

The ECLIPSE

January
2022

The Newsletter of the Barnard-Seyfert Astronomical Society

Next Membership Meeting:

January 19, 7:30 pm
Online meeting

Link will be posted on
bsasnashville.com

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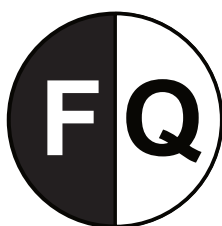


NASA's James Webb Space Telescope launched Dec. 25 at 7:20 a.m. EST on an Ariane 5 rocket from Europe's Spaceport in French Guiana, on the northeastern coast of South America. Webb, a partnership with the European Space Agency and the Canadian Space Agency, will explore every phase of cosmic history – from within our solar system to the most distant observable galaxies in the early universe.

Credits: [NASA/Bill Ingalls](#)



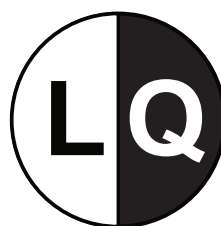
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**Jan 17
Feb 16**



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Book Review: Blue Latitudes Reviewed by Robin Byrne

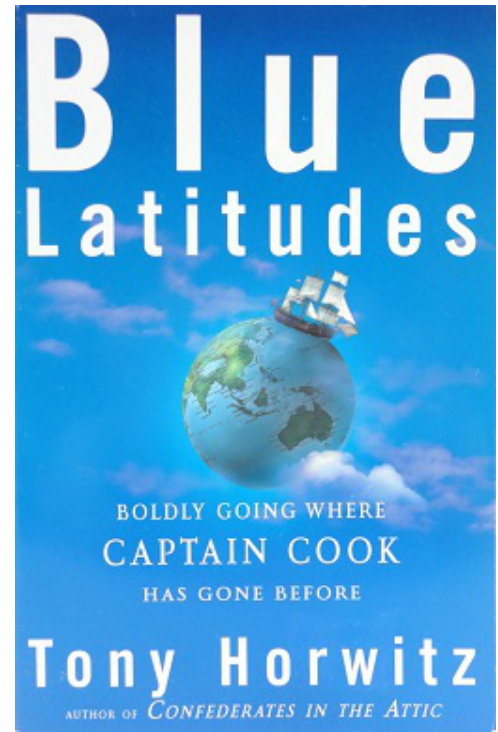
When I came across the book, “Blue Latitudes: Boldly Going Where Captain Cook Has Gone Before” by Tony Horwitz, I was expecting a reenactment of Cook's voyages, including the astronomy. Well ... it wasn't, but it was still a very enjoyable read. So, after reviewing the book, I will discuss some of the astronomy that did occur on the Cook voyages.

The author, Horwitz, decided to travel to the places that Cook visited, in roughly the same order as Cook. However, his mode of transportation was mostly by plane, with only a few ventures aboard ships. However, he did begin by spending a week on a recreation of one of Cook's ships as a crew member. If anything, his description of that short trip made me never want to sail on a historic ship.

During the majority of his travels, Horwitz was accompanied by a friend who, if nothing else, provided much comic relief to many of the situations they encountered. Their travels took them to Tahiti, Bora-Bora, New Zealand, Australia, Tonga, England (to visit Cook's hometown), Alaska, and Hawaii. In each location, they tried to discover how Cook was remembered, if at all, and the legacy of his encounters. Throughout the book, it is clear that the result of Cook's contact with the indigenous peoples in the various locations was largely negative. As more Europeans followed in Cook's footsteps, the local populations rapidly changed from the untouched lifestyle of pre-contact, to one of being exploited. Another legacy was the loss of the local culture. It is only recently that, in the majority of these places, the indigenous populations have taken renewed pride in their heritage, and the local governments have begun to recognize the importance of the indigenous peoples. One of the recurring ironies in the tale is that monuments to the indigenous peoples are now more prominent than any of the smaller memorials erected in honor of James Cook.

