THE CAPE PHOTOGRAPHIC DURCHMUSTERUNG.

Corrections to the C. P. D.

1. In *Harvard C. O. Annals* **76** a first investigation of the corrections to the C. P. D. magnitudes was made. From the first six hours of the Draper Catalogue, which were complete at that time, the photographic magnitudes were taken and used to derive reductions of the C. P. D. scale to the Harvard scale, first as a function of magnitude (Table III, p. 246), completed by a constant reduction different for each plate. Afterwards, when the whole Draper Catalogue had been completed, this investigation was extended over the whole sky (*Harvard Annals* **80,** N⁰. 13). The dependence on magnitude was not determined anew ; only for the fainter classes, where the stars of the Draper Catalogue become scarce, the curve giving the correction as a function of magnitude was continued by comparison with the "Harvard regions" at $-45°$. These corrections (Table V, p. 235) were applied to the C. P. D. magnitudes, and the mean of the remaining differences D. C.—C. P. D. for each plate, rounded to the next tenth magnitude, was adopted as a constant plate correction. These plate corrections are found for the whole C. P. D. in Table VII of H. A. **80,** N⁰. 13, first column.

This supposition, that the correction of the C.P.D. is composed of two parts, the first a function of magnitude that is constant over the whole sky, and the second a plate correction constant for all magnitudes, tacitly assumes that the mean colour changes with magnitude in the same way within and without the galactic zone. For the magnitudes of the C. P. D., though determined from photographs, have been adapted to the visual scale of Gould's Zone Catalogue. Since this assumption is not true, the dependence on magnitude will itself vary with galactic latitude. The adopted correction table has been derived chiefly from regions of high galatic latitude. Thus we may expect that for high latitudes the differences D. C.—C. P. D. on a plate will be fairly constant, but for low latitudes they will show a variation with magnitude. The published results, containing only the average correction for each plate, do not allow to test this matter. At my request Director Harlow Shapley has kindly sent me a manuscript copy of the list of separate differences for all the stars on each plate. They form the basis of the following discussion.

2. The data are not sufficient to derive independant correction curves for too small parts of the sky. Hence we will assume the correction to the C. P. D. magnitudes to consist of three parts: **1.** a function of magnitude valid for large regions in the sky (3 regions in the galactic zone, with plate centres between $\pm 20°$, 4 in the intermediate zone 20°—40°, 2 in the polar zone 40°—90°) ; **2.** a linear correction to this function, valid to a number of consecutive plates of the same zone of declination ; **3.** a constant plate correction.

In order to find the first part, for each region the mean of the differences (which are the remaining differences after the two corrections of H. A. **80** Table V and Table VII, the magnitude function and the adopted plate correction, have been applied) for each tenth magnitude was computed. To these means the values of Table V must be added to get the difference D. C.—C. P. D. The results are given in Table 1. of this paper. The regions *Ga*, *Gb*, *Gc* denote the galactic plates N of —43° in 6^h—11^h A. R., N of —43° in 14^h—19^h, and S of —43° in 9^h—16^h; the regions *Ma Mb Mc Md* denote the plates of medium latitude 4^h—7^h N of —53°, 9^h—15^h N of — 43°, 20^h—23^h N of —53°, and the part S of —53, containing the southern pole; the regions *Pa* and *Pb* are the polar regions around the S galactic pole, N and S of —38°. It appears that indeed the differences for the galactic zone show a systematic course, while for the polar zone they are small.

Table 1. Reduction of C. P. D. to the Harvard scale.

m C.P.D.	Differences C. P. D. corrected — D. C.								
	Ga	*Gb*	*Gc*	*Ma*	*Mb*	*Mc*	*Md*	*Pa*	*Pb*
> 6.3	—04	—11	+03	—05	—25	—16	+07	—01	—05
6.3—5	—18	—09	—10	—02	—33	—21	+04	—05	+05
6.6—7	—15	—24	—16	—18	—31	—29	+06	—09	—00
6.8—9	—19	—17	—20	—04	—14	—01	+06	—07	—01
7.0—1	—22	—26	—22	—18	—26	+05	—10	—11	00
7.2—3	—27	—10	—26	—16	—12	—04	—04	—03	—01
7.4	—21	—19	—28	—09	—17	—17	—09	—02	—03
7.5	—17	—16	—24	—06	—22	—04	—04	+05	+01
7.6	—15	—10	—16	—03	—05	+02	+03	+02	—01
7.7	—23	—23	—28	—09	—10	—11	—05	+03	—05
7.8	—09	—02	—12	—06	—14	+04	—16	+07	+03
7.9	—22	+05	—20	—04	+03	—12	—10	+12	—01
8.0	—09	+02	—04	—04	+08	+08	—06	+03	+03
8.1	00	+02	—16	—02	+10	+19	—04	+02	+12
8.2	—02	+02	+08	+05	+07	+10	—05	+08	—02
8.3	+07	+22	+09	+09	+08		+02	+10	—07
8.4	+12	+11	+10	+07	+17	+03	—01	+10	00
8.5	+27	+13	+18	+10	+43		—08	+18	+05
8.6	+16	+13	+20	+17	+20	+06	+09	+03	+08
8.7	+38	+26	+20	+35	+27	+24	+15	+11	+10
8.8	+27	+17	+21	+25	+26		+07		+04
8.9	+30	+33	+29	+29	+26	+06	+08	+01	—04
9.0	+43	+15	+29		+23		+18		+01
9.1—5	+37	+22	+32	+08	+22	—02	+08	—07	—06
< 9.5			+17					—64	—49

m C.P.D.	Differences C. P. D. not corrected — D. C.								
	Ga	*Gb*	*Gc*	*Ma*	*Mb*	*Mc*	*Md*	*Pa*	*Pb*
> 6.3	— 04	— 11	+ 03	— 05	— 25	— 16	+ 07	— 01	— 05
6.3—5	— 08	+ 01	— 00	+ 08	— 23	— 11	+ 14	+ 05	+ 15
6.6—7	+ 05	— 04	+ 04	+ 02	— 11	— 09	+ 26	+ 11	+ 20
6.8—9	+ 01	+ 03	00	+ 16	+ 06	+ 19	+ 26	+ 13	+ 19
7.0—1	+ 08	+ 04	+ 08	+ 12	+ 04	+ 35	+ 20	+ 19	+ 30
7.2—3	+ 03	+ 20	+ 04	+ 14	+ 18	+ 26	+ 26	+ 27	+ 29
7.4	+ 19	+ 21	+ 12	+ 31	+ 23	+ 23	+ 31	+ 38	+ 37
7.5	+ 23	+ 24	+ 16	+ 34	+ 18	+ 36	+ 36	+ 45	+ 41
7.6	+ 25	+ 30	+ 24	+ 37	+ 35	+ 42	+ 43	+ 42	+ 39
7.7	+ 27	+ 27	+ 22	+ 41	+ 40	+ 39	+ 45	+ 53	+ 45
7.8	+ 41	+ 48	+ 38	+ 44	+ 36	+ 54	+ 34	+ 57	+ 53
7.9	+ 28	+ 55	+ 30	+ 46	+ 53	+ 38	+ 40	+ 62	+ 49
8.0	+ 51	+ 62	+ 56	+ 56	+ 68	+ 68	+ 54	+ 63	+ 63
8.1	+ 60	+ 62	+ 44	+ 58	+ 70	+ 79	+ 56	+ 62	+ 72
8.2	+ 68	+ 72	+ 78	+ 75	+ 77	+ 85	+ 65	+ 78	+ 68
8.3	+ 77	+ 92	+ 79	+ 79	+ 78		+ 72	+ 80	+ 63
8.4	+ 92	+ 91	+ 90	+ 87	+ 97	+ 83	+ 79	+ 90	+ 80
8.5	+107	+ 93	+ 98	+ 90	+123		+ 72	+ 98	+ 85
8.6	+106	+103	+110	+107	+110	+ 96	+ 99	+ 93	+ 98
8.7	+128	+116	+110	+125	+117	+122	+105	+108	+100
8.8	+127	+117	+121	+125	+126		+107		+104
8.9	+130	+133	+129	+136	+126	+114	+108	+110	+ 96
9.0	+153	+125	+139		+133		+128		+111
9.1—5	+167	+152	+162	+138	+152	+128	+138	+123	+124
< 9.5			+187					+104	+121

Through the values in the second part of this table curves are drawn, from which correction tables could be derived. These are given in Table 2, where to the values of regions *G* a constant correction —0.50, of regions *M* a correction —0.20, for reasons given here after, has been added.

3. After the corrections of those tables (without these 0.50 and 0.20) had been applied, the remaining differences, condensed into 4 magnitude groups 6.2—7.4—8.0—8.6—9.5, were computed for each consecutive series of plates and expressed by linear formulae $a + b\ (m - 8)$. For a great many of these series the coefficients found hardly exceed their probable errors; for another considerable number of series, however, they seem to be real. The m.e. of the coefficient *b*, deduced from the m.e. of unit weight 0.40, increases from 0.02 for the dense to 0.08 for the poorest regions, while the mean of all values of *b* is 0.09. Thus we have adopted these linear correction formulae for all series as they were given by computation. The values of the coefficients are contained in Table 3.

After also these corrections had been applied the average residuals for each plate were derived, Table. 2. General Corrections to the C. P. D.

