First Light Lite

January1, 2023

Jim Lynch – Editor

Message from the CCAS President

Another year has gone by, and for CCAS it was a fairly eventful one. After two years and a few months of avoiding direct contact with people, we re-initiated in-person events and star parties this summer. We got to interact with: Joint Base Cape Cod, the Falmouth Newcomers Club, the Cape Cod National Seashore, the Dennis-Yarmouth School District, and the Upper Cape Tech adult education program. All these events went reasonably well, and we look forward to continuing them in the coming year, as well as initiating further contacts and events. And we also had our excellent slate of speakers (both live and Zoom), which you can see on our website. This level of activity may not have quite matched our peak before Covid, but it is not bad at all for what is realistically a recovery period. Thanks, and kudos goes to all the members who participated and made things work!

We have just as ambitious an agenda for the beginning of 2023, with a lot of personal interaction being one of our targets. As usual, we will keep trying to attract some first-rate speakers for our monthly talks – astronomy is one of the most active and vital areas of modern science, and these talks help keep us reasonably up to date. And we will be having star parties at Werner Schmidt Observatory again, though we will be trying a modified way of scheduling, as the Cape's weather is not exactly the most accommodating for observing. (As an example, two of our star parties with Upper Cape Tech were weathered out, and we will offer a rain date at the end of this month using our new approach.)

And we also want to be of more interest to our club members of all backgrounds. Classes/sessions on how to use amateur gear (including our Observatory) and what to see in the sky will be part of our scheduling. If you're in an amateur club, gaining familiarity and skill with the basics of the craft (whether it's astronomy, art, photography, hiking, whatever…) is a big part of the fun. I think we need to concentrate a bit more on that, as many people that have expressed interest in CCAS have said that they wanted to learn such skills.

Two other areas that we hope to improve include our website and club communications. The CCAS website has already shown some improvement thanks to the efforts of new webmaster Mike Hunter, CCAS Secretary Jonathan Hatch, and CCAF Treasurer Janice Marks. There are more improvements planned, which we hope to implement in 2023. And communications, especially as regards keeping track of our members and friends, has also been improved thanks to efforts by Jonathan Hatch. Maintaining a current and useful mailing list may seem trivial to do, but as a few of us can testify, things aren't as simple as all that!

There is more detail but let me save that for the rest of the topics in this newsletter.

Adult Education Program Star Parties at Upper Cape Tech

One of our initiatives this fall was two "talk plus star party" events at Upper Cape Tech, held on November 16th and December 14th. The talks, which stressed amateur astronomy basics, astrophotography, and using amateur telescopes, went fairly well, with very good participation. The star party component(s), however, didn't fare so well. About 60% of nights on the Cape are cloudy enough that observing the stars is a non-starter, and that's aside from the Moon washing out fainter objects half the time just to start with. So, our star party components both got pushed aside in favor of a bit more chat about amateur gear. A reasonable Plan B, but not a substitute for seeing some of the wonders of the night sky.

So, we are planning a "rain check" star party at the end of January/beginning of February for both classes, as well as any general public members and/or students who might wish to attend. That is our next topic (below)!

Rain Check Star Party

While the chance of getting rained/clouded/Mooned out of observing on a single night is likely around 60-70% here on the Cape, giving yourself a 5–6-day window significantly improves your chances of finding a good night, especially as weather systems tend to be 3-4 days in duration. We tried this approach with Ms. Garcia's astronomy class at DYHS, and it actually worked well. Specifically, we designated a weeklong window, and then notified everyone via email on the first clear night that we would hold the session that night. The good part is that we do

get an observing night in! The less good news is that not everyone will be available on a given night, either from the club volunteers or from the potential attendees. But, this seems to be the best way to do things for now, and so we'll go with it. Our tentative "rain dates" for the cancelled UCT sessions are January 30 – Feb 5, 2023. We will send more information on this event (via email) in the near future, as well as posting it on our website. It will be at Werner Schmidt Observatory on the DYHS grounds, and will feature a sky tour, small scope observations, and astrophotography with our main observatory scope. And also, a warm room to duck into, as this is the heart of winter!

DYHS Astro-News

Last fall we had both an in-class talk to the DYHS students about black holes (always a topic of choice) and also a very successful star party for the students at the Werner Schmidt Observatory. Things like this, as well as class projects, have been traditional throughout the years for CCAS and DYHS, and we're hoping that these will continue to grow again.

This month (January) we have a podcast interview arranged with the students (topic – supernovae), which should be a lot of fun! I'm hoping that when it is done, we can have all our club members listen in on it and support these student efforts. Again, stay tuned!

Member Training (also available to any others interested)

We still want and need more people to get familiar with "things amateur astronomical." As mentioned in a previous newsletter, amateur equipment is made to be user friendly, and learning the night sky is only a matter of a night or two's observing. Charlie Burke and I have started work/training sessions both at WSO and in Falmouth. Using solar scopes, go-to mounts, and basic photography will be major parts of the sessions, which will also be done in daytime to make things easier for members.

