87	2·94	383
7469	5014	ϑ Cyg	4·64	2·14	2·23	2·30	473
7478	5021	φ Cyg	4·79	3·15	3·26	3·22	122
7479	5023	α Sge	4·37	2·90	2·87	2·89	839
7488	5027	β Sge	4·45	3·28	3·20	3·35	482
7495	5031	— Cyg	5·05			2·29	335
7525	5047	γ Aql	2·80	4·10	3·99	4·16	507
7528	5048	δ Cyg	2·97	1·77	1·51	1·63	1353
7536	5052	δ Sge	3·78	4·32	3·98	4·14	327
7546	5058	ζ Sge	4·95	1·44	1·68	1·68	246
7557	5062	α Aql	·89	2·12	2·10	2·06	1019
7565	5068	12 Vul	4·91	1·49	1·36	1·45	578
7566	5069	19 Cyg	5·43			4·38	335
7570	5071	η Aql	3·7	2·96		2·84	120
7582	5079	ε Dra	3·99	3·06	3·30	3·16	288
7589	5083	— Cyg	5·51			1·41	242
7592	5086	13 Vul	4·50	1·59	1·58	1·59	237
7595	5089	ξ Aql	4·86	3·30	3·45	3·38	131
7602	5093	β Aql	3·90	3·03		3·05	708
7613	5102	22 Cyg	4·87	1·41	1·30	1·48	578
7615	5103	η Cyg	4·03	3·26	3·11	3·28	306
7619	5105	ψ Cyg	4·80	1·76	1·78	1·86	300
7635	5118	γ Sge	3·71	4·27	4·14	4·29	362
7647	5127	25 Cyg	5·15			1·43	202
7653	5132	15 Vul	4·74	1·84	1·82	1·90	237
7678	5150	— Cyg	5·69			2·34	242
7685	5153	ρ Dra	4·66	4·09	3·85	3·94	122
7688	5156	17 Vul	5·08			1·41	242
7708	5170	28 Cyg	4·82	1·77	1·36	1·45	749
7710	5171	ϑ Aql	3·37	1·70		1·64	268
7724	5182	ρ Aql	4·96	1·73	1·81	1·75	246
7730	5186	30 Cyg	4·96	1·45	1·87	1·79	243
7735	5187	31 Cyg	3·95	4·00	3·77	3·78	306
7736	5188	29 Cyg	4·98	1·78	1·84	1·89	232
7739	5190	— Vul	4·82	1·28	1·36	1·41	613
7740	5191	33 Cyg	4·32	1·99	1·83	1·90	405
7741	5192	22 Vul	5·38			3·23	226
7744	5195	23 Vul	4·73	4·26	3·80	3·98	122
7750	5199	κ Cep	4·40	1·50	1·56	1·61	444
7751	5200	32 Cyg	4·16	4·10	4·33	4·22	299
7763	5208	P Cyg	4·88	2·41		2·17	831
7796	5229	γ Cyg	2·32	2·91	2·99	2·76	1295
7806	5235	39 Cyg	4·60	4·04	3·91	3·96	122
7834	5255	41 Cyg	4·09	2·28	2·25	2·28	288
7844	5265	ω_1 Cyg	4·89	1·24	1·64	1·53	633
7850	5270	ϑ Cep	4·28	2·08	2·16	2·04	389
7852	5272	ε Del	3·98	1·53	1·55	1·52	1052
7866	5279	47 Cyg	4·85	4·78	4·31	4·41	175
7871	5282	ζ Del	4·69	1·91	2·13	1·92	257
7882	5291	β Del	3·72	2·35	2·35	2·40	667
7884	5294	71 Aql	4·51	2·98		2·98	43
7891	5301	29 Vul	4·78	1·44	1·66	1·59	111
7896	5304	κ Del	5·23			2·79	226
7906	5310	α Del	3·86	1·73	1·74	1·64	795
7924	5320	α Cyg	1·33	1·85	1·88	1·84	1508
7928	5323	δ Del	4·53	2·26	2·32	2·23	330
7929	5325	51 Cyg	5·41			1·51	242
7942	5331	52 Cyg	4·34	3·48		3·18	116
7948	5335	γ Del	4·12	3·04		3·00	130
7949	5336	ε Cyg	2·64	3·42	3·48	3·40	696
7955	5344	— Cep	4·63	2·72	2·63	2·58	474
7957	5346	η Cep	3·59	3·33	3·31	3·30	355
7963	5350	λ Cyg	4·47	1·56	1·39	1·54	721
7977	5361	55 Cyg	4·89	2·74	2·44	2·17	795
7995	5373	31 Vul	4·76	3·16	2·98	3·05	280