m	*G a*	*G b*	*G c*	*M a*	*M b*	*M c*	*M d*	*P a*	*P b*
6.0	— 57	— 58	— 49	— 22	— 48	— 37	— 11	— 01	+ 02
.1	— 56	— 58	— 49	— 21	— 46	— 35	— 10	00	+ 03
.2	— 56	— 57	— 49	— 20	— 43	— 32	— 10	+ 01	+ 05
.3	— 55	— 57	— 49	— 19	— 41	— 30	— 09	+ 03	+ 07
.4	— 54	— 56	— 49	— 18	— 39	— 27	— 08	+ 04	+ 09
.5	— 53	— 55	— 49	— 17	— 36	— 24	— 06	+ 06	+ 12
.6	— 52	— 54	— 48	— 15	— 32	— 20	— 04	+ 08	+ 14
.7	— 51	— 52	— 48	— 13	— 28	— 17	— 02	+ 10	+ 17
.8	— 50	— 51	— 47	— 11	— 24	— 13	00	+ 13	+ 12
.9	— 48	— 49	— 47	— 09	— 20	— 09	+ 02	+ 16	+ 21
7.0	— 47	— 46	— 46	— 06	— 16	— 05	+ 04	+ 19	+ 24
.1	— 45	— 43	— 45	— 03	— 12	— 01	+ 06	+ 22	+ 27
.2	— 43	— 40	— 43	00	— 08	+ 03	+ 08	+ 26	+ 30
.3	— 40	— 36	— 41	+ 03	— 03	+ 06	+ 10	+ 30	+ 33
.4	— 37	— 31	— 39	+ 07	+ 01	+ 10	+ 12	+ 35	+ 36
.5	— 32	— 26	— 35	+ 11	+ 07	+ 15	+ 15	+ 40	+ 40
.6	— 28	— 20	— 30	+ 15	+ 12	+ 20	+ 18	+ 45	+ 44
.7	— 23	— 14	— 24	+ 19	+ 18	+ 24	+ 21	+ 50	+ 47
.8	— 17	— 08	— 19	+ 24	+ 24	+ 29	+ 24	+ 55	+ 51
.9	— 10	— 01	— 12	+ 29	+ 31	+ 35	+ 28	+ 60	+ 55
8.0	— 02	+ 07	— 04	+ 35	+ 38	+ 41	+ 32	+ 65	+ 60
.1	+ 07	+ 15	+ 05	+ 42	+ 46	+ 47	+ 37	+ 70	+ 65
.2	+ 17	+ 23	+ 16	+ 50	+ 55	+ 53	+ 43	+ 76	+ 70
.3	+ 28	+ 32	+ 26	+ 58	+ 64	+ 60	+ 49	+ 81	+ 75
.4	+ 39	+ 40	+ 36	+ 67	+ 73	+ 67	+ 56	+ 86	+ 80
.5	+ 50	+ 48	+ 46	+ 77	+ 82	+ 74	+ 63	+ 92	+ 85
.6	+ 60	+ 55	+ 55	+ 86	+ 89	+ 80	+ 70	+ 96	+ 90
.7	+ 70	+ 62	+ 63	+ 94	+ 96	+ 86	+ 77	+101	+ 95
.8	+ 79	+ 68	+ 72	+102	+102	+ 92	+ 83	+105	+100
.9	+ 88	+ 75	+ 80	+109	+108	+ 97	+ 91	+109	+105
9.0	+ 97	+ 81	+ 88	+116	+113	+101	+100	+113	+109
.1	+105	+ 88	+ 96	+121	+119	+104	+107	+116	+113
.2	+113	+ 94	+104	+126	+124	+108	+113	+119	+117
.3	+122	+ 99	+112	+130	+129	+112	+120	+122	+120
.4			+120				+127	+125	+124
.5			+128					+128	+127

which should be added to the constant plate corrections given in H. A. **80**, After a number of plates had been treated in this way, the resulting values proved almost entirely to be smaller than their mean errors (m. e. 0.06—0.08, mean value 0.06). Hence it was preferred to neglect them and to adopt for the constant plate corrections the values of H. A. **80**, N⁰ 13, Table VII. Since for the *G* regions they are all but one, for the *M* regions for a large part negative, their mean value — 0.50 and — 0.20 has been included in the first correction table (Table 2); thus the plate corrections in our Table 3, given in tenth magnitudes in the last column (negative values in italics) are formed from the values H. A. **80** Table VII by adding + 0.5 and + 0.2 for the *G* and the *M* regions.

4. The mean error of one difference between C. P. D. and D. C. has been derived from the remaining deviations (by means of the average of the first powers). The results are for the

Table 3. Linear and Constant Corrections to the Plates.

Plates	Curve	a	b	Constant Plate Corrections
1— 13	*P a*	00	00	4 4 1 4 4 6 4 5 3 4 2 1 3
14— 18	*M a*	00	—05	5 6 1 *1* *2*
19— 28	*G a*	00	—13	*1* *2* *2* *4* *5* *1* *1* *1* 5 5
29— 36	*M b*	00	—09	3 0 4 *1* 2 1 1 3
37— 40	*P a*	+05	+16	0 1 *4* 1
41— 49	*M b*	00	—12	1 3 2 0 2 2 1 3 *1*
50— 59	*G b*	+01	—10	3 4 5 5 2 *2* 0 1 2 2
60— 64	*M c*	00	—08	1 4 0 2 3
65— 84	*P a*	+02	+06	*2* *2* 1 0 2 4 1 2 1 0 0 *2* *1* *1* 0 0 1 2 *1* 0
85— 89	*M a*	—02	+07	0 1 *1* *1* *1*
90— 97	*G a*	00	+06	0 0 *4* *4* *4* *4* *2* 2
98—115	*M b*	+04	+12	2 0 1 3 2 2 3 3 1 0 2 0 2 2 2 0 2 *2*
116—124	*G b*	+02	+06	2 2 1 0 *2* *1* *2* *0* *1*
125—128	*M c*	+02	+06	*2* 0 *1* 1
129—148	*P a*	—01	—05	*1* *2* *1* *1* 1 3 0 *1* 0 4 2 2 0 *1* 0 *2* 0 *1* *4* *2*
149—152	*M a*	—02	—10	1 1 0 *1*
153—162	*G a*	+02	+08	*1* 2 *2* *2* *1* *1* 0 0 2 3
163—175	*M b*	+02	+07	*2* *2* *2* 1 3 3 1 2 3 1 1 *1* *1*
176—185	*G b*	—01	+04	3 2 2 0 *2* *2* *2* *3* 0 1
186—189	*M c*	—04	+09	*1* 0 *1* 1
190—207	*P a*	—02	—03	*1* 0 *1* *2* 1 1 1 3 1 *2* 2 1 1 3 1 0 0 *1*
208—212	*M a*	—02	—09	2 4 1 0 *2*
213—222	*G a*	+02	—02	2 1 0 *1* *4* *1* 0 0 5 2
223—232	*M b*	+03	—07	0 1 1 *2* 1 *2* *2* 1 *3* *2*
233—242	*G b*	+03	—05	2 3 3 4 5 1 *4* *1* 2 0
243—246	*M c*	+07	+09	*1* 2 5 3
247—264	*P b*	+01	—01	1 5 1 *2* 2 1 3 3 1 2 3 2 2 *7* 1 *1* *2* *0*
265—268	*M a*	+06	+19	1 1 *1* *2*
269—279	*G a*	+01	+01	2 0 *3* *1* *2* *2* 1 *1* 2 0 *1*
280—285	*M b*	+04	+03	1 1 *2* *1* 0 *2*
286—296	*G b*	+04	+04	*1* 1 2 3 2 1 *1* *1* *3* *2* 1
297—300	*M c*	00	—03	*4* *4* 2 2
301—318	*P b*	00	+03	0 1 *1* *1* 0 0 4 5 0 1 4 0 1 *2* 1 *1* 0 0
319—322	*M a*	+04	+08	4 0 *3* *1*
323—348	*G c*	+03	+05	1 0 *3* *3* *3* *1* 0 1 0 *1* 3 *1* 3 3 3 0 1 1 *1* 3 0 1 1 0 2 1
349—352	*M c*	+05	—12	0 0 2 0
353—369	*P b*	+02	—01	0 3 3 5 3 4 2 1 0 0 1 *1* *2* 3 1 1 0
370—373	*M a*	+02	—01	2 0 *5* 1
374—397	*G c*	+03	+14	3 1 *1* *1* 0 *1* *1* 2 0 *1* 2 0 1 3 1 3 3 2 0 0 *2* 2 2 *1*
398—401	*M c*	00	—15	1 0 3 1
402—416	*P b*			3 *1* *2* 4 2 2 1 4 4 1 1 *2* 0 2 0
417—421	*M d*	+04	+23	4 *1* 2 0 *1*
422—442	*G c*	+01	+05	4 2 *2* 1 *1* 1 *2* *2* *1* 1 1 0 1 2 2 2 1 2 *2* 0 4
443—446	*M d*	—02	+10	2 0 *2* 0
447—460	*P b*	+02	+02	*2* 4 0 3 2 2 *2* 2 0 2 1 2 2 1
461—464	*M d*	+03	+13	*1* *3* 1 0
465—483	*G c*	—01	—06	4 3 2 1 0 *1* *2* *1* *4* *6* *3* *2* 1 *2* *1* 2 3 1 5
484—487	*M d*	—02	+13	0 0 0 *5*
488—499	*P b*	+02	+07	*4* *2* 1 1 1 *4* *2* *1* *3* *2* 0 0
500—504	*M d*	—05	—06	2 1 0 *1* 2
505—519	*G c*	—04	—13	2 5 *2* *1* *4* *3* 1 *2* *2* 1 1 *1* 0 *1* 0
520—524	*M d*	—02	+02	*1* 2 *1* 2 *2*
525—533	*P b*	—02	—05	0 *1* 1 *2* *4* *5* 0 1 2
534—539	*M d*	+06	+12	0 *1* *4* 1 *2* 2
540—552	*G c*	+05	—04	*2* *2* 1 1 *2* 0 0 *1* *1* 1 *2* 1 3
553—557	*M d*	+02	+07	1 0 *1* *1* 2
558—563	*P b*	+01	—02	*3* 1 1 *1* *1* *2*
564—569	*M d*	00	+06	1 *2* *4* 1 0 0
570—577	*G c*	+05	—04	2 0 2 3 5 2 3 *1*
578—583	*M d*	—02	—11	*3* *5* *2* 0 *1* 2
584	*P b*	+01	—02	*1*
585—591	*M d*	—02	—11	5 1 3 *1* 1 1 *3*
592—595	*G c*	+05	—04	1 1 *3* *2*
596—613	*M d*	+01	—08	1 *2* 1 *1* 0 3 2 2 2 0 2 *2* *1* 0 0 *2* 1 *2*

m	Galactic zone	Medium zone	Polar zone
6 —7.5	0.41	0.40	0.36
7.6—8.3	0.41	0.36	0.31
8.4—9	0.40	0.36	0.34
All.	0.41	0.38	0.34

In our discussion of the Bonn and Cordoba Durchmusterung Catalogues we found for the mean error of a Harvard photometric magnitude 0.15 (Publ. Amsterdam **1**, p. 24). The photographic magnitudes, deduced by addition of the colour index, contain the errors of the spectrum too. Their amount can be estimated only roughly ; if we take the m.e. of the spectrum 0.3 of a spectral class, we get for the total m. e. of a photographic D. C. magnitude $\sqrt{(0.15^2 + 0.12^2)} = 0.19$. Then the m. e. of a C. P. D. magnitude becomes 0.36, 0.33 and 0.28 for the three zones.

In the introduction to Vol I of the C. P. D. KAPTEYN gives values for the probable error of a magnitude, deduced from the differences between overlapping plates. These values are expressed in the unit of the adopted C. P. D. scale, which is larger than a true photometric magnitude. Their ratio can be found (at least for the brighter classes) from our curves Table 1; for magn. 7.0—7.9, 8.0—8.4, 8.5—8.9 we have one magn. C. P. D. = 1.43, 1.76, 1.68 true magnitude classes. Thus we have for:

magn.	7.0—7.9	8.0—8.4	8.5—8.9
prob. error C. P. D. scale	0.124	0.093	0.111
prob. error true scale	0.18	0.16	0.19
mean error	0.27	0.24	0.28

These values are somewhat smaller than our result 0.32. Probably the differences between adjacent plates may give a somewhat too small value for the errors of the separate magnitudes ; on the other hand the uncertainty of the colour corrections applied to the D. C. may have been underestimated. Hence 0.30 may be adopted as the m. e. of a corrected C. P. D. magnitude. It is of the same order, but somewhat smaller, than the m.e. of a visual D. M. magnitude of Bonn or Cordoba, for which 0.30—0.40 was found.

The distribution of the C. P. D. stars.