But what about the astronomy? Cook's first voyage had a most decidedly astronomical objective: observe the transit of Venus across the Sun. The plan was to sail to Tahiti, which had been “discovered” the previous year. There would be two official astronomers (Cook and Charles Green), plus several other crew members to assist them. After 8 months at sea, Cook's ship arrived at Tahiti on April 13, 1769, giving them close to two months to prepare for the June 3rd event. The plan was to accurately time when Venus first appeared in front of the Sun, and when it departed. By comparing observations from 76 different points on the globe, the hope was to be able to triangulate the distance to Venus. This would then give the starting point to knowing all the other distances in the solar system. At this time, only the relative scale of the solar system was known, but not the actual distance values, so this would have been a phenomenal measurement.

To make the observations, they brought a variety of telescopes, quadrants, sextants, clocks, and tent observatories. During the transit, they discovered that knowing the precise time of the start and end of the transit was trickier than expected. What they didn't know is that



Venus has an atmosphere, so it doesn't present a sharp edge, but instead, a fuzzy, indistinct boundary. This led to differences in the timing by as much as 42 seconds among those observing the transit. Sadly, because of these difficulties, the observations weren't precise enough to be useable.

However, that wasn't the only astronomical job during the voyage. As new lands were encountered, their precise location was measured. To do this, astronomical observations were made. To measure latitude, the Sun's altitude at local noon was measured. This value was compared to the Sun's declination in the published almanac to quickly determine their location north-south. Longitude was trickier. For this, precisely timed astronomical events could be observed (lunar occultations or timings of Jupiter's moons were popular), and the local time of the event is then compared to when the event would have occurred in Greenwich, England. The difference in the timing then determined the location East-West. However, this requires accurate clocks, which were difficult to come by. Despite the challenges, Cook and his crew measured relatively precise coordinates for all of the places they visited.

Venus was not the only transit that was observed on Cook's first voyage, either. On November 9, 1769, Mercury also transited the Sun. This time Cook was in New Zealand, which he "discovered" on this voyage. The timing of the transit and measurement of the Sun's altitude allowed them to accurately determine the latitude and longitude of their location, which they dubbed "Mercury Bay."

On Cook's subsequent voyages, the astronomy exclusively involved measuring latitudes and longitudes of the various islands and coastlines encountered. His second voyage had the goal of discovering a large continent in the southern Pacific Ocean that was theorized to exist. (It doesn't.) The third voyage had the goal of finding a "northwest passage" linking the Atlantic and Pacific oceans. None was found, but they did measure the coordinates of spots along the western American coast and "discovered" Hawaii. That last stop didn't end well for Cook (spoiler - he was killed there).

Meanwhile, back to the book ... There are many entertaining episodes described in the book, which I don't want to spoil, though I will say that alcohol and the author's friend were often involved. Just be prepared to laugh frequently. Whether you are interested in James Cook, issues related to indigenous peoples, travel stories, or just enjoy a well-told tale, "Blue Latitudes: Boldly Going Where Captain Cook Has Gone Before" by Tony Horwitz is a book I would highly recommend.

References:

Blue Latitudes: Boldly Going Where Captain Cook Has Gone Before by Tony Horwitz, Henry Holt and Company, 2002

[Exploring the History of New Zealand Astronomy by Wayne Orchiston, 2016, Chapter 4](#)

[Exploring the History of New Zealand Astronomy by Wayne Orchiston, 2016, Chapter 5](#)

[Exploring the History of New Zealand Astronomy by Wayne Orchiston, 2016, Chapter 6](#)

[James Cook and the Transit of Venus, NASA Science, May 27, 2004](#)