8001	5375	57 Cyg	4·68	1·46	1·56	1·49	435
8028	5393	ν Cyg	4·04	1·73	1·90	1·75	425
8047	5410	59 Cyg	4·86	2·06	1·93	1·51	562
8053	5414	60 Cyg	5·24			1·31	202
8079	5431	ξ Cyg	3·92	4·50	4·76	4·54	305
8085	5433	61_1 Cyg	5·57		3·62	3·64	341
8086	5434	61_2 Cyg	6·28		4·09	3·93	341
8089	5436	63 Cyg	4·88	4·17	4·47	4·38	107
8097	5443	γ Equ	4·76	2·17	2·63	2·33	249
8115	5452	ζ Cyg	3·40	3·16	3·45	3·20	380
8123	5455	δ Equ	4·61	2·48	2·66	2·52	199
8130	5460	τ Cyg	3·82	2·40	2·37	2·34	895
8131	5461	α Equ	4·14	2·54		2·45	472
8143	5469	σ Cyg	4·28	1·94	1·81	1·89	439
8146	5471	υ Cyg	4·42	1·57	1·61	1·58	592
8154	5474	68 Cyg	5·06			1·60	536

H.R.	P.G.C.		m_H	Leiden XIV red. to c_2/T'	B.A.N. 35 red. to c_2/T'	mean $\frac{c_2}{T'}$	weight $\frac{1}{(m.e.)^2}$
			m				
8162	5480	α Cep	2·60	1·92	2·19	2·05	1430
8171	5488	6 Cep	5·18			1·52	242
8173	5489	1 Peg	4·24	3·58	3·61	3·50	297
8209	5512	69 Cyg	5·84			1·45	373
8220	5519	— Cyg	5·74			2·02	335
8225	5522	2 Peg	4·76	4·40	4·56	4·43	182
8232	5527	β Aqr	3·07			2·95	276
8238	5532	β Cep	3·32	1·45	1·50	1·39	1195
8243	5535	— Cep	5·52			1·72	242
8252	5543	ρ Cyg	4·22	3·00	3·02	3·04	211
8255	5546	72 Cyg	4·98	3·86	3·60	3·64	87
8279	5563	9 Cep	4·87	2·11	2·08	2·01	724
8281	5565	— Cep	5·64			1·77	476
8301	5580	π_1 Cyg	4·78	1·36	1·51	1·48	593
8308	5584	ε Peg	2·54	4·13	4·23	4·17	536
8309	5587	μ Cyg	4·45	2·38	2·38	2·38	111
8313	5590	9 Peg	4·52			3·42	215
8315	5592	κ Peg	4·27	2·39	2·49	2·34	295
8316	5593	μ Cep	4·2	5·18		4·98	201
8317	5594	11 Cep	4·85	3·37	3·55	3·53	190
8327		— Cep	5·97			1·93	202
8334	5608	ν Cep	4·46	2·42	2·56	2·48	497
8335	5609	π_2 Cyg	4·26	1·40	1·48	1·52	691
8343	5617	14 Peg	5·00	1·52	1·35	1·50	237
8356	5627	16 Peg	5·05			1·43	242
8357	5629	— Cyg	5·54			1·47	242
8371	5639	13 Cep	6·01			2·58	242
8375	5642	— Cep	5·85			1·50	242
8384		— Cep	6·28			1·57	242
8402	5663	ο Aqr	4·66	1·48		1·49	236
8406	5667	14 Cep	5·50			1·62	202
8413	5674	ν Peg	4·90	4·40	3·96	4·21	199
8414	5676	α Aqr	3·19	3·02		3·09	201
8417	5679	ξ Cep	4·40	2·29		2·26	310
8427		— Lac	6·16			1·47	202
8428	5687	19 Cep	5·17			1·61	476
8430	5688	ι Peg	3·96	2·27	2·30	2·27	412
8450	5703	θ Peg	3·70	1·79	1·55	1·70	722
8454	5709	π Peg	4·38	2·42	2·41	2·39	263
8465	5714	ζ Cep	3·62	3·93	4·25	4·17	433
8468	5716	24 Cep	4·99	3·01	3·15	3·10	182
8469	5719	λ Cep	5·19		1·89	1·79	519
8485	5732	— Lac	4·64	3·97	4·05	4·02	122
8494	5742	ε Cep	4·23	2·15	2·15	2·16	444
8498	5746	1 Lac	4·22	3·98	4·03	4·00	263
8518	5761	γ Aqr	3·97	1·53		1·59	252
8520	5762	31 Peg	4·93	1·42	1·51	1·46	602
8522	5763	32 Peg	4·88	1·71	1·63	1·66	366