5. The corrections which have been found for the C. P. D. magnitudes are so much different for different plates that counts of stars after the uncorrected magnitudes have no value at all. If we wish to count stars of the same real magnitude everywhere, the arguments and limits of the counts should be different for each plate. Therefore the following modus has been followed.

The limits of the magnitude groups were chosen the same as in the discussion of the visual D. M. Catalogues, viz. 6.7, 7.5, 8.2, 8.8, 9.3. The difference between visual and photographic magnitudes was derived from the colour index and the number of stars of each spectral class and assumed to be 0.9^m; thus the limits become the photographic magnitudes 7.6, 8.4, 9.1, 9.7, 10.2. For each plate of the C. P. D. a correction table was constructed giving the true photographic magnitudes for each 0.1^m C. P. D. The tenth magnitudes C. P. D., whose true photographic magnitudes lay between two limits of a magnitude group, were assumed te belong to this group, and the stars belonging to them were counted. Thus e.g. for Plate 1 the corresponding C. P. D. and photographic magnitudes are

	7.0	7.1	7.5	7.6	8.0	8.1	8.4	8.5	8.7	8.8
	7.59	7.72	8.30	8.45	9.05	9.20	9.66	9.82	10.11	10.25. Then to groups

> 7.6	7.6—8.4	8.4—9.1	9.1—9.7	9.7—10.2	phot. magn. belong the C. P. D. magn.
B—7.0	7.1—7.5	7.6—8.0	8.1—8.4	8.5—8.7.	

The areas for which the stars were counted, are the same as in *Publ.* **1**, N hem., limited by the parallels 20°, 25° .... 85° 90° S decl., and the declination circles 0^h 0, 0^h 20, 0^h 40, 1^h 0 .... (for higher declinations they extend over 40^m, 1^h, 3^h, 6^h). Usually 4 plates contribute to each area in different proportions; on each plate of course the counts were made after its own correction table.

The results of these counts cannot be used uncorrected, because the interval covered by these few 0.1^m C. P. D. classes does not exactly correspond to the right interval between the limits. Thus e.g. the right interval in the last group is 0.50^m; if we assume the C. P. D. decimals 8.5 8.6 8.7 to reach from 8.45 to 8.75 of the C. P. D. scale, this corresponds to 9.74 to 10.18 photogr., thus covering an interval of 0.44^m only and providing too few stars. Now the fact that the different decimals have not the same frequency in the C. P. D. makes this still more complicated. The even decimals occur nearly twice as much as the odd decimals. This is shown by the following numbers of each tenth magnitude among the comparison stars of the preceding discussion:

7.4	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.0
672	373	732	387	688	352	738	288	717	276	598	266	606	265	578	218	503

By some smoothing we find for the extent of each decimal

.069 .132 .071 .130 .066 .140 .057 .143 .059 .137 .061 .139 .062 .141 .058

For 7.4—7.9 the average extent is 0.069 for the odd, 0.131 for the even figures; from 8.0 downward they are 0.060 and 0.140. Thus for the limits of the consecutive decimal classes C. P. D. we adopt

7.46 .53 .66 .73 .86 .93 8.07 .13 .27 .33 .47 .53 .67 .73 .87 .93 etc.

on the C. P. D. scale. The computation for Plate 1 now becomes

Limits C. P. D. scale	7.06		7.53		8.07		8.47		8.73
Correspond. phgr magn.	7.67		8.34^5		9.15^5		9.77		10.15
Real interval		0.67^5		0.81		0.61^5		0.38	
instead of		0.80		0.70		0.60		0.50	

Hence the counted numbers should be multiplied by $80/67^5$, 70/81, $60/61^5$, 50/38. Now to each area as a rule four plates contribute in different proportions; these proportions are the weights to be given to the real interval of each of the plates to get the average real interval. Thus e.g. for the area —22° 0^h 0^m—20^m we have Plates 1, 2, 73, 74 contributing $^2/_5$ $^2/_5$ $^9/_{80}$ $^7/_{80}$; their results for the lower limit (L_1) and the four intervals (I) are

	L_1	I_1	I_2	I_3	I_4
Plate 1	7.67	0.67^5	0.81	0.61^5	0.38
2	7.67	0.67^5	0.81	0.61^5	0.38
73	7.62	0.73	0.79	0.47^5	0.59
74	7.62^5	0.82^5	0.65	0.62^5	0.38
Mean for area	7.67	0.69	0.79	0.60	0.40
Normal	7.60	0.80	0.70	0.60	0.50

Hence the log of the number of stars counted should be corrected by the values log 80—log I_1, log 70—log I_2, log 60—log I_3, log 50—log I_4 for these intervals; the correction to the number counted brighter than the limit L_1 (here 7.67) is 0.48 (7.60—L_1), where the coefficient 0.48 is the increase of log N per magnitude. In this way the number of stars per square degree for each magnitude group in each area is obtained.

6. This number of stars per square degree given by observation must be compared with the values $N(6.7)$, $N(7.5)$—$N(6.7)$ .... $N(9.3)$—$N(8.8)$ taken from the Table for the schematical universe. (Table 4 *Public.* **1**, p. 15) Since we could not derive the mean difference photographic-visual magnitude with great certainty, we have assumed it to be constant; in reality it will be variable with magnitude and galactic latitude. This means only that our basis of comparison is not exactly the same schematical universe, as has been used in our former investigation; we compare here the number of stars as a function of photographic magnitude with a table of schematical values, obtained from Table 4, Publ. **1**, by adding 0.9 to the magnitudes. For our purpose, the study of the irregularities, it is of no importance; the numerical results will not be strictly comparable with our former results.

The corrections, to be subtracted from the logarithms of the counted numbers in consequence of the accidental errors of observation (*cf.* Publ. **1**, p. 19) have been added to the schematical values; they have been computed with $\mu = 0.30$ and amount to 0.032 (6^m) to 0.024 (10^m) for $b = 0°$, 0.026 (6^m) to 0.015 (10^m) for $b = 90°$.

The resulting differences are contained in Table 4, which is constructed in the same way as Table 57 Publ. **1**. The first column designates the area by its mean R A (hour, 10^m); the second the galactic latitude; $\triangle'_1$, and $\triangle'_2$ gives the difference N obs.—N comp. for 6.7 and 6.7—7.5 for the numbers themselves, $\triangle_3$ $\triangle_4$ $\triangle_5$ the differences of the logarithms log (N(8.2)—N(7.5)) obs.—comp. etc.

7. Our chief aim in deriving the results of the preceding table from the C. P. D. was to test the results obtained in Vol 1 of these Publications and to complete them for the Southern Polar region, which had to be left blank there, because the Cordoba Durchmusterung ceased at — 62°. For the study of the irregularities in the distribution of the stars the results of Table 4 have been condensed into two charts. They reach from — 20° to the S Pole ; the circles of 30° are drawn ; the deviations are given in unit 0.01, the positive deviations are underlined, the negative are not. The first chart (p. 84) contains the average deviation $(\triangle'_2 + \triangle'_2):2$ and may be taken to stand for magnitude $(5.6 + 6.9):2 = 6.2$; contour curves are drawn at + 1.00 + .50 + .20 and .00. The second chart (p. 85) contains the average logarithmic deviation $(\triangle_4 + \triangle_5):2$ and may be taken to stand for 8.6^m; curves are drawn for + .40, + .20, .00, — .20.

On the first chart we find the Milky Way band as a zone of large positive deviation, whereas negative deviations occur only in some ill defined parts of the remaining sky, and never reach an appreciable amount there. The average of all the deviations is positive ; this means only that the difference between visual and photographic magnitude scales has been adopted somewhat too large for this magnitude. In the galactic surplus band we find three regions with excessive density : a region in Puppis-Vela 8^h 10^m —44°, a region in Carina 10^h 50^m —59°, and a region in Scorpio-Sagittarius 17^h 40^m — 35°, connected with a smaller one at 16^h 40^m —43°. The deviations of the density from the schematical values are far more considerable here than in the former research; deviations + 0.54 and + 0.56 were the largest occurring there, whereas we have here values as high as + 2.0. The reason must be sought for in the preponderance of *B* stars in the groups with maximum density ; they are counted here down to a limit much lower than in the former discussion of the visual catalogues.

In Publications Vol 1 charts were given for the brighter stars (5.7) and for a medium magnitude 7.4 (I and II). The present chart shows a resemblance to both, though in its contour lines the similarity to II is greater. It must be borne in mind that a congruity of the lines may be expected only in the case of strong gradients ; in other cases small variations of the values over large regions may give strong displacements and changes in the lines. As a rule areas of high or low density depicted

Table 4. Deviations of surface density.

