

University of Groningen

Determination and discussion of the spectral classes of 700 stars mostly near the north pole ten Bruggen Cate, Gerrit Hendrik

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version

Publisher's PDF, also known as Version of record

Publication date:
1920

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

ten Bruggen Cate, G. H. (1920). *Determination and discussion of the spectral classes of 700 stars mostly near the north pole*. Drukkerij Gebroeders Hoitsema.

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

On the average the probable error of the unit of weight is $\pm 0^m.125$.

The unit of weight in these computations is the weight of a single colour-index determination i. e. the difference between the photogr. magnitude of a star of the *Greenwich catalogue* and the vis. magn. of *Potsdam* (MÜLLER and KRON). For the weight of the second member of every equation of condition was taken equal to the number of stars from which the latter was derived.

As to the fact that b is different for different spectral classes, Prof. KAPTEYN found the same result in his paper *On the Absorption of light in space* (*Contributions Mount Wilson* No. 42). The author attributes the phenomenon to an error in the photogr. scale of the Draper Catalogue (see pages 5 and 6 of the above-mentioned paper).

In the same manner I have treated the values of c :

Table 23.

| Spectrum | Average c | Weight | p. e. of c |
|----------|-------------------------|--------|-----------------------------|
| B and A | ^m — 0.015 | 216 | ^m ± 0.010 |
| F | — 0.022 | 179 | ± 0.007 |
| G | — 0.060 | 142 | ± 0.013 |
| K and M | — 0.083 | 75 | ± 0.008 |

Here we find on the average the same value for the probable error of the unit of weight i. e. the probable error of a single colour-index determination, viz. $\pm 0^m.126$.

6. Summary of results.

- 1) The later spectral types predominate among the fainter stars (Table 15).
- 2) The apparent faint stars are, ceteris paribus, bluer than the bright stars (Table 22).

In my opinion this effect is probably due to an error in the photographic scale of the *Greenwich catalogue* or an error in the visual scale of *Potsdam*.

The surprising result of table 22 is, that the value of b changes with the spectrum.

- 3) The stars with small proper motion are, ceteris paribus, redder than those with large proper motion (Table 23).

This effect is probably due to an influence of the absolute magnitude on the colour. This influence seems to increase with advancing type, but the effect

seems not to exist for the B and A stars, because for these spectra the value of c ($\pm 0^m.015$) is but 1.5 times larger than its probable error ($\pm 0^m.010$).

The same phenomenon is found by Dr. P. J. VAN RHIJN in his dissertation *Derivation of the change of colour with distance and apparent magnitude* and by ADAMS and KOHLSCHÜTTER. In the discussion of the results on page 71, of the above-mentioned dissertation we can see that c i. e. the increase of the colour index per unit of distance for the B-stars and early A-stars is equal to 0.00000, whereas c shows a systematic change with the spectral type.

ADAMS and KOHLSCHÜTTER came to the following conclusion on page 1 of their paper *Some spectral criteria for the determination of absolute stellar magnitudes* ¹⁾.

„The continuous spectrum of the small proper motion stars is relatively fainter in the violet as compared with the red than is the spectrum of the large proper motion stars. The magnitude of this effect appears to depend on the spectral type, and increases with advancing type between F₀ and K₀.“

¹⁾ Contributions from the Mount Wilson Solar Observatory No. 89.