Monthly Newsletter
Cape Fear Astronomical Society
Serving Wilmington, NC and Surrounding Areas

Januarv 2020

(New) President's Report

by Jon Stewart-Taylor

Thanks to Terry Herrin, Billy Kidney, and Scott Spike for their service as officers during 2019. Thank you, Cape Fear Astro members, for entrusting me with the honor of becoming the President of Cape Fear Astro for 2020.

I've thought a lot about the responsibilities and duties of the President: as enumerated in the organization's constitution, as required by North Carolina statutes, and as my duty to the members of the organization and to the community at large.

Billy Kidney called our attention to responsibilities as an incorporated organization lost due to member attrition. Thank you, Billy, for helping us realize what we didn't know that we didn't know. One of my primary goals as President this year is to recover this knowledge and document it.

Cape Fear Astro, like most clubs and organizations of this type, is shrinking as current members move away without replacement, and growing older as few of the younger people who visit become members. Another of my goals for this year is to amend the meeting structure and add content to make meetings more attractive to potential and new members.

Thanks our new (and returning) officers: Skip as Vice President, Karl as Associate Vice President in addition to Newsletter Editor, Bill as Secretary, and Ben as Treasurer. They are in many ways more important to the functioning of the club than the President, and I look forward to working with them over the next year to help Cape Fear Astro grow and flourish.

Our Constitution says our goals shall be: "to contribute to the advancement of the science of astronomy, to encourage and coordinate the activities of amateur astronomical societies, to reach out to the community with astronomy education, to promote observational and computational studies, to develop craftsmanship in the various fields of astronomy and to correlate amateur activities with professional research".

Every member can contribute in large or small ways to those somewhat lofty goals. Let's also strive for the goal prescribed in the preamble: "the benefits and pleasures of an association of individuals sincerely interested in amateur astronomy". Let's make the organization a place where we can experience and share the wonder, beauty and fun of amateur astronomy.

Cape Fear Astro Calendar

Events marked with ★ **and bold** are Cape Fear Astro events for the current Month.

January 2020

03 First Quarter Moon
04 Quadrantid meteors –one of 2020's Best, per Sky & Telescope
★ **04 Observing at Starfields**
05 Earth at Perihelion
10 Full Moon
10 Penumbral eclipse of the moon

★ **12 Cape Fear Astro Monthly Meeting**

GAStronomy Meeting
Sunday, January 12, 5:00pm – 6:45pm
(Dinner, prior to the Monthly Meeting)
Your Pie, 4403 Oleander Dr. Suite H, Wilmington

Next CFAS Monthly Meeting
Sunday, January 12, 7:00pm – 9:30pm
212 DeLoach Hall, UNCW Campus
Program: "2020: Looking Backward and Forward"

12 Moon 1.3º NNE of Beehive (M44), morning
17 Last Quarter Moon
★ **17 Club Observing**
★ **18 Club Observing**
18 Mars 4.7º N of Antares, morning

20 Moon 2.2º NNE of Mars, morning
23 Moon .4º SE of Jupiter, morning: Close to Sun!
24 New Moon
★ **24 Club Observing**
★ **25 Club Observing**

28 Venus .07º from Neptune, evening sunset
28 Moon, Venus and Neptune w/in circle of 4º, mags -7, -4, 8
29 Moon at apogee

Astro phenomena from
https://www.universalworkshop.com/astronomical-calendar-any-year/

Tourist Traps #6: Objects for Late Winter and Early Spring

"Tourist Trap" is my code-word for the objects to view during public observing sessions. They should have one or more of the following characteristics:

- ★ Easy to find, even in light-polluted conditions.
- ★ Able to stand up to a bright background sky.
- ★ Representative of a class of objects.
- ★ Unusual or distinctive trait or appearance.

This time we'll cover the suggested objects for late winter and early spring. They'll be visible at other times, but are best during the usual 8-11 PM time for public sessions in late January through early April.

M41: open cluster in Canis Major. This bright cluster is easy to find, since it's just a few degrees south of Sirius. It's about 2,350 light years away, and about contains about 100 stars spread over 20 light years. It's a good binocular object as well. Along with M35, i like to describe it as "what the Orion Nebula will turn into when it grows up".

M35; Open cluster in Gemini At about 2200 light years away it's almost the same distance as M41, but it's both larger and more populous, with about 300 stars packed into a diameter of about 30 light years. Open cluster 2158 is in the same low-power field of view. but it's much further away. Although M35 doesn't have a very bright "road sign" like M41 does, its position in the "feet" of Gemini and the fact that it shows up well in a finder make it a quick find even under public session conditions. And, once found, it generates a wow from most people; a cluster with that many bright stars really makes an impression.

M44: The Beehive Cluster or Praesepe, an open cluster in Cancer. At about 525 light years away, it's one of the closest star clusters, and is large (about 40 light years across). It's somewhat loosely packed, with about 200 stars. The nearness and large size give this cluster a very large apparent size in the sky as well. It's usually visible to the unaided eye as a fuzzy spot about 1/2 way between Pollux and Regulus. It's too big to fit in the standard 1-degree low-power field of view, but in binoculars or a finder it looks nicer than most clusters do through small to medium 'scope.