AR	β	Δ'_1	Δ'_2	Δ_3	Δ_4	Δ_5
−20° −25°						
0.1	81	+20	+24	+05	−16	−32
0.3	84	+17	−27	−01	+18	+02
0.5	85	+01	+08	+23	+15	−17
1.1	82	−04	−22	+10	+08	−04
1.3	78	+05	−04	00	+11	−16
1.5	74	00	−05	−01	+02	−20
2.1	69	−08	−06	+19	+11	−07
2.3	65	+01	+24	+03	−26	−13
2.5	60	+12	+02	−09	+06	−03
3.1	56	+13	+01	−42	+05	−18
3.3	52	−09	−10	+10	+26	−24
3.5	47	+29	+02	−01	+35	−10
4.1	43	+07	−05	−13	+10	−15
4.3	38	+17	+33	00	−15	−01
4.5	34	−06	−10	−01	−10	+10
5.1	30	+10	+02	+20	−08	+06
5.3	26	+13	+26	+05	+04	+25
5.5	21	−06	+19	+14	+19	+26
6.1	17	+42	+61	+21	+33	+28
6.3	13	+41	+36	+20	+36	+21
6.5	8	+98	+112	+57	+43	+51
7.1	4	+48	+77	+56	+62	+54
7.3	0	+70	+114	+39	+52	+63
7.5	4	+61	−10	+19	+38	+41
8.1	7	+46	+57	+30	+27	+32
8.3	11	+14	+35	+11	+26	+14
8.5	15	−01	+22	−05	−26	−10
9.1	18	−18	+19	−06	−18	−09
9.3	22	+32	+57	+13	+04	+18
9.5	25	−04	+17	−03	00	+07
10.1	28	+02	+25	+01	+08	+05
10.3	31	−14	+01	+02	+20	−05
10.5	33	−18	−07	00	+07	−06
11.1	35	−03	−05	−06	+05	+07
11.3	37	00	−03	−05	−15	−04
11.5	39	−12	+14	+03	−29	−42
12.1	40	+11	+06	−21	−14	−13
12.3	40	−20	+02	+06	−09	−05
12.5	40	+02	−02	−19	−23	−19
13.1	39	−04	+20	+01	−06	−07
13.3	38	−13	−05	−51	−14	−12
13.5	37	00	−20	−10	+09	−06
14.1	35	−17	+04	+04	−10	−08
14.3	33	+17	+38	−10	−03	−06
14.5	31	+03	−20	−04	−34	−23
15.1	28	−03	00	−06	−17	−31
15.3	25	+08	+19	+13	−21	−16
15.5	22	+65	+34	+10	−06	−13
16.1	19	+44	+18	+13	−40	−35
16.3	15	−08	+19	−40	−45	−56
16.5	12	+05	+20	−05	−24	−21
17.1	8	+01	+04	+07	−15	−23
17.3	4	−04	−22	−11	−19	−25
17.5	0	+99	+42	+19	+16	+21
18.1	4	+31	+26	+29	+34	+21
18.3	8	+48	+19	+09	+06	+03
18.5	12	+50	+23	+27	−02	+03
19.1	16	+46	+58	+09	+14	+03
19.3	21	+09	+14	+04	+17	−08
19.5	25	+06	−23	−15	−12	+07
20.1	29	−19	+22	+08	+19	+22
20.3	34	+04	+21	+11	+19	+20
20.5	38	−04	+14	−06	+14	−06
21.1	42	+25	+69	+20	−05	−24
21.3	47	+10	+01	+19	−15	+02
21.5	51	−19	+05	−23	+10	+12
22.1	55	+16	+09	−07	+17	−02
22.3	60	−04	−01	−04	+14	−19
22.5	64	+05	+01	+04	−09	+04
23.1	69	+13	−05	−05	+22	−11
23.3	73	−07	+06	−10	−24	+09
23.5	77	−07	+12	−10	+07	−01
−25° −30°						
0.1	83	+07	−04	−04	+05	−44
0.3	87	−02	+26	+10	+11	−16
0.5	88	+07	−08	−06	−51	−10
1.1	84	−16	−17	−05	−14	−10
1.3	79	−01	+12	−21	−19	−10
1.5	75	−01	−14	+12	+11	+13
2.1	70	−16	+11	+26	+11	+23
2.3	66	−03	+02	+29	+12	−12
2.5	61	+01	−06	+07	+08	+09
3.1	57	+15	+05	+15	−10	+06
3.3	53	+11	−15	−38	+20	+06
3.5	48	+01	−02	+05	+06	+19
4.1	44	−06	−21	+05	−01	+22
4.3	40	−16	+29	+15	+01	+18
4.5	36	−07	−09	−21	−10	+01
5.1	31	+03	+05	00	+01	+22
5.3	27	−03	−02	+02	−10	+13
5.5	23	+04	00	−09	+04	+17
6.1	19	+18	+24	+09	+13	+14
6.3	15	+16	−05	+19	+04	+20
6.5	11	+75	+50	+31	+35	+20
7.1	7	+105	+88	+42	+57	+47
7.3	3	+104	+92	+48	+52	+46
7.5	1	+04	+29	+18	+60	+39
8.1	5	+13	+24	+28	+36	+44
8.3	8	+12	+48	+24	+32	+28
8.5	12	+02	+30	+03	−04	−09
9.1	15	+16	+27	−20	−18	−33
9.3	18	+23	00	+06	−28	−20
9.5	21	+11	00	−17	−05	+04
10.1	24	−06	−11	−11	−50	−22
10.3	26	+04	−19	−05	−27	−40
10.5	29	−02	+12	−27	−44	−08
11.1	31	+10	−10	00	−10	−32
11.3	32	−05	−04	−23	+02	−18
11.5	34	−03	+03	−111	−09	−35

AR	β	Δ'1	Δ'2	Δ3	Δ4	Δ5
12.1	35	— 17	+ 04	— 10	— 01	— 38
12.3	35	— 08	— 06	— 12	+ 03	— 30
12.5	35	+ 10	— 08	+ 02	— 08	— 13
13.1	34	— 18	— 18	— 30	— 11	— 20
13.3	33	+ 14	+ 16	— 10	— 09	— 28
13.5	32	— 10	+ 31	— 10	+ 01	+ 01
14.1	31	+ 15	+ 11	+ 01	— 12	— 05
14.3	29	— 02	+ 34	— 16	— 01	+ 02
14.5	26	+ 34	— 20	— 19	+ 01	— 35
15.1	24	+ 11	— 36	— 12	— 24	— 32
15.3	22	+ 09	— 43	— 02	+ 02	— 11
15.5	19	+ 08	+ 32	+ 31	+ 13	+ 21
16.1	16	+ 29	+ 07	+ 12	— 22	— 19
16.3	13	+ 12	— 15	+ 01	— 12	— 49
16.5	9	+ 15	+ 56	+ 22	— 03	— 09
17.1	6	+ 40	+ 29	— 16	— 17	— 28
17.3	2	— 06	— 42	— 13	00	— 04
17.5	2	+ 34	+ 84	+ 32	+ 32	+ 31
18.1	6	+ 30	+ 99	+ 24	+ 20	+ 14
18.3	10	+ 23	+ 40	+ 09	+ 08	— 25
18.5	14	+ 22	— 02	— 31	+ 11	00
19.1	18	+ 03	+ 03	+ 02	00	+ 16
19.3	22	— 04	+ 03	— 03	+ 17	— 01
19.5	26	+ 08	+ 04	+ 22	+ 03	— 06
20.1	30	— 18	+ 02	+ 05	+ 21	— 02
20.3	34	+ 48	+ 20	+ 08	— 03	+ 04
20.5	39	+ 32	— 18	+ 11	— 22	+ 22
21.1	43	— 06	+ 12	+ 12	+ 11	+ 06
21.3	48	— 06	+ 16	— 10	+ 19	— 25
21.5	52	+ 05	+ 19	+ 04	+ 06	+ 20
22.1	56	+ 10	+ 22	+ 11	00	— 28
22.3	61	+ 12	— 03	+ 01	+ 20	+ 02
22.5	66	+ 01	+ 26	+ 08	— 17	— 12
23.1	70	— 02	+ 15	+ 23	— 09	+ 04
23.3	75	+ 03	+ 03	+ 30	— 14	— 09
23.5	79	+ 16	— 04	— 34	+ 18	— 11
			— 30° — 35°			
0.1	81	00	— 04	+ 06	+ 23	— 12
0.3	84	— 05	— 02	— 34	+ 17	— 07
0.5	84	— 01	— 06	— 31	— 01	— 04
1.1	82	— 01	— 07	— 15	— 15	— 09
1.3	78	+ 13	+ 10	+ 08	+ 03	— 08
1.5	74	+ 09	+ 04	— 09	+ 05	+ 15
2.1	70	— 16	— 01	— 16	+ 18	— 09
2.3	66	+ 27	+ 12	+ 13	— 11	— 05
2.5	62	+ 10	+ 20	— 07	— 27	+ 07
3.1	58	— 02	+ 01	+ 11	— 25	— 11
3.3	54	— 03	+ 09	+ 14	+ 17	— 53
3.5	49	— 04	— 06	00	+ 16	+ 20
4.1	45	+ 10	— 10	— 02	+ 07	+ 20
4.3	41	+ 08	+ 01	+ 16	— 10	+ 08
4.5	37	— 05	— 04	— 07	— 09	+ 06
5.1	32	— 01	— 11	+ 01	— 14	+ 04
5.3	28	+ 19	+ 19	+ 13	+ 06	+ 17
5.5	24	+ 24	+ 04	+ 02	+ 16	— 03
6.1	20	+ 21	+ 36	+ 06	+ 23	+ 08
6.3	16	+ 59	+ 32	+ 02	+ 22	+ 12
6.5	12	+ 78	+ 44	+ 02	— 21	— 25
7.1	9	+ 90	+ 76	+ 36	+ 22	— 07
7.3	5	+ 56	+ 35	+ 38	+ 43	+ 02
7.5	1	+ 39	+ 91	+ 36	+ 28	00
8.1	2	+ 22	+ 98	+ 28	+ 28	+ 01
8.3	6	+ 60	+ 20	— 02	+ 14	+ 10
8.5	9	+ 06	+ 19	— 15	— 03	00
9.1	12	— 03	+ 30	00	— 02	— 33
9.3	15	+ 30	00	— 07	— 11	— 02
9.5	17	+ 18	— 01	— 16	— 26	— 14
10.1	20	— 02	+ 21	— 12	— 15	— 22
10.3	22	— 02	— 10	00	— 23	— 13
10.5	24	+ 09	— 04	+ 12	+ 08	— 21
11.1	26	+ 28	— 26	+ 02	— 28	— 07
11.3	28	+ 33	— 14	— 31	— 13	— 17
11.5	29	+ 20	+ 14	— 27	— 14	— 12
12.1	30	+ 06	+ 17	+ 03	— 07	— 01
12.3	30	— 18	— 18	00	+ 03	00
12.5	30	+ 05	— 02	+ 07	— 08	— 10
13.1	29	— 06	+ 08	— 03	— 02	— 16
13.3	29	+ 24	+ 05	— 11	— 14	— 17
13.5	28	+ 19	+ 14	+ 10	+ 02	+ 02
14.1	27	— 09	+ 44	— 06	+ 06	+ 02
14.3	25	— 04	— 07	— 01	00	— 06
14.5	22	+ 26	+ 04	— 17	— 17	— 10
15.1	20	— 26	+ 05	— 30	— 10	— 14
15.3	18	+ 18	— 01	+ 17	— 11	— 07
15.5	15	+ 45	+ 07	+ 10	— 06	— 23
16.1	12	+ 20	+ 12	— 14	— 04	— 34
16.3	9	+ 06	+ 27	— 08	+ 04	— 12
16.5	6	+ 62	+ 02	+ 16	+ 06	— 12
17.1	3	+ 70	+ 47	+ 09	+ 07	— 04
17.3	1	+ 80	+ 134	+ 23	+ 34	+ 47
17.5	5	+ 88	+ 100	+ 64	+ 43	+ 60
18.1	8	+ 59	+ 96	+ 14	+ 26	+ 30
18.3	12	+ 46	+ 24	+ 19	+ 13	+ 14
18.5	16	+ 11	+ 36	+ 04	+ 18	+ 04
19.1	20	+ 04	+ 31	+ 18	+ 14	+ 14
19.3	24	+ 06	— 02	— 14	00	+ 14
19.5	28	+ 06	+ 06	— 25	+ 01	— 26
20.1	32	+ 02	+ 08	— 07	— 02	— 09
20.3	36	— 06	— 10	+ 12	— 14	+ 17
20.5	40	+ 23	+ 05	— 02	+ 06	— 08
21.1	44	— 19	00	+ 25	+ 10	— 13
21.3	49	00	— 03	+ 09	+ 14	— 08
21.5	53	— 08	— 07	+ 04	— 07	— 05
22.1	57	+ 02	+ 06	+ 07	+ 20	+ 04
22.3	62	+ 11	+ 09	+ 01	— 09	+ 19
22.5	66	+ 25	— 07	— 12	— 04	— 13
23.1	70	— 07	— 02	— 04	— 26	— 17
23.3	74	— 11	+ 16	— 36	+ 08	— 20
23.5	78	+ 08	+ 20	— 03	+ 20	— 08
			— 35° — 40°			
0.1	78	— 10	+ 19	+ 04	— 03	— 32
0.3	80	— 05	+ 06	— 08	— 06	— 23

