

To the Editors of 'The Observatory'

On the Absence of Flat Star Clusters

Taylor¹ has asked the question (which had never occurred to me, but is obvious in hindsight) why there are no flat star clusters. Even though the question is now obvious to me, the answer is not. However, a useful starting point might be a paper by the late, great Donald Lynden-Bell, 'Can Spherical Clusters Rotate?'², in which he breaks with the tradition that the answer is always 'no' if there is a question mark in the title and points out that a spherical cluster of mass points may rotate without becoming oblate. To be sure, he considers an *unrelaxed* system, while Taylor seems to be thinking of a relaxed system and assuming that rotation will lead to flattening. On the other hand, *Gaia* results indicate that at least some globular clusters rotate³, but with no evidence of a link between rotation and flattening. ADS lists 51 citations for Lynden-Bell's paper — 12 after 2018, 28 after 2006, and none between 1964 and 1979; thus it appears to have remained relevant, especially in recent times. Lynden-Bell also remarks on "how little is the relief granted to a rotating cluster when it flattens".

Perhaps another reader knows the answer to Taylor's question, which might also be found in Lynden-Bell's rather technical paper, or in papers which cite it (or papers which cite those papers, *etc.*). His paper was written before I was born, and the topic is rather far from my main interests. I learned of its existence because, a couple of years ago, I had obtained a complete set of the sadly defunct *Quarterly Journal of the Royal Astronomical Society*. Apart from revisiting some classic papers read in observatory libraries over the years, I'm currently browsing all issues, looking for items which pique my interest. The older issues of the *QJRAS* contain abstracts of papers published in *MNRAS*. In particular, the first issue contains the abstract⁴ of Lynden-Bell's paper.

Yours faithfully,
PHILLIP HELBIG

Institut d'Astrophysique et de Géophysique
Université de Liège
Quartier Agora
Allée du 6 août
B-4000 Liège 1 (Sart-Tilman)
Belgium

helbig@astro.multivax.de

2021 September 14

References

- (1) C. Taylor, *The Observatory*, **141**, 246, 2021.
- (2) D. Lynden-Bell, *MNRAS*, **120**, 204, 1960.
- (3) A. Sollima, H. Barmgardt & M. Hilker, *MNRAS*, **485**, 1460, 2019.
- (4) *QJRAS*, **1**, 117, 1960.