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List of stars nearer than 5 parsecs

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COMMUNICATIONS FROM THE OBSERVATORY AT LEIDEN.

List of stars nearer than 5 parsecs, by *Ejnar Hertzsprung*.

The great progress made in the determination of stellar parallaxes in recent years makes it desirable at intervals to bring the list of the nearest stars up to date. My first list of this kind (*Zeitschr. für wissensch. Photographie* **5**, 87; 1907) contained all the stars, for which at that time a parallax of more than 0″·1 had been found. As the number of stars with measured parallaxes has since increased considerably, the main feature of such a list is already shown, when only the very nearest stars with distances below 5 parsecs are included. Counting the components of multiple systems as separate stars, I find at present 29 stars with a parallax above 0″·2. These have been listed in the accompanying table. The spectra of Lac 8760 and Gou 32416 have been kindly communicated by Professor S. J. BAILEY in advance of publication.

It will be noted that out of the 29 stars in the list 15 are members of double or multiple systems.

KAPTEYN and VAN RHIJN give the number of stars, counting double stars as one star, pro cubic parsec in the vicinity of the sun as ·0451 (*Contrib. from the Mount Wilson Obs.* N°. 188, *Ap. J.* **52**, 32; 1920). According to this we should expect 24 stars nearer than 5 parsecs and 12 nearer than 4 parsecs. The numbers here found are respectively 20 ± 4·5 (m. e.) and 16 ± 4. The agreement is so far good, but it seems on the other hand rather improbable, that we should already now practically know all the stars within 4 or 5 parsecs from the sun. Especially several absolutely faint stars of this kind are likely to have escaped attention. Of stars within 5 parsecs and fainter than $+5^m$ absolute magnitude we know 10 ± 3, while according to KAPTEYN and VAN RHIJN we should expect 4.

The relation between absolute magnitude and spectrum is, for the great majority of the stars contained in a given volume, in good agreement with the general rule, viz: that the effective temperature decreases with the absolute brightness. In addition to the absolutely bright yellow stars like α Bootis etc., which form the most distinctive exception to this rule, there is another class of exceptions which is certainly less brilliant but not therefore less deserving of attention. This class consists of absolutely faint relatively white stars. In the accompanying table there are two objects of this kind viz: VAN MAANEN's star *) and the companion to Sirius. The spectrum of the latter may, according to Adams, not be quite certain and has therefore been put in parentheses. A third similar object is the primary star of Σ 518, the well known double companion to o_2 Eridani, the parallax of which triple system is near to the limit of the present table. The effective wavelength of this star indicates a white colour (*Contrib. from the Mount Wilson Obs.* N°. 101, *Ap. J.* **42**, 111; 1915) and its spectrum is of class *A*0 according to Adams (*Publ. of the Astron. Soc. of the Pacific* **26**, 198; 1914). Recently F. C. LEONARD found the spectrum of the fainter component of Σ 518 to be *Md* (*Publ. of the Astron. Soc. of the Pacific* **33**, 272; 1921). The absolutely faint white stars seem to be even more frequent per unit volume than the absolutely bright yellow stars.

For the fainter components of Σ 2398, Groombr. 34 and Krüger 60 no spectrum is available, but the effective wavelengths (*l. c.*) indicate a yellow colour for these three stars corresponding to class *M*. This has been indicated in the table by [*M*]. The same notation is used for Innes's companion to α Centauri, where the colour has been estimated from the difference between photographic and visual magnitude.

The relation between absolute brightness and colour of the very faintest stars deserves further attention. The effective wavelengths of absolutely faint stars

*) According to SEARES (*Publ. Astr. Soc Pacific* 30, 192, 1918), the colour index of this star is + ·57, corresponding to + ·42 on the scale I_H of the Göttingen Actinometry.

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