AR	β	Δ'_1	Δ'_2	Δ_3	Δ_4	Δ_5
0.5	80	— 15	— 05	+ 16	+ 05	+ 14
1.1	78	+ 10	— 17	+ 01	— 10	— 11
1.3	75	00	— 09	+ 13	+ 04	— 21
1.5	72	+ 09	— 11	+ 14	— 16	— 19
2.1	69	— 16	— 12	+ 16	— 02	— 16
2.3	65	+ 05	+ 09	+ 26	+ 08	+ 08
2.5	61	+ 14	+ 22	+ 24	— 12	+ 20
3.1	57	+ 14	+ 07	— 04	+ 02	— 04
3.3	53	+ 32	— 05	— 19	— 10	+ 04
3.5	49	+ 16	— 04	— 05	+ 07	— 19
4.1	45	+ 12	+ 31	— 18	+ 09	— 20
4.3	42	— 04	+ 22	+ 03	00	+ 02
4.5	38	+ 15	+ 10	— 18	— 32	— 35
5.1	34	+ 09	— 17	— 15	— 22	— 30
5.3	30	+ 06	— 02	— 04	+ 05	+ 01
5.5	26	+ 66	— 17	+ 04	— 13	— 14
6.1	22	+ 28	+ 26	+ 14	— 09	— 01
6.3	19	+ 70	+ 39	+ 06	— 01	— 07
6.5	15	+ 26	+ 65	+ 05	— 01	— 10
7.1	11	+ 66	+ 62	+ 08	+ 10	+ 11
7.3	8	+ 125	+ 37	+ 18	+ 03	— 08
7.5	4	+ 173	+ 84	+ 14	+ 06	+ 07
8.1	1	+ 181	+ 153	+ 26	+ 24	+ 22
8.3	2	+ 69	+ 100	+ 24	+ 10	+ 33
8.5	5	+ 114	+ 03	+ 02	+ 06	+ 11
9.1	8	+ 53	+ 06	— 05	— 23	— 01
9.3	11	+ 22	+ 65	+ 05	— 18	— 06
9.5	13	— 13	+ 43	— 19	— 12	— 16
10.1	16	+ 21	— 10	— 14	— 32	— 23
10.3	18	+ 13	+ 28	+ 03	— 27	— 11
10.5	20	+ 10	— 04	+ 04	— 14	+ 11
11.1	21	+ 28	+ 05	+ 02	— 11	— 01
11.3	23	+ 18	+ 34	— 04	— 08	— 03
11.5	24	+ 09	+ 08	— 18	— 11	+ 10
12.1	25	+ 13	+ 02	— 14	— 17	+ 11
12.3	25	— 06	— 08	+ 03	— 19	+ 10
12.5	25	+ 15	— 05	— 29	— 04	— 08
13.1	24	+ 19	+ 02	— 28	— 08	— 01
13.3	24	+ 08	+ 24	— 05	— 22	+ 01
13.5	23	+ 22	+ 40	— 02	— 05	+ 10
14.1	22	+ 11	— 03	— 10	— 12	+ 07
14.3	20	+ 30	— 06	— 08	— 13	+ 13
14.5	18	+ 32	+ 30	— 43	00	— 01
15.1	16	+ 66	— 07	+ 11	+ 06	— 11
15.3	14	+ 41	+ 21	— 09	— 07	— 21
15.5	11	+ 52	+ 19	— 18	+ 01	— 13
16.1	9	+ 26	— 24	— 43	— 36	— 46
16.3	6	+ 48	+ 18	— 20	— 14	— 29
16.5	3	+ 81	+ 36	+ 28	+ 02	+ 02
17.1	0	+ 30	+ 36	— 01	+ 05	+ 03
17.3	4	+ 69	+ 136	+ 40	+ 38	+ 67
17.5	7	+ 132	+ 163	+ 67	+ 60	+ 96
18.1	11	+ 112	+ 52	+ 35	+ 32	+ 55
18.3	15	+ 50	+ 05	+ 08	+ 34	+ 23
18.5	18	+ 36	+ 25	+ 15	+ 09	00
19.1	22	+ 46	— 13	— 24	+ 02	+ 07
19.3	26	— 09	— 11	— 22	— 11	— 27

AR	β	Δ'_1	Δ'_2	Δ_3	Δ_4	Δ_5
19.5	29	+ 47	+ 27	— 07	+ 04	— 28
20.1	33	— 02	+ 06	+ 07	— 04	— 17
20.3	37	— 06	— 05	— 37	— 02	+ 05
20.5	41	+ 11	+ 10	+ 01	— 09	+ 19
21.1	45	+ 08	+ 12	00	+ 08	— 06
21.3	49	— 08	+ 08	00	— 10	— 16
21.5	53	+ 10	+ 19	+ 02	00	+ 19
22.1	57	+ 08	+ 13	— 01	— 06	+ 07
22.3	61	— 06	+ 02	— 18	+ 09	+ 10
22.5	65	+ 05	+ 21	— 30	— 20	— 59
23.1	68	— 10	— 13	— 27	— 19	+ 01
23.3	72	— 10	— 02	— 16	— 11	— 12
23.5	76	00	+ 17	— 03	— 33	— 20
		— 40°	— 45°			
0.1	73	— 09	— 11	+ 13	— 07	— 05
0.3	75	+ 38	00	+ 04	+ 24	— 24
0.5	75	+ 06	00	+ 01	+ 05	— 06
1.1	74	+ 12	+ 10	+ 06	— 14	— 08
1.3	72	— 04	— 22	+ 08	— 19	— 40
1.5	69	+ 07	+ 31	+ 02	— 04	— 27
2.1	66	+ 26	— 28	— 02	— 22	— 13
2.3	63	— 05	+ 01	+ 28	+ 26	+ 04
2.5	60	— 04	+ 41	+ 22	+ 12	+ 09
3.1	56	— 05	+ 02	+ 17	+ 04	— 03
3.3	53	+ 22	+ 11	+ 15	+ 19	— 11
3.5	49	+ 15	+ 02	+ 13	+ 17	+ 01
4.1	45	— 05	+ 29	— 10	+ 24	— 25
4.3	42	— 02	+ 22	— 05	+ 08	+ 27
4.5	38	— 09	+ 14	— 14	— 04	+ 05
5.1	34	— 16	+ 02	— 20	— 33	— 21
5.3	31	— 05	+ 16	— 14	— 18	— 16
5.5	27	+ 18	+ 30	+ 06	— 13	— 11
6.1	24	+ 52	+ 17	— 01	— 25	— 18
6.3	20	+ 40	+ 43	+ 23	— 21	— 14
6.5	17	+ 44	+ 06	+ 02	+ 10	+ 02
7.1	13	+ 54	+ 05	— 04	+ 01	+ 02
7.3	10	+ 80	+ 53	+ 04	— 05	+ 06
7.5	7	+ 168	+ 83	+ 27	+ 24	+ 32
8.1	4	+ 63	+ 120	+ 24	+ 26	+ 38
8.3	1	+ 84	+ 138	+ 35	+ 28	+ 39
8.5	2	+ 216	+ 49	+ 32	+ 22	+ 28
9.1	5	+ 72	+ 96	— 01	+ 10	— 03
9.3	7	+ 35	+ 33	— 14	— 03	— 03
9.5	9	— 13	+ 19	+ 10	+ 06	— 05
10.1	11	+ 40	+ 66	+ 07	— 19	— 21
10.3	14	+ 42	+ 16	— 02	— 10	— 09
10.5	16	+ 24	+ 79	+ 08	+ 06	— 06
11.1	17	+ 20	+ 36	— 08	00	— 13
11.3	18	— 04	+ 07	— 30	— 22	— 43
11.5	19	— 04	— 06	— 16	— 40	— 31
12.1	20	+ 22	+ 11	— 14	— 06	— 10
12.3	21	— 08	+ 23	— 14	— 19	— 03
12.5	21	+ 10	— 10	— 06	— 24	— 19
13.1	20	+ 46	— 06	— 09	— 32	— 20
13.3	19	+ 57	— 06	— 02	— 09	— 04
13.5	18	+ 34	+ 03	+ 10	+ 03	00

AR	β	Δ'₁	Δ'₂	Δ₃	Δ₄	Δ₅
14.1	17	+ 70	+ 16	— 11	— 35	— 03
14.3	16	+ 38	+ 01	— 05	— 14	+ 07
14.5	14	+ 38	+ 07	— 16	— 04	00
15.1	12	+ 148	+ 11	— 16	+ 19	— 03
15.3	10	+ 70	+ 65	+ 08	+ 08	— 02
15.5	8	+ 47	+ 33	— 01	— 19	— 12
16.1	5	+ 11	+ 01	— 37	— 15	— 36
16.3	2	+ 39	+ 38	— 18	+ 01	+ 07
16.5	0	+ 194	+ 190	+ 22	— 01	+ 10
17.1	3	+ 48	+ 76	+ 15	+ 01	+ 05
17.3	6	+ 46	+ 120	+ 51	+ 33	+ 35
17.5	9	+ 21	+ 37	+ 29	+ 29	+ 10
18.1	13	+ 65	+ 30	+ 17	+ 01	— 04
18.3	16	+ 46	+ 28	+ 10	— 07	— 17
18.5	20	+ 25	+ 05	+ 10	— 08	+ 11
19.1	23	+ 04	00	— 03	+ 10	+ 23
19.3	27	+ 22	+ 19	+ 10	+ 01	— 12
19.5	30	+ 04	+ 08	+ 02	+ 04	— 02
20.1	34	+ 06	+ 33	00	— 15	— 14
20.3	38	+ 07	+ 13	— 54	+ 05	— 10
20.5	41	+ 09	+ 07	— 01	— 02	— 10
21.1	45	+ 13	+ 18	+ 04	— 16	— 09
21.3	49	+ 03	— 12	— 05	— 11	— 11
21.5	52	— 17	+ 06	— 04	+ 08	— 16
22.1	56	+ 06	+ 07	+ 11	— 07	— 19
22.3	59	+ 39	— 19	— 08	+ 12	00
22.5	63	— 10	+ 19	+ 08	— 24	— 30
23.1	66	+ 08	+ 25	— 30	+ 18	+ 16
23.3	69	— 04	— 01	+ 02	— 06	— 05
23.5	71	+ 06	+ 16	— 13	+ 10	+ 07