M81, Bode's Galaxy, and M82 the Cigar Galaxy, both in Ursa Major. They're at about the same distance (12 million light years away), and about the same size (36,000 light years across the long axis), and fit within the same low-power field. M82 is being deformed by a close encounter with the more massive M81. These are hard to find (compared to most tourist traps), being in a part of the sky with no bright guide stars. They're detectable in binoculars or a good finder, though, and most people are excited by the idea that they can actually see interacting galaxies.

Zeta Uma; "double star" Mizar and Alcor, or "the Horse and Rider", in Ursa Major. This is the "crook" in the handle of the Big Dipper, and many people can see them as separate stars. They're not a true double, since Mizar is 78 light years away, while Alcor is 81. Through binoculars they'll leap apart and reveal a much fainter third star forming an isosceles triangle with the faint star at the point. This bears the imposing name "Sidus Ludovicianum", or "Ludwig's Star". With a 'scope at any power much above 40, Mizar will be split into two components. This is a true double: in fact, it was the first double star discovered. The two stars take nearly 100,000 years to circle each other. There are actually 4 stars in the Mizar system, as each of the components is a spectroscopic double (as is Alcor), but they components can't be separated with a telescope.

Pleiades: The Seven Sisters (Messier 45

by Bradley Johnson

When I step outside on clear late autumn evenings, I immediately scan the eastern sky to look for the dipper-shaped Pleiades star cluster. Under dark sky conditions, it is an outstanding naked eye object. This bright open cluster looks amazing through binoculars. The bright stars known as “The Seven Sisters” are clearly visible and are a sight to behold. In classic Greek mythology, these stellar jewels were the daughters of Atlas and Pleione. The Pleiades cluster has been known since ancient times and references to it appear in literature from many different cultures and mythologies. Charles Messier listed it as M45 in in a catalog published in 1771.

The true nature of Messier 45 is revealed when I bring it into focus in a low power telescopic eyepiece. The main stars are very bright and well defined. A trail of 7th magnitude stars extends from one corner of the dipper-shaped asterism. Many stars too dim to be seen with the naked eye are now found to be a part of this famous cluster. This was noted by Galileo Galilei when he was the first to observe the Pleiades through a telescope. The detailed sketch of his observations published in Sidereus Nuncius in 1610 included 36 stars. The image of this sketch comes to mind each time I observe the cluster through my telescope.

This young star cluster is located in the prominent constellation of Taurus and is over 400 light-years from Earth. The star group formed approximately 115 million years ago and includes 3,000 stars in an area that spans 13 light-years! It contains several middle-aged, hot B-type stars. The brightest hot blue and extremely luminous stars are all of stellar class B. Some of the faintest stars are still 40 times brighter than the sun would appear at the same distance. The brightest of the Seven Sisters, Alycone, is 2,400 times more luminous than the sun!

The Pleiades star cluster contains numerous double stars and a few triples. It also contains many brown dwarfs. Some of the largest stars are rapidly rotating. Alcyone (Eta Tauri) is an example of a multiple star system. It is a triple star orbited by 3 additional stars, one of which is itself a double star! It is the biggest star of the Pleiades and its name means “The Central One”. The primary star is a blue-white B7 type giant star. It is estimated that the cluster will survive for about 250 million years before gravity works to disperse the stars. For now, it is truly a sight to behold in dark autumn and winter skies.

Brad

Image from “The Question Of Nebulae: Galileo's Examination Of Orion And The Pleiades”
http://galileo.rice.edu/lib/student_work/astronomy95/orionpleiades.html

- Karl

In light-polluted or hazy conditions, the Pleiades may not be apparent. The easy way to find them is to use the 3 stars in Orion’s belt, which point toward the bright star Aldebaran, and continue on to the Pleiades. They are also beautiful in binoculars. - Karl

Cape Fear Astro Meetings

by Jon Stewart-Taylor

The monthly meetings are some of the most important activities for Cape Fear Astro. For some members they are the most important. They serve as a place to socialize, to do club business, and maybe even learn something related to astronomy, physics, or space exploration.

Meetings should also be attractive to new and potential members. They don't seem to be doing that. There are two components to the problem: "push" and lack of "pull". "Push" is what drives people away. "Pull" is what draws people in.

What's making our current meetings "push"?

Many people get bored with long extended business discussions, especially if they are not long-time club members. We (myself included!) have a tendency to "rabbit hole" on side topics, and to try to problem-solve at length during meetings. Even long-time members may not be interested if they'd don't have a stake in the outcome.

Socializing is an important part of the meetings, but new people may feel left out when reminiscing is a significant portion of the socializing.

"Pull" is two parts: promotion and content.

To attend our meetings people have to know about them. We need to make a concerted effort to spread the word about Cape Fear Astro meetings. This will be a long-term continuing effort addressing print media, broadcast media, on-line event calendars, and social media. Would anyone be interested in the position of CFAS Media Mogul?