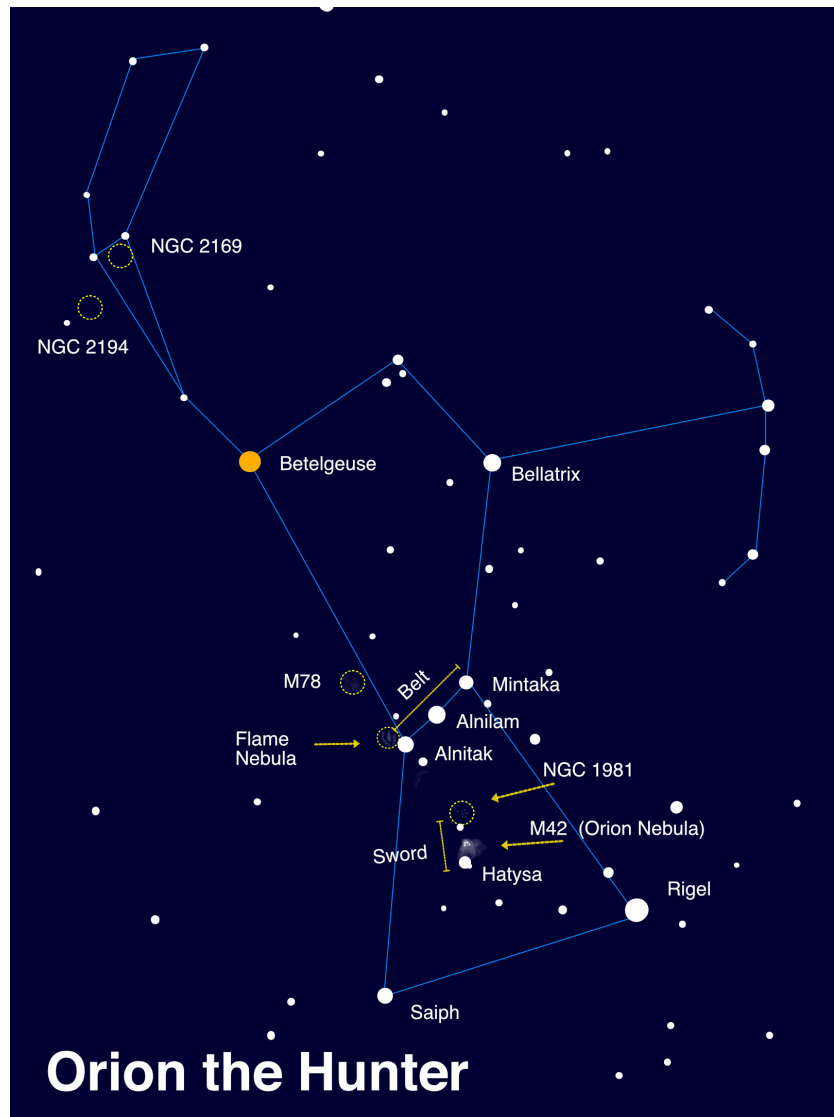
Hunting the Hunter: Observing Orion

By David Prosper

If you are outside on a clear January night, it's hard not to notice one distinctive star pattern above all: Orion! While we've covered Orion in earlier articles, we've never discussed observing the constellation as a whole. Perhaps you've received a new telescope, camera, or binoculars, and are eager to test it out. Orion, being large, prominent, and full of interesting, bright objects, is a perfect constellation to test out your new equipment and practice your observing skills - for beginners and seasoned stargazers alike.

In Greek mythology, Orion is a strong hunter, with numerous legends about his adventures. Being such a striking group of stars, cultures from all around the world have many myths about this star pattern. There are so many that we can't list them all here, but you can find a wonderful interactive chart detailing many cultures' legends on the Figures in the Sky website at figuresinthesky.visualcinnamon.com.