— 45° — 50°

AR	β	Δ'₁	Δ'₂	Δ₃	Δ₄	Δ₅
0.1	69	— 09	+ 01	— 19	— 36	+ 10
0.3	70	+ 35	+ 01	+ 02	— 13	+ 22
0.5	70	— 03	+ 13	— 12	— 01	— 20
1.1	69	— 08	— 05	— 24	+ 07	— 01
1.3	67	+ 05	+ 30	+ 01	— 07	— 13
1.5	65	+ 04	+ 23	— 24	— 06	— 22
2.1	63	— 15	+ 18	— 07	00	+ 08
2.3	60	— 04	— 05	+ 04	— 02	+ 06
2.5	57	— 05	+ 27	+ 06	— 03	— 17
3.1	54	+ 06	— 14	+ 25	— 15	+ 02
3.3	51	+ 02	— 09	+ 29	— 16	+ 03
3.5	48	+ 08	+ 24	— 06	— 26	+ 04
4.1	45	+ 01	+ 12	— 05	+ 16	— 17
4.3	42	+ 06	+ 11	— 35	00	+ 16
4.5	38	— 14	— 06	+ 06	— 07	— 06
5.1	35	— 03	00	— 01	— 18	— 45
5.3	31	+ 16	00	— 05	— 64	— 20
5.5	28	+ 26	— 03	+ 04	— 06	+ 10
6.1	25	+ 37	+ 27	+ 07	— 04	+ 07
6.3	22	+ 23	+ 25	+ 14	+ 01	— 06
6.5	19	+ 82	+ 28	— 06	+ 01	— 19
7.1	15	+ 68	+ 39	+ 04	+ 05	— 02
7.3	12	+ 22	+ 35	+ 08	+ 01	— 15
7.5	10	+ 196	+ 76	+ 42	+ 08	+ 06
8.1	7	+ 225	+ 196	+ 47	+ 39	+ 23
8.3	4	+ 225	+ 84	+ 44	+ 33	+ 30
8.5	1	+ 70	+ 76	+ 37	+ 29	+ 36
9.1	1	+ 54	+ 63	+ 18	+ 13	+ 03
9.3	3	+ 24	+ 59	+ 13	+ 15	— 11
9.5	6	+ 50	+ 61	+ 04	+ 12	+ 12
10.1	7	+ 23	+ 85	+ 12	— 10	+ 16
10.3	9	+ 09	+ 28	+ 05	+ 02	— 05
10.5	11	+ 22	+ 15	+ 07	— 10	+ 05
11.1	12	+ 45	+ 28	+ 20	— 19	+ 14
11.3	13	+ 10	+ 68	+ 05	— 22	— 02
11.5	14	+ 33	+ 58	— 16	— 09	00
12.1	15	+ 16	+ 03	— 17	— 04	— 09
12.3	16	+ 34	— 02	— 02	— 13	+ 17
12.5	16	+ 32	+ 14	— 06	— 06	— 05
13.1	15	+ 49	— 03	+ 09	— 10	— 19
13.3	15	+ 22	+ 22	+ 13	— 13	00
13.5	14	+ 66	+ 39	— 05	+ 04	+ 16
14.1	13	+ 25	+ 30	— 02	— 12	+ 02
14.3	11	+ 74	+ 08	+ 11	— 24	— 04
14.5	9	+ 28	— 06	+ 10	— 14	— 05
15.1	8	+ 56	— 05	— 09	+ 02	+ 06
15.3	6	+ 14	+ 27	+ 24	+ 16	+ 06
15.5	4	+ 36	+ 26	+ 17	— 23	— 01
16.1	1	+ 55	+ 74	+ 07	00	00
16.3	1	+ 81	+ 119	+ 25	+ 21	+ 36
16.5	3	+ 74	+ 37	+ 24	— 10	+ 28
17.1	6	+ 127	+ 36	+ 11	+ 16	+ 24
17.3	9	+ 79	+ 71	+ 26	+ 15	+ 08
17.5	12	+ 09	+ 52	+ 03	— 01	— 01
18.1	15	+ 38	+ 22	+ 12	+ 03	+ 12
18.3	19	+ 50	+ 48	+ 12	— 02	— 16
18.5	22	+ 35	+ 47	+ 02	— 06	+ 19
19.1	25	— 17	+ 26	+ 02	+ 03	+ 11
19.3	28	— 04	+ 06	— 01	+ 08	+ 24
19.5	31	+ 07	+ 03	+ 04	— 14	+ 07
20.1	35	— 14	+ 09	— 22	+ 06	+ 15
20.3	38	— 07	+ 10	— 22	+ 02	+ 13
20.5	41	+ 10	+ 12	00	— 09	+ 18
21.1	45	— 01	+ 32	+ 13	— 08	— 05
21.3	48	— 12	— 15	— 02	— 06	+ 10
21.5	51	— 06	+ 03	+ 17	+ 06	+ 08
22.1	55	+ 08	+ 22	— 04	+ 16	+ 08
22.3	58	— 04	+ 30	— 08	+ 01	— 06
22.5	60	+ 31	+ 42	+ 18	+ 06	— 10
23.1	63	— 02	— 11	+ 05	— 03	— 17
23.3	65	+ 25	+ 19	— 45	+ 23	— 16
23.5	67	— 03	+ 07	— 37	— 25	00

— 50° — 55°

AR	β	Δ'₁	Δ'₂	Δ₃	Δ₄	Δ₅
0.2	64	+ 12	— 08	00	+ 10	+ 02
1.0	65	— 14	— 15	+ 08	+ 03	+ 17
1.4	62	+ 18	— 04	+ 08	— 12	— 04
2.2	58	+ 09	+ 22	+ 01	+ 03	+ 17
3.0	54	— 13	+ 02	— 06	00	— 13
3.4	48	+ 04	+ 10	+ 17	— 12	+ 12
4.2	42	— 08	— 12	+ 11	— 18	+ 07
5.0	36	+ 01	+ 06	+ 04	— 04	+ 02

AR	β	Δ'_1	Δ'_2	Δ_3	Δ_4	Δ_5
5.4	30	+ 23	+ 18	00	+ 07	− 03
6.2	24	+ 27	+ 48	+ 11	+ 08	− 16
7.0	18	+ 60	+ 18	+ 15	− 12	− 05
7.4	13	+ 102	+ 22	+ 18	00	− 05
8.2	8	+ 153	+ 53	+ 07	00	00
9.0	3	+ 70	+ 51	+ 19	+ 09	+ 20
9.4	1	+ 92	+ 81	+ 23	+ 20	+ 27
10.2	4	+ 36	+ 108	+ 09	+ 15	+ 31
11.0	7	+ 22	+ 41	+ 11	+ 02	+ 21
11.4	9	− 08	+ 40	+ 25	+ 18	+ 16
12.2	9	+ 17	+ 38	+ 01	+ 12	+ 13
13.0	10	+ 40	+ 35	+ 01	+ 16	+ 06
13.4	9	+ 47	+ 27	+ 05	+ 03	− 04
14.2	7	+ 38	− 05	+ 04	− 10	− 07
15.0	4	+ 11	+ 28	+ 05	+ 01	− 16
15.4	1	+ 59	+ 99	+ 36	+ 25	+ 06
16.2	3	+ 48	+ 64	+ 36	+ 27	+ 29
17.0	8	+ 54	+ 77	+ 21	− 02	+ 32
17.4	13	+ 14	+ 19	− 11	+ 05	− 18
18.2	18	+ 32	+ 30	− 01	+ 03	− 05
19.0	24	+ 39	+ 17	+ 09	+ 05	+ 14
19.4	30	+ 08	+ 05	+ 15	+ 08	+ 23
20.2	36	− 10	− 10	+ 03	− 09	+ 23
21.0	42	+ 11	+ 09	+ 03	− 02	+ 07
21.4	48	− 10	+ 21	+ 06	− 07	+ 10
22.2	53	− 06	+ 20	− 14	− 10	− 03
23.0	58	+ 18	− 07	− 12	− 12	+ 06
23.4	62	+ 02	+ 01	+ 06	− 04	− 10

— 55° — 60°

AR	β	Δ'_1	Δ'_2	Δ_3	Δ_4	Δ_5
0.2	59	+ 12	− 14	+ 03	− 02	+ 09
1.0	60	+ 07	− 10	− 36	− 24	+ 18
1.4	58	+ 03	− 17	− 07	+ 12	− 24
2.2	55	− 05	− 01	+ 12	+ 03	+ 16
3.0	52	− 12	− 10	− 15	− 05	+ 02
3.4	47	− 12	− 11	+ 08	+ 08	− 04
4.2	41	+ 05	− 03	− 27	+ 04	+ 12
5.0	36	− 03	− 08	− 01	− 03	+ 12
5.4	31	+ 15	+ 02	+ 06	− 19	− 01
6.2	25	+ 16	+ 23	+ 09	− 07	− 02
7.0	20	+ 47	+ 56	− 11	+ 04	+ 05
7.4	15	+ 53	+ 49	+ 28	+ 08	− 08
8.2	11	+ 75	− 01	+ 13	− 02	+ 09
9.0	7	+ 86	+ 58	+ 16	+ 29	+ 26
9.4	3	+ 110	+ 92	+ 36	+ 29	+ 28
10.2	0	+ 127	+ 165	+ 55	+ 49	+ 52
11.0	3	+ 155	+ 226	+ 72	+ 50	+ 63
11.4	4	+ 79	+ 59	+ 34	+ 46	+ 35
12.2	5	+ 75	+ 67	+ 39	+ 33	+ 28
13.0	6	+ 73	+ 40	+ 45	+ 43	+ 38
13.4	4	+ 44	+ 57	+ 32	+ 39	+ 16
14.2	2	+ 86	+ 43	+ 11	− 02	+ 04
15.0	0	+ 38	+ 54	+ 10	+ 18	+ 03
15.4	3	+ 27	+ 41	+ 26	+ 14	+ 23
16.2	6	+ 32	+ 62	+ 09	+ 22	+ 13
17.0	10	+ 100	+ 46	+ 23	− 05	+ 17
17.4	15	+ 41	+ 25	+ 07	+ 13	− 01
18.2	20	+ 03	+ 26	+ 01	− 02	+ 01
19.0	25	+ 01	+ 48	+ 11	− 20	− 12
19.4	30	+ 17	+ 10	+ 10	+ 01	− 06
20.2	36	− 11	− 07	− 02	− 01	+ 14
21.0	41	+ 10	− 01	+ 12	− 05	+ 15
21.4	46	+ 10	+ 02	+ 07	− 13	+ 11
22.2	51	− 08	+ 03	− 02	+ 16	+ 07
23.0	55	+ 07	+ 08	+ 25	+ 16	+ 02
23.4	58	+ 06	+ 25	+ 11	+ 07	− 06

— 60° — 65°

AR	β	Δ'_1	Δ'_2	Δ_3	Δ_4	Δ_5
0.3	55	+ 16	− 09	− 10	− 12	+ 03
1.3	54	+ 07	− 14	− 27	− 12	+ 05
2.3	50	+ 05	+ 20	+ 03	+ 03	+ 24
3.3	45	+ 24	+ 02	+ 07	− 10	− 06
4.3	39	+ 22	− 05	− 14	+ 09	− 06
5.3	33	+ 20	+ 01	+ 12	+ 01	+ 02
6.3	26	+ 18	+ 22	+ 11	00	+ 08
7.3	19	+ 25	+ 83	+ 17	+ 12	+ 18
8.3	13	+ 29	+ 21	− 02	− 07	+ 02
9.3	8	+ 66	+ 69	+ 08	+ 17	+ 08
10.3	4	+ 145	+ 72	+ 37	+ 60	+ 53
11.3	1	+ 168	+ 112	+ 49	+ 56	+ 47
12.3	0	+ 78	+ 116	+ 43	+ 48	+ 48
13.3	1	+ 72	+ 96	+ 41	+ 57	+ 61
14.3	3	+ 50	+ 49	+ 31	+ 39	+ 33
15.3	6	+ 58	+ 65	+ 34	+ 40	+ 46
16.3	11	+ 27	+ 40	+ 22	+ 32	+ 32
17.3	16	+ 33	00	+ 16	− 02	+ 39
18.3	23	+ 34	+ 38	+ 08	− 06	+ 13
19.3	29	+ 01	+ 04	− 14	+ 03	− 07
20.3	36	+ 38	+ 02	− 04	+ 10	− 09
21.3	43	− 04	+ 01	+ 12	+ 08	− 02
22.3	49	+ 06	+ 24	+ 21	+ 02	− 24
23.3	53	+ 06	+ 32	+ 18	+ 08	+ 35

