THE RELATIONSHIP BETWEEN THE COLOR AND LUMINOSITY OF STARS NEAR THE SUN

OLIN J. EGGEN
LICK OBSERVATORY, UNIVERSITY OF CALIFORNIA

The tabulation and description of all the individual stars was once considered to be the ultimate goal of astronomy. This Herculean task, which can no longer be seriously considered since the number of known stars and the variety of their physical and astrometric properties available for observations are so great, has been considerably lightened by the application of statistical methods.

The observed quantities that we shall deal with here are

V_E	The apparent, visual magnitude.
$(P - V)_E$	The color or difference between the visual and the photographic magnitude.
$\pi(t)$	The trigonometric parallax.

The values of $\pi(t)$ and V_E are combined to give the absolute visual magnitude,

$$M_V = V_E + 5 + 5 \log_{10} \pi(t) . \tag{1}$$

It is assumed that the nearby stars are not affected by interstellar absorption. The correlation to be investigated is that between M_V and $(P - V)_E$ and will be referred to as the color-luminosity array.

The three samples of nearby stars to be discussed are characterized as follows, for $(P - V)_E < +1^m.25$:

Group	$\pi(t)$	Weight	M_V	Number	Per cent observed
I	>0".050	>36	All	52	90
II	>0.050	16–36	<+4.55	63	95
III	0.040–0.050	>20	<+4.55	29	80

The objects in groups I, II, and III are listed in sections A, B, and C, respectively, of table I where they are numbered as in the Yale Parallax Catalogue [1]. The spectral types in the last column of table I, which are followed by a Roman numeral indicating the luminosity class, are from the Yerkes Spectral Atlas [2], or from other sources stated to be on the same system. The types preceded by the prefix "d" for dwarf, or "g," for giant, were assigned at the Mount Wilson Observatory [3]; unpublished types, determined at the Lick Observatory by J. H. Moore, for a few southern stars are also included.