VII. The Influence of the Selective Absorption in Space upon a Differential Scale of Stellar Magnitudes.[1]

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In the catalogue of Tartu Obs. Publ. 28_2 the scale of photographic magnitudes is based upon Harvard visual magnitudes of stars earlier than F8. Assumed mean colour indices are there added to the visual magnitudes, and standard photographic magnitudes are obtained in this manner.

In general the faint stars are farther away than the brighter ones. On account of selective absorption the colour indices of faint stars must be larger than the mean assumed value. This may cause a systematic error in the photometric scale of the catalogue.

In the following an upper limit to the correction for the selective absorption is estimated. The coefficient of the selective absorption is certainly overestimated if we assume $+ 0.^m5$ per 1000 parsec. For each star, used for calibrating the photometric scale, the distance was calculated from the known absolute magnitude, or from a mean value of the absolute magnitude of the given spectral type. The distance being known, it is possible to find the correction for selective absorption.

The stars are divided into groups according to their apparent brightness. For each group the mean value of the correction was computed. The zero point of the colour index has no influence upon the scale correction. Therefore the values of the scale correction are given relative to the mean selective absorption.

The results are presented in the following table and in the accompanying figure.

[1] Seminar in Astrophysics 1936/37, conducted by E. Öpik.

m	A	Δi	n
	m	m	
4.0 — 4.5	0.017	— 0.059	3
4.5 — 5.0	0.04	— 0.036	1
5.0 — 5.5	0.038	— 0.038	4
5.5 — 6.0	0.03	— 0.046	1
6.0 — 6.5	0.062	— 0.014	13
6.5 — 7.0	0.063	— 0.013	14
7.0 — 7.5	0.084	+ 0.008	14
7.5 — 8.0	0.094	+ 0.018	19
8.0 — 8.5	0.087	+ 0.011	14
8.5 — 9.0	0.120	+ 0.044	3
9.0 — 9.5	0.12	+ 0.044	1
Mean	0.076	0.000	....

m — magnitude interval of the group
A — mean computed selective absorption
Δi — relative scale correction
n — number of stars in the group

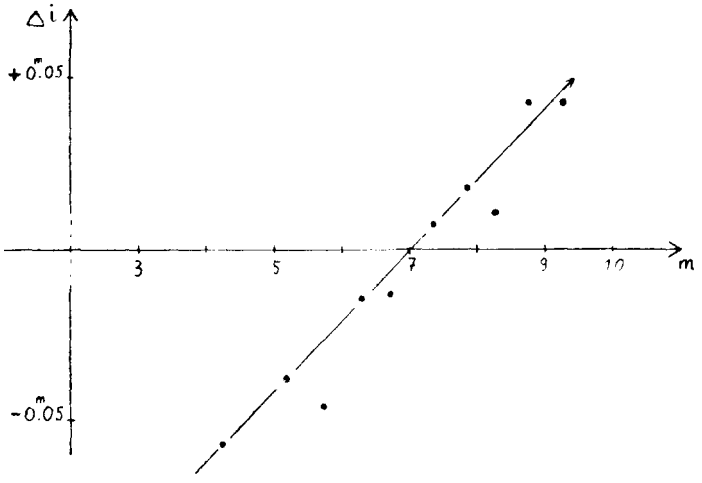

Fig. 2.

Our theoretical scale correction appears to be quite close to a linear function of magnitude. Considering the fact that our assumed value of the coefficient of space absorption amounts to at least the double of the probable value, the actual corrections must be much smaller than those given in the table; they are small enough to be disregarded in the above mentioned catalogue.

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