— 65° — 70°

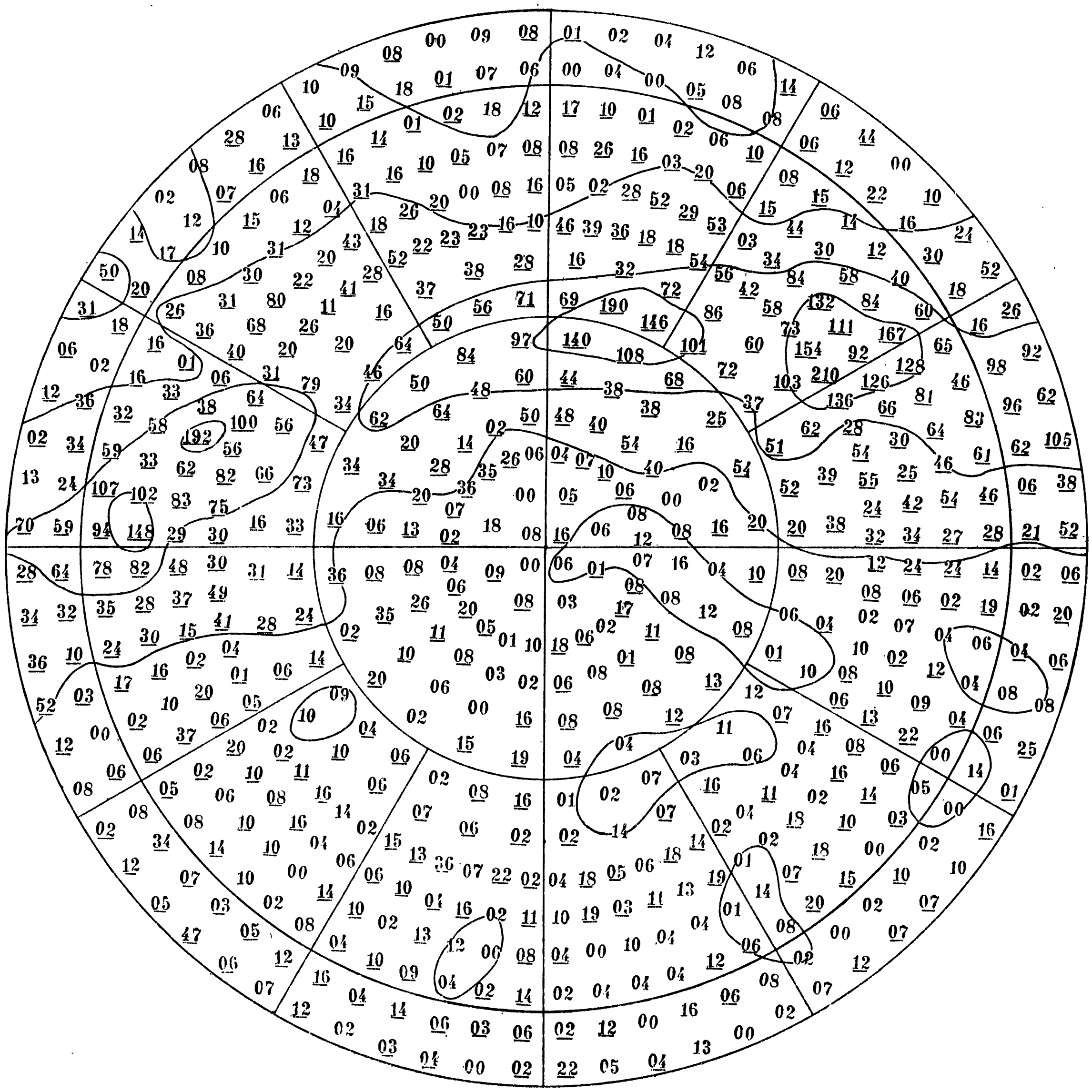
AR	β	Δ'_1	Δ'_2	Δ_3	Δ_4	Δ_5
0.3	50	− 05	+ 20	+ 07	− 04	+ 15
1.3	49	+ 13	+ 02	+ 04	− 02	+ 12
2.3	46	+ 22	− 05	− 23	− 07	+ 21
3.3	42	+ 06	+ 11	− 09	− 13	− 04
4.3	37	− 19	− 06	− 13	− 04	+ 15
5.3	32	+ 06	− 15	+ 04	+ 06	+ 14
6.3	26	+ 10	+ 21	− 10	− 06	+ 03
7.3	21	− 09	+ 04	− 07	− 08	+ 04
8.3	16	+ 38	− 06	− 02	− 02	+ 07
9.3	12	+ 63	+ 14	+ 18	+ 18	+ 18
10.3	8	+ 49	+ 26	+ 29	+ 40	+ 30
11.3	6	+ 49	+ 39	+ 21	+ 30	+ 35
12.3	5	+ 61	+ 60	+ 15	+ 31	+ 37
13.3	5	+ 63	+ 34	+ 18	+ 28	+ 34
14.3	7	+ 79	+ 50	+ 22	+ 23	+ 24
15.3	10	+ 39	+ 01	+ 16	+ 31	+ 38
16.3	14	+ 59	+ 08	+ 20	+ 30	+ 19
17.3	18	+ 16	− 03	+ 10	+ 09	+ 12
18.3	24	+ 06	+ 10	− 02	− 04	+ 14
19.3	30	+ 45	+ 25	+ 20	− 08	+ 13

AR	β	Δ'_1	Δ'_2	Δ_3	Δ_4	Δ_5
20.3	36	+ 27	− 06	− 03	− 03	− 18
21.3	41	00	− 11	− 32	− 11	+ 07
22.3	45	− 06	+ 06	+ 04	+ 12	+ 23
23.3	48	+ 12	+ 21	00	+ 05	+ 30
			− 70° − 75°			
0.0	45	+ 16	− 04	− 04	− 15	+ 28
1.0	44	− 06	− 11	− 18	− 02	+ 11
2.0	42	− 11	+ 13	+ 12	− 11	− 09
3.0	40	+ 10	+ 12	+ 04	+ 13	− 42
4.0	36	+ 01	− 16	− 13	− 16	+ 06
5.0	31	− 09	− 23	+ 03	+ 03	+ 05
6.0	27	− 02	+ 18	− 34	− 39	− 22
7.0	22	− 11	+ 11	− 18	− 17	− 22
8.0	18	+ 45	+ 36	+ 03	− 11	− 10
9.0	15	+ 61	+ 46	− 02	− 03	+ 02
10.0	12	+ 52	+ 28	+ 03	+ 03	00
11.0	11	+ 51	+ 45	+ 01	+ 05	+ 05
12.0	10	+ 42	+ 59	− 03	− 22	− 22
13.0	10	+ 20	− 16	− 16	− 17	− 19
14.0	12	+ 23	+ 06	+ 09	+ 11	+ 22
15.0	14	+ 34	+ 22	+ 24	+ 15	+ 35
16.0	17	+ 26	+ 14	+ 08	+ 20	+ 38
17.0	21	+ 09	+ 17	+ 18	+ 30	+ 40
18.0	25	+ 09	+ 07	+ 23	+ 07	+ 23
19.0	30	− 06	+ 57	+ 17	+ 28	+ 23
20.0	34	+ 17	+ 05	+ 05	− 05	+ 05
21.0	38	+ 23	− 06	− 04	− 09	+ 11
22.0	41	− 02	− 04	− 02	− 07	00
23.0	44	− 10	+ 06	+ 18	− 03	+ 16
			− 75° − 80°			
0.0	40	+ 06	+ 30	+ 05	− 11	− 05
1.0	39	+ 12	00	+ 07	− 04	− 16
2.0	38	+ 05	− 09	+ 17	+ 12	− 05
3.0	36	+ 16	+ 18	− 30	+ 02	− 18

AR	β	Δ'_1	Δ'_2	Δ_3	Δ_4	Δ_5
4.0	33	+ 10	+ 06	+ 05	− 08	+ 13
5.0	30	+ 03	− 17	− 12	− 16	− 29
6.0	27	− 16	− 08	− 18	− 28	− 22
7.0	24	+ 08	− 24	− 17	− 15	− 19
8.0	21	+ 19	− 07	− 07	− 34	− 22
9.0	19	+ 19	+ 02	− 14	− 21	− 07
10.0	17	+ 18	− 04	− 38	− 39	− 26
11.0	16	+ 36	− 28	− 32	− 34	− 14
12.0	15	+ 17	− 28	− 29	− 39	− 34
13.0	15	+ 28	+ 24	− 09	− 03	+ 04
14.0	16	+ 74	− 04	+ 17	+ 16	+ 18
15.0	18	+ 30	+ 42	+ 05	+ 21	+ 35
16.0	20	+ 18	− 04	− 12	+ 02	+ 44
17.0	23	+ 02	+ 02	− 03	+ 16	+ 32
18.0	26	− 04	+ 11	+ 03	+ 06	+ 26
19.0	29	− 22	+ 35	+ 20	+ 11	+ 11
20.0	32	+ 09	+ 31	+ 09	+ 11	+ 11
21.0	35	+ 04	+ 06	− 03	+ 08	− 24
22.0	37	+ 10	− 12	+ 05	− 04	− 29
23.0	39	+ 05	− 24	− 14	− 17	+ 03
			− 80° − 85°			
1.3	34	− 02	− 04	+ 04	− 20	− 02
4.3	31	+ 06	− 04	− 07	− 10	+ 04
7.3	26	+ 02	− 15	− 23	− 22	+ 04
10.3	21	+ 04	+ 06	− 04	− 18	− 19
13.3	20	+ 17	− 18	− 21	− 23	− 04
16.3	23	− 06	− 29	+ 03	+ 01	+ 07
19.3	29	+ 07	+ 11	+ 18	+ 20	+ 10
22.3	33	+ 22	− 05	− 09	− 07	+ 07
			− 85° − 90°			
3.0	29	− 02	− 09	+ 01	00	− 12
9.0	26	+ 18	+ 13	− 01	− 06	− 18
15.0	25	+ 07	− 24	− 08	+ 01	− 06
21.0	29	− 01	+ 01	− 10	+ 08	− 07

