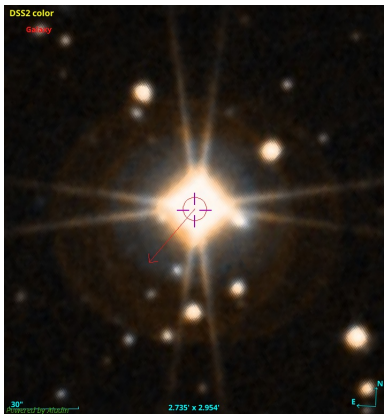
Garching AG Tagung 2026 GAVO Puzzler: Solution

The hints already spell out the query to run, so there is little to disclose here. Just change the magnitude limit to 7 and you will find that the brightest object migrated from Pavo to Indus and has a mean G magnitude of 6.74.



If you are curious, you can find out more by requesting the full Gaia record:

```
select * from gaia.dr3lite where source_id=6370482242902225664
```

When you ask Simbad about the resulting position,

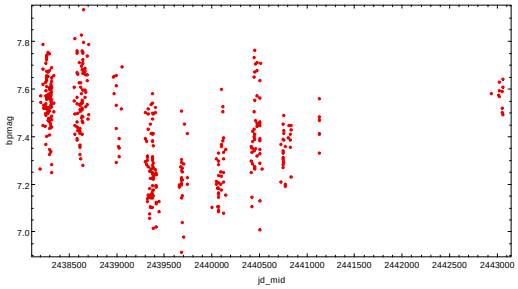
$$\alpha = 323.1266596, \delta = -73.89306232,$$

you will find that this is actually an object with a name, because it is a variable star. I was a bit dismayed to see it's known as CM Ind already and started to doubt the direction of the movement I had found. But it turns out that the variable star observers are quite on the ball. Simbad has a note from 2006IBVS.5721....1K: "Avoid the use of V392 Pav (not the proper constellation name)." They have already noticed!

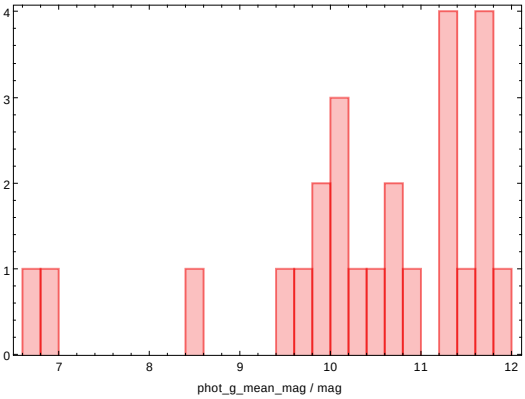
Realising what kind of object that is also made me add hedging language to the problem sheet: "mean G magnitude" matters a lot; "G" because it's a really red object (spectral type M4), "mean" because it's variable. Not much, but still enough to matter. While Gaia DR4 isn't there, the next best thing for a lightcurve of this thing is running this query against Applause's TAP server:

```
select jd_mid, bpmag
from applause_dr4.source_calib as a
  join applause_dr4.exposure using(plate_id, archive_id)
where a.gaiaedr3_id=6370482242902225664
```

This, indeed, shows some minor long-term variability:

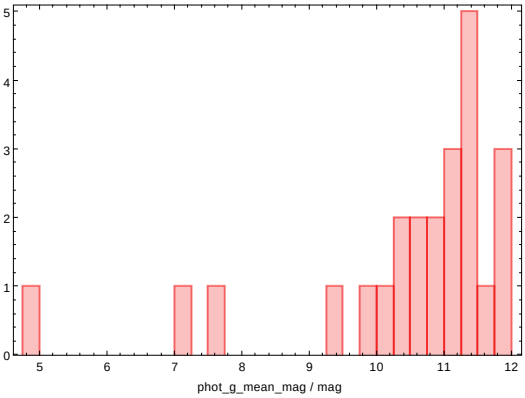


Incidentally, the solution was a bit less guessable than I had wanted it to be. Consider the bar plot of migrating stars down to magnitude 12:



The two bright migrants rather clearly are outliers, and any semblance of a smooth, guessable distribution only starts at, perhaps, magnitude 9 or so.

On the other hand: if you look at the distribution for stars hat have migrated in the previous quarter-century, between 1975 and 2000, there's bright outliers, too:



I think the fact that there are these odd bright outliers is an interesting conspiracy between bright stars being rare, but on average closer and hence faster than weak stars. But don't quote me on that.