To increase "pull" content, I'm going to add new "mini-presentations" at the beginning of the meeting: a 5 minute or less presentation on one each of unaided-eye, binocular, and telescopic observing, and a mobile-device app or tip. I'll do all four at the January meeting. After that, anyone is welcome to contribute one or more times throughout the year.

The Astronomical League published an article about "Better Astronomy Club Meetings": https://www.astroleague.org/al/socaids/betrmeet.html

It's a longish article, but definitely worth reading. Not all of it applies to or is necessarily useful to Cape Fear Astro. I will be trying to learn from it, and apply what makes sense for us to improve our meetings over the next year.

Do you have ideas or opinions about reducing "push" or increasing "pull"? I'd love to hear them. Post to the e-mailing list, or directly to me at stewarttaylorj@gmail.com.

January Program: 2020: Looking Backward and Forward

The Program for our January 12 meeting will be in 3 parts.

First, we will take a look forward at the 2020 astronomical calendar focusing on what's in the sky on 1st Quarter Moon nights – the usual public observing nights..

Second, with help from members, we will look back at 2019. What memorable things occurred for you, such as making an observation, taking an image, acquiring equipment, attending an event, etc.?

Lastly, again, with help from members, we will look forward to what we wish to accomplish in 2020.

Proplyds

I remember being amazed, maybe you were too, when I saw the Hubble Space Telescope of images of proplyds in Orion. Below it taken from an "Astronomy Picture of the Day", APOD, 10/16/1996.

About This Image

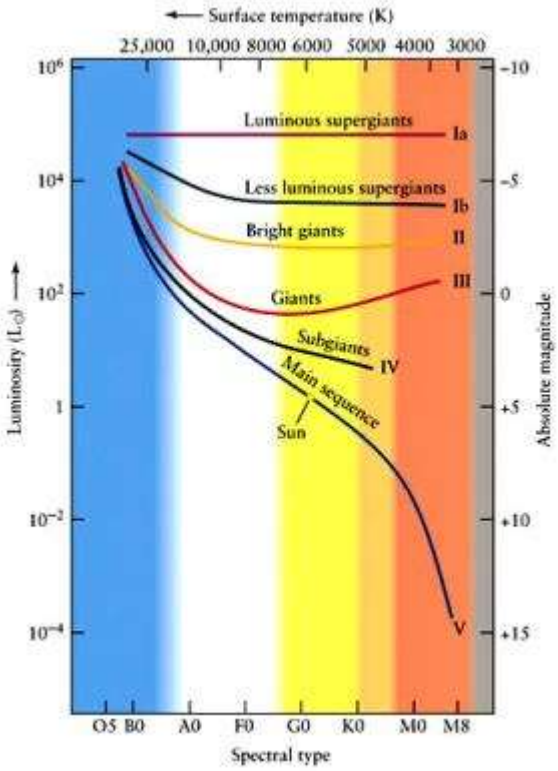
A Hubble Space Telescope view of a small portion of the Orion Nebula reveals five young stars. Four of the stars are surrounded by gas and dust trapped as the stars formed, but were left in orbit about the star. These are possibly protoplanetary disks, or "proplyds," that might evolve on to agglomerate planets. The proplyds which are closest to the hottest stars of the parent star cluster are seen as bright objects, while the object farthest from the hottest stars is seen as a dark object. The field of view is only 0.14 light-years across. The Orion Nebula star-birth region is 1,500 light-years away, in the direction of the constellation Orion the Hunter. The image was taken on 29 December 1993 with the HST's Wide Field and Planetary Camera 2.

CREDITS:
Credit: C.R. O'Dell/Rice University; NASA

Star Spectral Class or Type

by Karl Adlon

I have often read that a star is a certain spectra class and kept reading without much understanding of what it meant. Since I'm coaching some students for the Science Olympiad, I had to learn more. Sirius A is spectral type A1V. The Spectra Types on the lower x-axis are divided into 5 subclasses, so A1 is just to the right of A0 and looking at the upper x-axis yields the star's surface temperature. Luminosity Class V is Main Sequence and, from the intersection point, the Absolute Magnitude and Luminosity can be found.



Alternatively, if you know the Spectra Type and Absolute Magnitude, the type of star can be determined.

The shape of the spectra and the spectra absorption lines that indicate the presence of isotopes of elements in the star's photosphere are used to determine the Spectral Type.

The Absolute Magnitude of the star can be determined from the Distance Modulus equation

$$M = m - 5 \log_{10}\left(\frac{r}{10}\right)$$

where m = apparent magnitude of the star
M = absolute magnitude of the star, and
r = distance to the star in parsecs

For relatively nearby stars, the distance can be determined using stellar parallax measurements. For more distant stars, methods of the "Distance Ladder" ("google" it) can be used.

It is pretty amazing what I've learned coaching the students.

I wonder how many students graduating college will know as much as these students will know this Spring. A very small percent, I think.

Editor's Note: Used in this Newsletter, "Cape Fear Astronomical Society" may be abbreviated "CFAS" or "CFAstro".

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