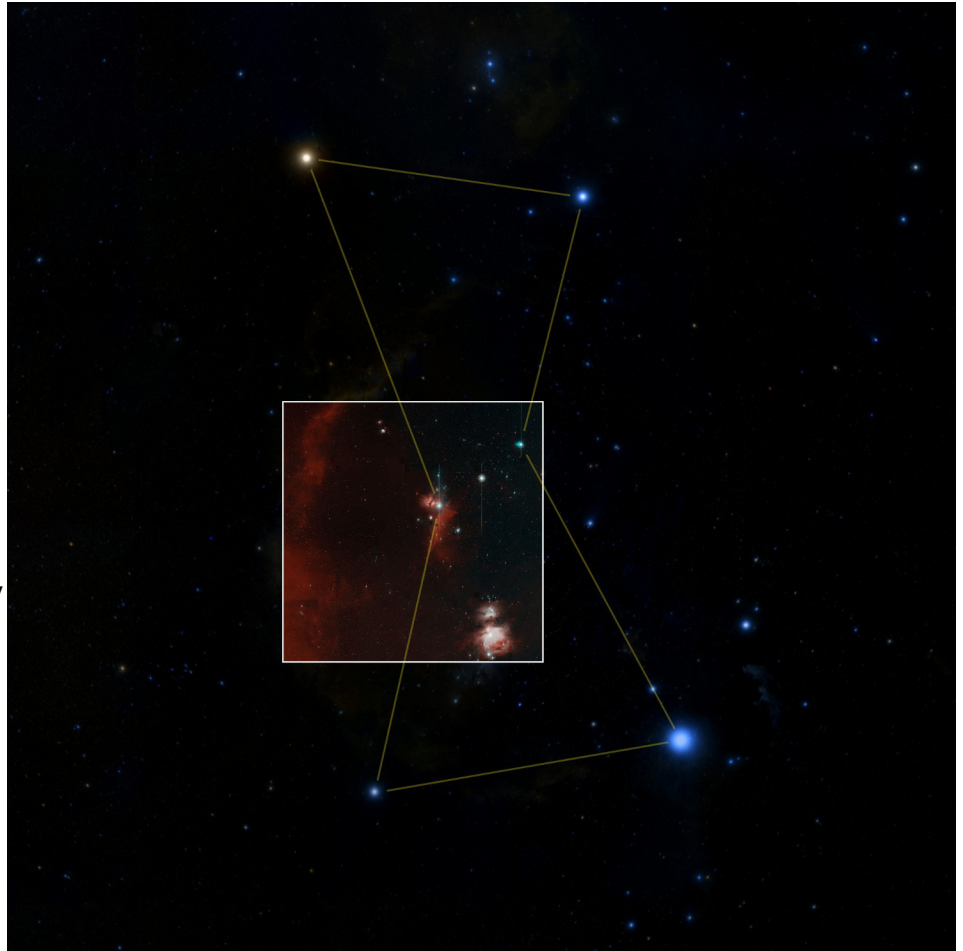
What sights can you see in Orion? Look above the variable orange-red supergiant "shoulder star" Betelgeuse to find the stars making up Orion's "club," then move across from Betelgeuse towards the bright star Bellatrix (Orion's other "shoulder") and the stars of his bow and arrow - both essential tools for the Hunter. Many interesting sights lie near Orion's "belt" and "sword." Orion's belt is made up of three bright giant stars forming an evenly spaced line: Alnitak, Alnilam, and Mintaka. Move from the belt stars



Northern Hemisphere observers can find Orion during January evenings in the east/southeast skies. Can you spot the Orion nebula with your naked eye, in Orion's sword? How does it look via binoculars or a telescope? What other details can you discern? Please note that some deep sky objects aren't listed here for clarity's sake. For example, M43, a nebula located directly above M42 and separated by a dark dust lane, is not shown. Orion's Belt and Sword are crowded, since they star-forming regions! You can read more in our November 2019 article Orion: Window Into a Stellar Nursery, at bit.ly/orionlight.

Image created with assistance from Stellarium.

towards the stars Rigel and Saiph (Orion's "feet" or "knees") to arrive at Orion's distinctive Sword, parts of which may appear fuzzy to your unaided eyes. Binoculars reveal that fuzz to be the famed Orion Nebula (M42), perched right next to the star Hatysa! Diving in deeper with a telescope will show star clusters and more cloud detail around the Nebula, and additional magnification brings out further detail inside the nebula itself, including the "baby stars" of the Trapezium and the next-door neighbor nebula M43. Want to dive deeper? Dark skies and a telescope will help to bring out the reflection nebula M78, the Flame Nebula (NGC 2024), along with many star clusters and traces of dark nebula throughout the constellation. Very careful observers under dark clear skies may be able to spot the dark nebula known as the Horsehead, tracing an equine outline below both the Belt and the Flame Nebula. Warning: the Horsehead can be a difficult challenge for many stargazers, but very rewarding.