8523	5764	2 Lac	4·66	1·35	1·50	1·47	391
8528		— Lac	6·27			1·56	242
8538	5776	3 Lac	4·58	3·31	3·28	3·31	190
8539	5777	π Aqr	4·64	1·80	1·86	1·61	879
8541	5779	4 Lac	4·64	1·85	1·80	1·81	426
8551	5790	35 Peg	4·93	3·12	3·37	3·28	116
8558	5793	ζ Aqr	3·75	2·47		2·32	98
8561	5796	— Cep	5·66			1·90	202
8572	5804	5 Lac	4·61	4·64	4·39	4·41	185
8571	5807	δ Cep	3·7	2·88		2·70	445
8579	5810	6 Lac	4·54	1·50	1·51	1·53	597
8585	5813	7 Lac	3·85	1·79	1·82	1·70	605
8597	5824	η Aqr	4·13	1·48		1·55	111
8603	5833	8 Lac	5·38			1·47	202
8606	5834	— Lac	6·20		1·45	1·57	208
8613	5837	9 Lac	4·83	2·02	1·91	2·01	300
8615	5838	31 Cep	5·22			2·33	335
8622	5844	10 Lac	4·91	1·38	1·30	1·35	1105
8632	5852	11 Lac	4·64	3·98	3·86	3·90	117
8634	5853	ζ Peg	3·61	1·67	1·53	1·54	990
8640	5856	12 Lac	5·18			1·33	202
8641	5858	ο Peg	4·85	1·48	1·47	1·56	382
8650	5865	η Peg	3·10	3·16	3·03	3·07	972
8665	5874	ξ Peg	4·31	2·46	2·56	2·46	615
8667	5875	λ Peg	4·14	3·23	3·37	3·30	285
8684	5885	μ Peg	3·67	3·23	3·00	3·07	353
8690	5890	14 Lac	5·84			1·69	242
8694	5891	ι Cep	3·68	3·25	3·39	3·38	459
8702	5899	— Cep	4·97	3·88		3·88	54
8717	5910	ρ Peg	4·95	1·62	1·79	1·66	265
8725	5913	16 Lac	5·54			1·42	202
8729	5917	51 Peg	5·59			2·76	493
8748	5927	— Cep	4·96	4·03		4·03	27
8752	5931	— Cas	5·48			3·69	226
8762	5933	ο And	3·63	1·63	1·40	1·53	821
8773	5939	β Psc	4·58	1·40	1·64	1·55	427
8775	5940	β Peg	2·61	4·55		4·53	532
8780	5942	3 And	4·91	3·29	3·41	3·40	185
8781	5944	α Peg	2·57	1·57	1·12	1·56	955
8795	5952	55 Peg	4·69	4·45	4·47	4·43	272
8796	5954	56 Peg	4·98	3·74	3·82	3·75	187
8797	5955	1 Cas	4·93	1·56	1·66	1·55	514
8819	5966	π Cep	4·56	3·11	3·01	2·93	361
8830	5975	7 And	4·62	2·08	2·17	1·94	457
8852	5988	γ Psc	3·85	3·23	2·85	3·06	385
8860	5993	8 And	4·99	4·32	4·42	4·42	263
8872	6000	ο Cep	4·90	2·96	3·07	3·03	159
8880	6005	τ Peg	4·65	1·71	2·19	1·96	316
8905	6024	υ Peg	4·57	2·67	2·54	2·61	674
8911	6031	κ Psc	4·94	1·61	1·69	1·73	423
8916	6037	θ Psc	4·45	3·11	3·42	3·29	362
8923	6040	70 Peg	4·67	3·32	3·14	3·21	215
8926	6046	AR Cas	4·87	1·50	1·36	1·47	630
8961	6071	λ And	4·00	3·30	3·26	3·23	309
8965	6073	ι And	4·28	1·72	1·54	1·60	409
8969	6077	ι Psc	4·28	2·35	2·61	2·47	304
8974	6078	γ Cep	3·42	3·50	3·52	3·46	486
8976	6080	κ And	4·33	1·56	1·40	1·49	321
8984	6084	λ Psc	4·61	1·90	1·86	1·90	305
8997	6094	78 Peg	4·98	3·46	3·15	3·19	190
9045	6135	ρ Cas	4·85	3·74	3·32	3·44	229
9052	6142	— Cas	6·05		1·74	1·73	316
9064	6150	ψ Peg	4·75	4·48	4·31	4·36	288
9071	6155	σ Cas	4·93	1·64	1·54	1·52	623
9072	6156	ω Psc	4·03	2·53	2·39	2·37	313
9088	6172	85 Peg	5·85			2·81	493