

## ***A Compendium of “Why Lunars Today”***

What’s most intriguing about doing lunars today is the reversed time perspective. In modern navigational practice, we start with accurate Greenwich Time before we work out an observation. The old navigators didn't, they had derived accurate Greenwich Time after (or from) their observation. [extrapolation from Bruce Stark<sup>1</sup>]

- Some modern celestial navigators see Lunar-Distance as a kind of Holy Grail; the ultimate challenge for observation and sextant skills. [Karl<sup>2</sup>]
- Nothing else comes close to a lunar for developing skill with a sextant and the observation is demanding enough to hold one's interest for a lifetime. [Reed]
- Observing Lunars hones skills of hand-eye measurement that is 30 times more sensitive to error than conventional sights. [Pearson<sup>3</sup>]
- There is a precise evaluation of your sextant shots – how close can your Lunar-Distance observation get to the actual time you made the observation. Good skills can find time within a minute of GMT, excellent skills can get within 30 or 15 seconds. Better than that is, well luck.[Reed]
- So, why would anyone practice Lunars today when a cheap \$20 Casio watch will keep GMT time to within a second for months on end?
- The short answer is for appreciation and confidence,
- Some practical applications, a lunar can:
  - produce a Line of Position without needing a horizon to take altitude of the moon and other body. This is valuable!
  - Clearing a lunar is as easy as reducing a celestial shot with HO 229, 249 or Law or Cosines. With garden variety scientific calculator, a direct spherical triangle solution using law of cosines is enough to clear a lunar and find the delta Z bearing angle between the moon and the other body.
  - And there are still practical applications. In the very rare event of losing the calendar day or UT at sea (storm lasting several days) with Lunars and only a poor watch it is possible to find what day it is and longitude at sea to within 30 nautical miles. Lunars, even in this rare circumstance, can be a backup to GPS. [John Karl, Bruce Stark] Lunars provides a simple method simple method of using the moon to improve a fix without time. [Letcher, Ken Gebhart <sup>4</sup> ]
- But there are deeper reasons. Lunars leads to an appreciation for and deeper understanding of astronomy, early missions of observatories and, most important, maritime

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<sup>1</sup> Preston's paper on Lewis & Clark's Navigation, [fer3.com/arc/m2.aspx/Prestons-paper-Lewis-Clarks-Navigation-BruceStark-jun-2003-w10378](http://fer3.com/arc/m2.aspx/Prestons-paper-Lewis-Clarks-Navigation-BruceStark-jun-2003-w10378)

<sup>2</sup> John Karl, Celestial Navigation in the Age of GPS

<sup>3</sup> Arthur Pearson, NavList, [fer3.com/arc/img/105621.lunars1\\_arthur\\_pearson.pdf](http://fer3.com/arc/img/105621.lunars1_arthur_pearson.pdf)

<sup>4</sup> [fer3.com/arc/m2.aspx/Persistence-demise-Lunars-Gebhart-dec-2017-g40908](http://fer3.com/arc/m2.aspx/Persistence-demise-Lunars-Gebhart-dec-2017-g40908)

history. There is more than half-century of literature and maritime practice related to Lunars. [Reed]

- Simplification of Lunar-Distance technique and computation was an obsession of 18th and 19th century astronomers, mathematicians and navigators. Nathaniel Bowditch, America's first post-Revolutionary War math savant authored "The American Practical Navigator" which included chapters on Lunar-Observations and extensive tables for clearing the distance, interpolating Greenwich Time and deriving Longitude. It's still in print, 100 years later, though lunars tables no longer appear.
- Engaging with historic Lunars techniques is to engage in the historical experience and that is rewarding enough. [Reed <sup>5</sup>]
- Historic ship logs often show lunar calculations and how navigation was actually practiced. These calculations give insight and detail to voyage records. [Reed]
- And lunars were used by land explorers as well: American mapping and surveying expeditions by Lewis & Clark and Mason Dixon and by Canadian explorers David Thompson and Peter Fidler. All of them used lunars to benchmark important land features and log their progress. [Gottfred <sup>6</sup>]
- In a more abstract sense, lunars illustrate the practical application various time-keeping systems such as Greenwich Apparent Time, Greenwich Central Time, Greenwich Mean Time, Local Apparent Time, Zone Time and Equation of Time and math simplification techniques such as logarithms, conveniences such as pLogs and trigonometric functions like Secants, as applied spherical trigonometry problems.

**In summary ... Lunars are both challenging and fun applied astronomy!**

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<sup>5</sup> Frank Reed, NavList, *Practical lunars in today's world*, [fer3.com/arc/m2.aspx/Practical-lunars-todays-world-FrankReed-apr-2016-g35059](http://fer3.com/arc/m2.aspx/Practical-lunars-todays-world-FrankReed-apr-2016-g35059)

<sup>6</sup> Jeff Gottfred, Lunar Distances