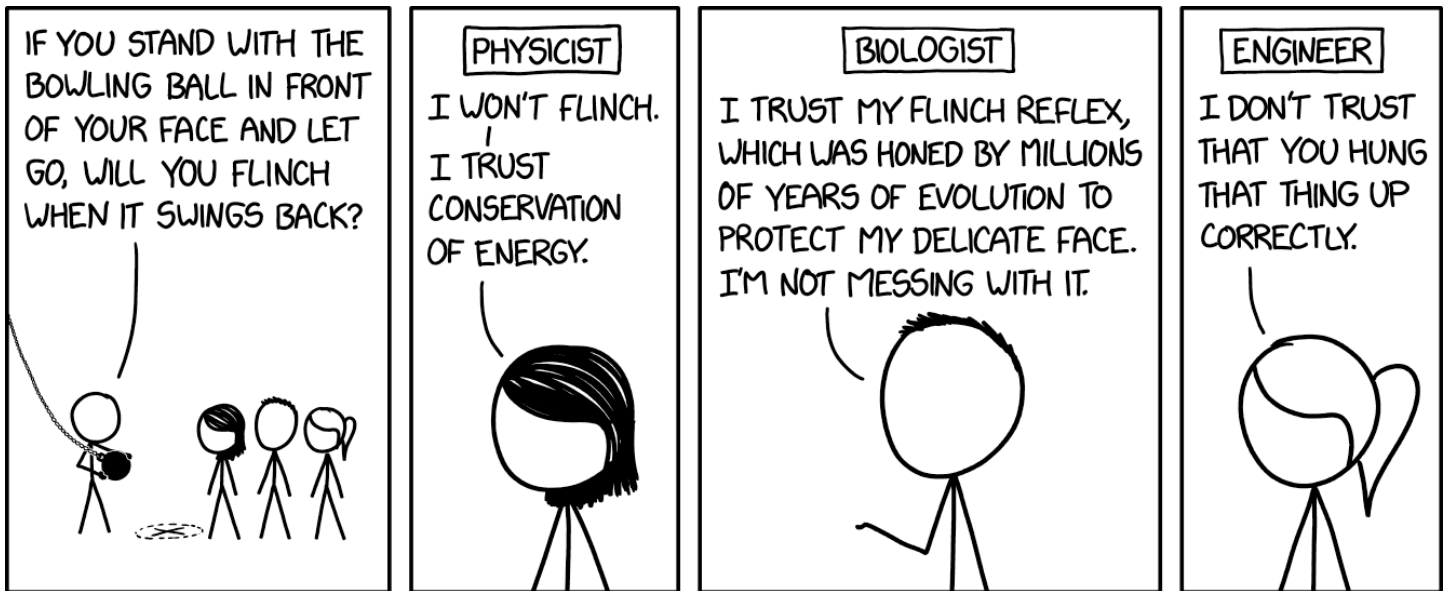
The inset image is the "first light" photo from the Zwicky Transient Facility, a large survey telescope designed to detect changes in the entire night sky by detecting "transient objects" like comets, supernovae, gamma ray bursts, and asteroids. For many astronomers, amateur and pro alike, Orion is often the "first light" constellation of choice for new equipment!

Image Credit: Caltech Optical Observatories

This is just a taste of the riches found within Orion's star fields and dust clouds; you can study Orion for a lifetime and never feel done with your observations. To be fair, that applies for the sky as a whole, but Orion has a special place for many. New telescopes often focus on one of Orion's treasures for their first test images. You can discover more of NASA's research into Orion's stars - as well as the rest of the cosmos - online at [nasa.gov](https://www.nasa.gov).

This article is distributed by NASA Night Sky Network. The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.gov to find local clubs, events, and more! You can catch up on all of NASA's current and future missions at [nasa.gov](https://www.nasa.gov). With articles, activities and games NASA Space Place encourages everyone to get excited about science and technology. Visit spaceplace.nasa.gov to explore space and Earth science!

xkcd



On the Cover: This image from the NASA/ESA Hubble Space Telescope captures the spiral galaxy NGC 105, which lies roughly 215 million light-years away in the constellation Pisces. While it looks like NGC 105 is plunging edge-on into a collision with a neighbouring galaxy, this is just the result of the chance alignment of the two objects in the night sky. NGC 105's elongated neighbour is actually far more distant and remains relatively unknown to astronomers. These misleading conjunctions occur frequently in astronomy — for example, the stars in constellations are at vastly different distances from Earth, and only appear to form patterns thanks to the chance alignment of their component stars.

