small confession

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share surprise

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name up there, in lights as it were,
share with you the story of how this came about

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start the story with some comments about open clusters

About 2000 ocls are known; only reasonbly complete within about 3000ly of the Sun.
100 000 believed to exist in total.
Most are < 10' and < 20 members
age: The open clusters one observes in the sky are significantly younger than the Galaxy, with ages ranging from a few million to ten billion years.

To fully characterise: position, diameter, distance, reddening, age, velocity, metallicity
Of the 2000: 23% PM and RV; 60% distance, Ev, age
distances: 130 - 42,000 ly ; scale height old clusters = 1200ly, young ocls 180
mass: 10M to 10,000 M

OCLS are NB for understanding Galactic structure & dynamics, and stellar evolution, because
- they are distributed over the whole galactic plane,
- and their ages, distances and reddening can be determined.

size: thickness of the galactic disk, height of Sun above plane, Sun distance to Galactic centre
structure: tracing spiral arms
dynamics: rotation of spiral pattern, orbits of clusters and cluster survival/disruption
galactic formation: ages of oldest clusters, abundances

Main advantage of using OCs is the precision with which one can
derive distance, age, velocity, chemical composition -- as compared to individual stars.
[single stars: mass to 10% from spectral type -
composition not easy but straightforward - age cannot be measured]

Cons: presence of field contaminating stars making it difficult to identify true cluster members. -> dififcult to MSF on the CMD.

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selection effects due to OC dissolution [excluding old clusters, poorly populated, low-mass]

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where does cluster end? is it even a real entity?
John Michell (b: 1724)
(1767) argued that star clusters are far too common than would be the case if stars were just randomly scattered. He estimated that there was only about one chance in 496 000 that a random distribution would produce a cluster like the Pleiades, thereby making possibly the first statistical argument in astronomy.
[Giovan Batista Hodierna a century earlier]
"a little short man, of a black complexion, and fat"
Mitchell inspired William Herschel and sparked his systematic searches for double stars. WH bought his 30-inch 10-foot telescope.
After WH bought his telescope, developed own
Caroline --> inspiration to discover DSOs ---> inspired John

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visual: over-density of stars in a star field

using one of the brain's cognitive procedures to see wholes, or gestalts.
if I draw 4 dots, depending on how i arrange them, you'll see a line or a square or Crux

eye at the eyepiece
later: photography gave persistence, but not objectively. the camera does lie.

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modern studies
systematic compilation of OCL data

last decade
made use of large databases (2MASS, DENIS) and astrometic compilations (USNO, UCAC)
automated search algorithms
2003: 2MASS All-Sky Data Release DVD set (10 double-sided DVDs)
change in methodology: use explicit criteria, but cutoff criteria still essentially arbitrary.
I only mention this because one sometimes reads that a particular technique was objective
Brian Skiff at Lowell Obs is fond of pointing out that at the front of a telescope is an objective, but at the back there is a subjective.

This set me wondering: since the brain is the most powerful image processor we know, and historical observers such as Herschel and Dunlop were pretty thorough at recognizing objects at the visual scale they were working on
observers using transit instruments to measure stellar positions
examined 30 southern-hemisphere astrometric catalogues (published 1752-1917)

Sergey Koposov

DSH
