STAR COUNTS IN FIELDS SURROUNDING THE LMC

M.T. Brück
Department of Astronomy
University of Edinburgh
Royal Observatory, Edinburgh EH9 3HJ

ABSTRACT

Star counts in a number of fields near the Large Magellanic Cloud have shown a maximum extension of about 10^{o} for the faint stars. The luminosity function in the outer regions of the LMC is consistent with an intermediate age population.

OBSERVATIONS

Observational material consists of five UKST IIIaJ plates of standard survey fields (Fields 30, 31, 32, 56 and 86) measured by the COSMOS automatic measuring machine as described in earlier papers (Brück 1978, 1980). Two plates cover the north-east and south-west quadrants of the main body of the LMC; the other three extend westward from the LMC to the wing of the SMC. The inner fields reach 18^{m} (B) and contain photometric standards by Butler (1976) and Martin (1977) to the same limit. One of the other fields, that which includes the SMC wing, has photometric calibration due to Kunkel (1980) which reaches 22^{m}. The measured areas of the inter-Cloud plates overlap slightly so that it has been possible to estimate magnitudes approximately in the uncalibrated fields.

LUMINOSITY FUNCTIONS

Counts in half magnitude bins from 13^{m} to 18^{m} in the inner parts of the LMC (Figure 1a) are equivalent to cumulative counts increasing at the rate of 0.40 in $\log N$ per magnitude. Among the faint stars in the outer periphery (5^{o} - 6^{o} from the centre in the south-west direction) a characteristic luminosity function emerges (Figure 1b) with an abrupt jump in numbers at around 19^{m} where horizontal branch stars in the LMC intermediate age population are known to be numerous (Butcher 1977; Stryker and Butcher 1981). A possible zero-point error in magnitudes due to transferred photographic photometry does not alter the unambiguous nature of this LF.

S. van den Bergh and K. S. de Boer (eds.), Structure and Evolution of the Magellanic Clouds, 97–98.

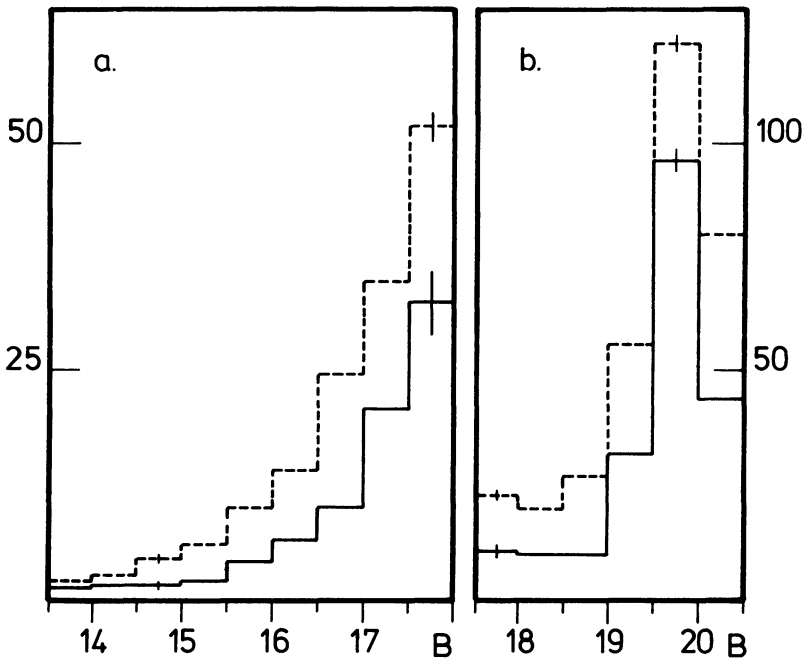

Figure 1. Luminosity functions in the LMC (a) inner disk and (b) halo. Dotted lines are observed total counts; solid lines are counts after subtraction of galactic foreground stars. Numbers are given per unit area 11.2 x 11.2. Multiply by 2870 to obtain numbers per square degree.

ACKNOWLEDGEMENT

The author thanks Dr W. Kunkel for generously supplying charts and data of his sequence.

REFERENCES

Brück, M.T.: 1978, Astron. Astrophys. 68, 181
Brück, M.T.: 1980, Astron. Astrophys. 87, 92
Butcher, H.: 1977, Astrophys. J. 216, 372
Butler, C.J.: 1976, Dunsink Obs. Publ. 1, No.6
Kunkel, W.: 1980, IAU Symp. 85 (ed. J.E. Hesser) p.353
Martin, W.L.: 1977, Mem. Roy. ast. Soc. 83, 69
Stryker, L. and Butcher, H.: 1982, IAU Colloq. 68 (ed. A.G. Davis Philip and D.S. Hayes) p.255