The Wide Field Camera 3 observations in this image are from a vast collection of Hubble measurements examining nearby galaxies which contain two fascinating astronomical phenomena — Cepheid variables and cataclysmic supernova explosions. Whilst these two phenomena may appear to be unrelated — one is a peculiar class of pulsating stars and the other is the explosion caused by the catastrophic final throes of a massive star's life — they are both used by astronomers for a very particular purpose: measuring the vast distances to astronomical objects. Both Cepheids and supernovae have very predictable luminosities, meaning that astronomers can tell precisely how bright they are. By measuring how bright they appear when observed from Earth, these “standard candles” can provide reliable distance measurements. NGC 105 contains both supernovae and Cepheid variables, giving astronomers a valuable opportunity to calibrate the two distance measurement techniques against one another.

Credit: ESA/Hubble & NASA, D. Jones, A. Riess et al.
Acknowledgement: R. Colombari



In honor of the club's 90th anniversary we partnered with Hatch Show Print to create a unique poster that would honor the achievement of the club. For those who don't know Hatch Show has been making posters for a variety of events and concerts for 140 years. In all that time we are their first astronomy club.

On the poster at the center is the moon. This was made from a wood grained stencil that the shop has used for over 50 years. To contrast that the telescope that the people are using is a brand new stencil made for our poster. The poster has three colors. First the pale yellow color of the moon was applied. Next the small stars, circles, and figures at the bottom were colored in metallic gold. The third color is

a blue for the night sky. Where it overlaps with the metallic gold it creates a darker blue leaving the figures at the bottom looking like silhouettes. This was a one time printing so the 100 that we have are all that will be printed.

The prints are approximately 13 3/4" x 22 1/4" and are available for \$20 at our membership meetings, or \$25 with shipping by ordering through bsasnashville.com. Frame not included.



Become a Member of BSAS!
Visit bsasnashville.com to join online.

All memberships have a vote in BSAS elections and other membership votes. Also included are subscriptions to the BSAS and Astronomical League newsletters.

Annual dues:

Regular: \$25
Family: \$35
Senior/Senior family: \$20
Student*: \$15

* To qualify as a student, you must be enrolled full time in an accredited institution or home schooled.

About BSAS

Organized in 1928, the Barnard-Seyfert Astronomical Society is an association of amateur and professional astronomers who have joined to share our knowledge and our love of the sky.

The BSAS meets on the third Wednesday of each month at the Cumberland Valley Girl Scout Building at the intersection of Granny White Pike and Harding Place in Nashville. Experienced members or guest speakers talk about some aspect of astronomy or observing. Subjects range from how the universe first formed to how to build your own telescope. The meetings are informal and time is allotted for fellowship. You do not have to be a member to attend the meetings.

Membership entitles you to subscriptions to *Astronomy and Sky & Telescope* at reduced rates; the club's newsletter, the *Eclipse*, is sent to members monthly. BSAS members also receive membership in the Astronomical League, receiving their quarterly newsletter, the *Reflector*, discounts on all astronomical books, and many other benefits.

In addition to the meetings, BSAS also sponsors many public events, such as star parties and Astronomy Day; we go into the schools on occasion to hold star parties for the children and their parents. Often the public star parties are centered on a special astronomical event, such as a lunar eclipse or a planetary opposition.

Most information about BSAS and our activities may be found at bsasnashville.com. If you need more information, write to us at info@bsasnashville.com.

Free Telescope Offer

Did someone say free telescope? Yes, you did read that correctly. The BSAS Equipment & Facilities Committee has free telescopes ranging in size from 2.6" to 8" that current members can actually have to use for up to 60 days at a time. We also have some other items in the loaner program such as a photometer, H-alpha solar telescope, educational CDs, tapes, DVDs, and books. Some restrictions apply. A waiting list is applicable in some cases. The BSAS Equipment Committee will not be held responsible for lost sleep or other problems arising from use of this excellent astronomy gear. For information on what equipment is currently available, contact info@bsasnashville.com.