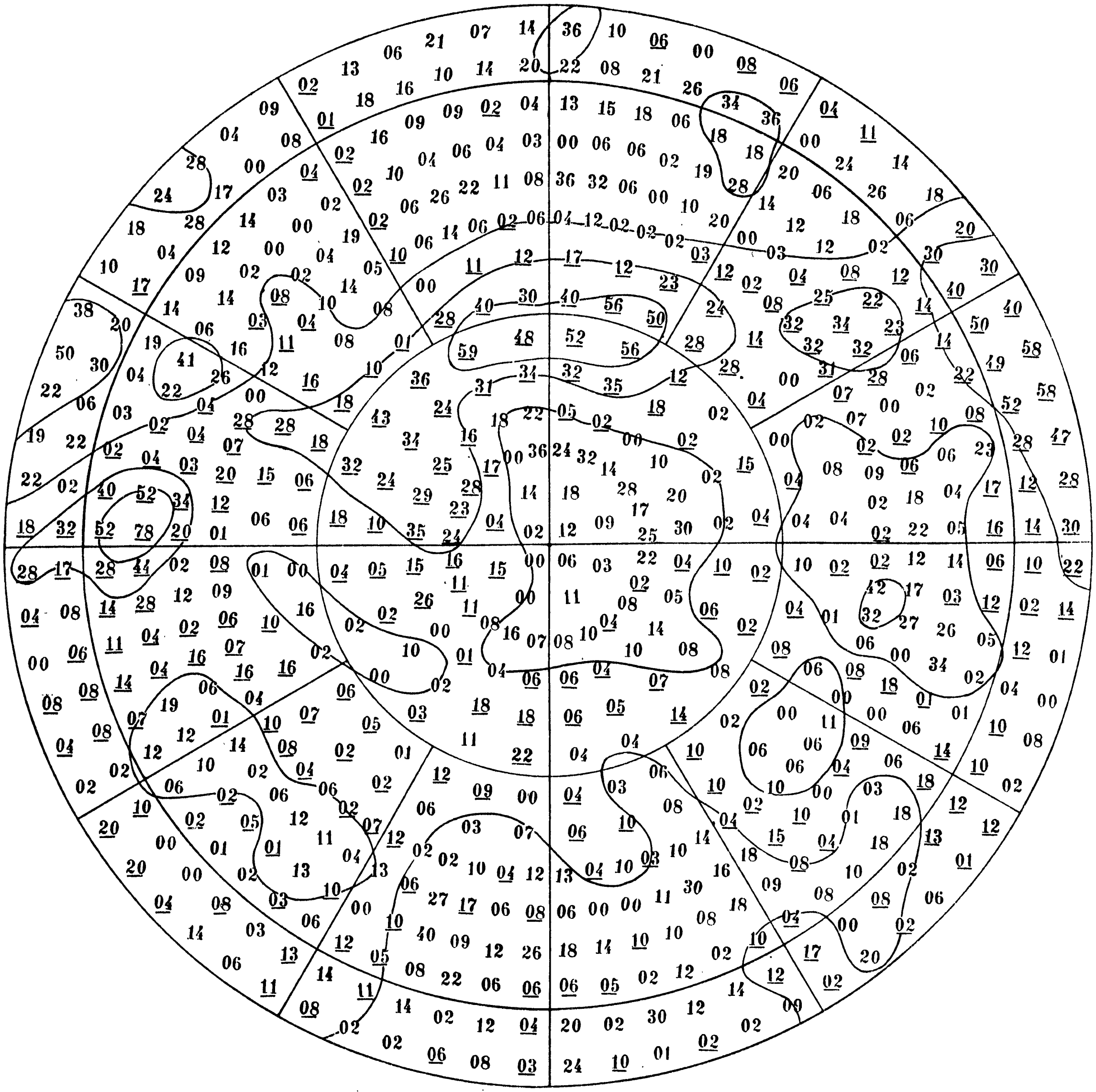
by lines on one chart are found to correspond to higher or lower values on the other chart, though the amount is often not sufficient to be separated by lines. The Canis major condensation on the present chart, just as on II, is less prominent (not reaching + 1.0) than the Vela condensation. The latter has here the same form as on II; the extension to λ Vel, due to an accumulation of *K* stars, is less marked than in the visual catalogue. The condensation ε Sgr—λ Sco is found both on I and II, the small group $16^h\,40^m$ —43° of the present chart is only marked on I (μ Sco). On the present chart the β δ Sco group has a considerable positive surplus, as it has also on I; on II the absorbing nebulosities lower the mean density values. As to the polar regions we find the broad positive galactic band extend to nearly —80° at 12^h; a region of negative deviation reaches from 5^h to the S pole.

Comparing our second chart with chart III in Publ. 1 we find the Carina condensation with its large positive deviations > 0.40 extending only to —65° or —70°; in its eastern part, however, it protrudes far to the S, to $16^h\,18^h$ —80°, and is there connected with the surplus density noted before in Pavo (16^h—60°). The Vela condensation is less prominent than that in Carina, though some-



Deviations of star density for $m = 6.2$.

what more so than in the visual results. In the present chart we find the surplus region of Monoceros, which on III ceased at — 25°, reach as far as — 33° ; hence it is probable, what was suspected then already, that the low densities found formerly at 8^h—30° were due to systematic errors in the corrections of the first Cordoba zones. The surplus region in Scorpio-Sagittarius 17^h 40^m— 35° is more strongly marked on the present chart than on the visual one. The great negative deviations between 15^h and 17^h, — 20° to — 40°, correspond to the strong absorption region in Scorpio, marked dark blue on chart III. A region of smaller negative deviations 5^h—6^h, — 40° is also found on both. The southern polar region is shown here to be a region of negative deviation, chiefly extending to the



Deviations of star density for $m = 8.6$.

6^h side. If we consider that the line of deviation 0 on the present chart corresponds with a negative deviation — .05 to — .10 on the former chart, we find a general concordance in the presence of a large negative region extending along the N border of the galactic zone. The minor fluctuations on the lower part of the charts do not show much resemblance; apart from the contour lines, however, we often find increasing and diminishing density deviations at nearly the same places on both charts.

Postcript. Comparison with the Cape Corrections. After these reductions and computations had been finished already for a long time, a new reduction of the magnitudes in a part of the C. P. D.

on quite other principles was published by the Cape Observatory.[1]) By making use of KRON's researches on the relation between brightness and exposure tine producing the same photographic action, a method has been devised by Dr. HALM and Mr. SPENCER JONES, to deduce the photographic magnitude from measured diameters of photographic stellar images in a general way, so that only one constant remained to be determined from other data on photographic magnitudes. Because in the Introduction to the C. P. D. for each of the plates used the constants have been given which served to deduce the C. P. D. magnitudes from the diameters, these diameters could be reconstructed from the C. P. D. magnitudes and used to derive true photographic magnitudes. In Table B pp. LXXIV—LXXIX of the Introduction of the above mentioned work the resulting corrections to the C. P. D. magnitudes are communicated for the zones 197—542 (centres 35° to 55°).

In order to compare these corrections with those derived in the present paper, the following way has been chosen. Our corrections consist of three parts: $f(m)$ from Table 2 for large regions, a small linear correction for each zone (Table 3) and a constant plate correction (Table 3). Subtracting the two last named corrections from the Cape correction for each plate, the remaining values should correspond to our Table 2; taking the means for each region and comparing the separate results with it, we may see how the two methods of reduction harmonize, and what are the accidental differences. The results of the comparison are found in the following Tables.

Table 5. Average Cape Corrections to the C.P.D., after Subtraction of constant and linear Plate Corrections (*C*); and Corrections from Table 2 (*A*) (Unit 0.01^m).

m	*Ga* *C*	*Ga* *A*	*Gb* *C*	*Gb* *A*	*Gc* *C*	*Gc* *A*	*Ma* *C*	*Ma* *A*	*Mb* *C*	*Mb* *A*	*Mc* *C*	*Mc* *A*	*Md* *C*	*Md* *A*	*Pa* *C*	*Pa* *A*	*Pb* *C*	*Pb* *A*
6.0	— 85	—57	—112	—58	— 89	— 49	— 42	— 22	— 61	— 48	— 53	— 37	— 28	— 11	— 26	— 01	— 16	+ 02
6.5	— 67	—53	— 90	—55	— 74	— 49	— 29	— 17	— 42	— 36	— 33	— 24	— 18	— 06	— 07	+ 06	00	+ 12
7.0	— 47	—47	— 67	—46	— 55	— 46	— 11	— 06	— 21	— 16	— 12	— 05	— 05	+ 04	+ 14	+ 19	+ 19	+ 24
7.5	— 22	—32	— 38	—26	— 30	— 35	+ 13	+ 11	+ 06	+ 07	+ 14	+ 15	+ 15	+ 15	+ 38	+ 40	+ 41	+ 40
8.0	+ 03	—02	— 08	+07	— 04	— 04	+ 34	+ 35	+ 32	+ 38	+ 37	+ 41	+ 33	+ 32	+ 61	+ 65	+ 60	+ 60
8.5	+ 30	+50	+ 26	+48	+ 25	+ 46	+ 56	+ 77	+ 61	+ 82	+ 60	+ 74	+ 50	+ 63	+ 84	+ 92	+ 80	+ 85
9.0	+ 68	+97	+ 69	+81	+ 65	+ 88	+ 85	+116	+ 98	+113	+ 92	+101	+ 80	+100	+115	+113	+105	+109
9.5	+108		+107		+107	+128	+111		+134		+118		+104		+138	+128	+125	+127
Nr. of plates	21		21		71		17		16		16		9		11		74	

Table 6. Difference of Corrections Cape-Table 2.

	Ga	*Gb*	*Gc*	*Ma*	*Mb*	*Mc*	*Md*	*Pa*	*Pb*
6.0	— 28	— 54	— 40	— 20	— 13	— 16	— 17	— 25	— 14
6.5	— 14	— 35	— 25	— 12	— 06	— 09	— 12	— 13	— 12
7.0	00	— 21	— 09	— 05	— 05	— 07	— 09	— 05	— 05
7.5	+ 10	— 12	+ 05	+ 02	— 01	— 01	00	— 02	+ 01
8.0	+ 05	— 15	00	— 01	— 06	— 04	+ 01	— 04	00
8.5	— 20	— 22	— 21	— 21	— 21	— 14	— 13	— 08	— 05
9.0	— 29	— 12	— 23	— 31	— 15	— 09	— 20	+ 02	— 04
9.5			— 21					+ 10	— 02

[1]) H. SPENCER JONES. Magnitudes of Stars Contained in the Cape Zone Catalogue, 1927.

It appears that in the medium magnitudes the differences are usually small ; for the brighter and the fainter stars, however, they are often large and show a systematic character. For the bright stars the Cape corrections are all more negative than those deduced here, and the same holds again for the faint stars. The curve according to the Cape tables is straighter and more regular than ours. Since, however, our curve was adapted to the observed magnitudes, we think it more probable that here the Cape corrections give too small values for the magnitude. The number of bright stars for each region, it is true, was not so great as for the other magnitudes ; but since all the regions show the same phenomenon and they together contain a sufficient number of comparison stars, with magnitudes determined photometrically, we must assume that the Cape method of deriving the correction curve for these bright stars has not given good results. For the faint stars this cannot be said with the same probability, because here the magnitudes of the photometric catalogues may be liable to systematic errors, which are not so exactly known as could be desired.

Provided the differences found here are confirmed by a direct comparison of the Cape results with the stellar magnitudes, we must conclude that the beautiful method devised by the Cape astronomers does not suffice entirely. It seems that if their formula contained one more arbitrary constant, it could be satisfactorily adapted to the observations.