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## Extended comparison between the Greenwich and Yerkes photographic magnitudes of stars in the north polar region

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Extended comparison between the Greenwich and Yerkes photographic magnitudes of stars in the North Polar region, by *Ejnar Hertzsprung*.

In *B. A. N.* 134 § 3 a comparison was made between the photographic magnitudes of Greenwich and Yerkes; 487 stars north of about  $+75^\circ$  were considered and divided into 48 groups according to magnitude and colourindex. A least square solution was made including quadratic terms.

After correction of a few errors\*) and addition of 146 stars south of  $+75^\circ$  the solution was repeated with the result given below.

The  $487 + 146 = 633$  stars were divided into 63 groups of ordinarily 10 stars each. Giving each group equal weight and putting  $I' = m_{Yk,pg} - m_{Yk,pv} - .636$ ,  $m'_{Grw} = m_{Grw} - 7.283$  and  $m'_{Yk,pg} = m_{Yk,pg} - 7.421$  the following formula was derived according to least squares

$$m'_{Grw} = -.0397 - .0413 I' + .9570 m'_{Yk,pg} - .0356 I'^2 \\ \pm .0107 \pm .0148 \pm .0100 \pm .0264 \\ + .0270 I' m'_{Yk,pg} + .0544 m'^2_{Yk,pg} \\ \pm .0209 \pm .0096$$

The representation of the normal equations is shown in Table I. The mean error of a single equation is  $\pm m.048$ . This is slightly greater than the value found in *B. A. N.* 134, viz.  $\pm .041$ . In spite of the increased number of stars (633 against 487) the present results have therefore no higher weight than those derived in *B. A. N.* 134.

The coefficients of the final equation are practically the same as before and the general conclusions devived in *B. A. N.* 134 remain unaltered.

TABLE I.

number of stars	I			$m_{Grw}$ O—C
	$m_{Yk,pg}$	$m_{Yk,pg} - m_{Yk,pv}$	$m_{Grw}$	
	m	m	m	m
10	4.917	-.291	5.215	-.04
10	5.615	-.134	5.706	- 4
10	6.199	-.100	6.217	+ 3
10	6.560	-.119	6.475	- 1
10	6.867	-.079	6.775	+ 2
10	7.191	-.161	7.165	+ 12
10	7.620	-.121	7.475	+ 3
10	5.291	.136	5.471	- 2

\*) One star had been taken as  $8^m.81$  in stead of  $8^m.11$ , reducing the greatest difference O—C in Table 2 of *B. A. N.* 134 from  $+10$  to  $+3$ .

In the Greenwich Catalogue the magnitude of BD  $+74^\circ 740$  should be 6.78 in stead of 8.78.

TABLE I. (Continued.)

number of stars	I			$m_{Grw}$ O—C
	$m_{Yk,pg}$	$m_{Yk,pg} - m_{Yk,pv}$	$m_{Grw}$	
	m	m	m	m
10	5.872	.133	5.995	+ .07
10	6.309	.157	6.300	+ 3
10	6.458	.120	6.456	+ 6
10	6.627	.102	6.508	- 3
10	6.729	.135	6.627	- 0
10	6.907	.133	6.770	- 1
10	7.009	.113	6.885	+ 1
10	7.139	.107	6.965	+ 3
10	7.266	.158	7.139	+ 3
10	7.337	.135	7.150	- 3
10	7.472	.178	7.319	+ 2
10	7.553	.108	7.349	- 3
10	7.647	.220	7.435	- 4
10	7.777	.216	7.572	- 3
10	7.923	.167	7.713	- 3
10	8.330	.172	8.102	- 6
10	5.824	.411	5.888	+ 2
10	6.793	.399	6.676	+ 0
10	7.197	.420	7.034	- 1
10	7.352	.430	7.135	- 5
10	7.514	.417	7.295	- 4
10	7.663	.475	7.458	- 2
10	7.829	.485	7.655	+ 1
10	7.970	.402	7.778	- 1
10	8.157	.433	7.946	- 4
9	8.343	.531	8.178	+ 0
10	5.970	.738	5.968	+ 1
10	7.192	.735	6.993	- 3
10	7.697	.737	7.514	+ 1
10	8.074	.738	7.867	- 2
10	8.522	.760	8.443	+ 8
10	6.685	1.035	6.530	- 1
10	7.172	1.005	6.966	- 2
10	7.451	1.060	7.318	+ 7
10	7.685	1.041	7.492	+ 1
10	7.823	1.024	7.583	- 4
10	7.989	1.005	7.739	- 5
10	8.134	1.031	8.004	+ 6
10	8.280	1.006	8.100	+ 1
10	8.377	1.057	8.098	+ 10
10	8.522	1.010	8.396	+ 4
12	8.783	1.027	8.716	+ 8
10	6.401	1.334	6.266	+ 1
10	7.591	1.284	7.387	+ 2
10	7.885	1.341	7.599	- 6
10	8.167	1.298	7.982	+ 2
10	8.373	1.313	8.243	+ 7
10	8.516	1.320	8.455	+ 12
10	8.725	1.368	8.469	- 9
10	6.770	1.686	6.577	+ 3
10	7.728	1.670	7.399	- 7
10	8.033	1.643	7.763	- 2
10	8.343	1.596	8.125	0
10	8.556	1.649	8.382	+ 3
12	8.848	1.682	8.642	- 4