We had our first session on November 28th at WSO, focusing on go-to mounts and our solar scopes. We made progress, and also found out about items that need some more attention. I think it would be fair to call it a successful afternoon, but it would also be fair to say it was just a start.

We will soon be planning more such sessions, with dates to be announced via email.

Assorted Topics

A few smaller notes.

First, for all you planet watchers, seven planets will be visible in the night sky early this month. Jupiter, Mars, and Saturn are bright, high, and prominent. Venus is low in the southwest and Mercury is visible in the east just before dawn. Uranus and Neptune are binocular objects. The eighth planet is under your feet, and the ninth was demoted. ☹

Second, there should be a nice binocular comet visible (hopefully – comets are not so easy to predict as far as brightness goes) at the end of January, if you are into astrophotography or just getting a peek. Comet C/2022 E3 (ZTF) is predicted to be magnitude 4.2 at the end of January. Lots of astronomy sites will have details.

Third, we've had suggestions for club events based on music and the Moon (either separately or together?!) this year. I'd like to solicit suggestions about some concrete activities that might be associate with them. We've also talked about a "Day of Astronomy" for the public, an again suggestions are welcomed. Using our imaginations to create interesting events and frameworks for events is something we all can do and will help to attract people to our club.

Finally, there are some further notes and material that I'd like to share with this group, but time does not allow me to send right now. So, you might brace for a "FLL Supplement" later this month! 😊

Last Month's Speaker

December 1st

Dr. Nathan Whitehorn, Michigan State University
Title: Neutrino Astronomy

Abstract: The Earth is constantly bombarded by high-energy particles. At low energies, these particles are mostly from the Sun, producing the aurora and other familiar features of the sky. But some have energies that reach far beyond the Sun's capability to accelerate particles, extending far beyond even the reach of supernovae and to more than 10 million times the energies available even from the highest-energy man-made particle accelerators. These must come from the most violent processes in the universe, but which ones and where remains almost completely unknown. This talk will discuss an approach to find and understand these sources using neutrinos, an electrically neutral cousin of the electron. This requires enormous natural detectors located in the deep ocean or the polar icecaps, which have yielded the first glimpses of the distant, high-energy universe over the last decade -- and it has become increasingly apparent that that glimpse is telling us something unexpected: that the sources of these high-energy particles are not what we thought they were and that the neutrino sky is not the one that we are used to. In this talk, I will describe the current state of our knowledge of the neutrino universe, how we got there, and the next steps to resolve this puzzle.

Precis: Cosmic rays, i.e. particles from space which can have energies of up to 100 million times those created in the Large Hadron Collider, have been a mystery since their discovery in 1912, one hundred ten years ago. Why so long? The prime reason is that they are not so easy to observe and track back to their sources. Cosmic ray protons are curved by magnetic fields in space, losing their directional information en route to us. And when the particles hit Earth’s atmosphere, they produce messy showers of secondary particles, which contain useful information, but take work to decipher. So, what do we do? One answer is to look at neutrinos, which are almost massless elementary particles that can penetrate matter readily and seem like an ideal probe for cosmic rays, as they come to us the most directly. We see neutrinos from nuclear reactors, the Sun, cosmic rays hitting the atmosphere, and also from unknown sources. As the business of science is to explore unknown phenomena, tracking neutrinos has become a research priority. Some suspects for the high energy neutrinos are supermassive black holes, gamma ray bursts, and galaxy clusters. However, based on a first map of the high energy

sky, these can only account for a fraction of the observed events. Moreover, the high energy sky does not look at all like the optical sky, and so there is something else going on. The story is still in the early stages of telling, and a big part of it will be deploying new detectors, and indeed the topic of detectors was a large part of the talk. For any oceanographers reading this, the NEPTUNE cabled underwater observatory will host one of the most advanced neutrino sensor arrays ever built, an idea that was proposed a quarter of a century ago but didn't have the technical support or equivalent funding that our modern oceanographic observatory structure affords. Stay tuned!

Next Month's Speaker – TBD.

We are trying to contact a speaker and will let people know if we arrange one. The Holiday season tends to be a bit hard for arranging speakers, for obvious reasons!

We will also be looking for winter and spring speakers, and if you have any thoughts, please pass them on to either Jim Lynch, Charlie Burke, or Janice Marks.

Directions to Dennis Yarmouth HS and Schmidt Observatory

For information on the location of our Dome behind Dennis-Yarmouth High School, click on the purple button "Old Website" and once there, click on "Meeting Location" viewing the two maps that are there: external for the Dome, and internal to locate the high school library where meetings are held. **NOTE:** We are redoing the website, so that this information may become dated soon. We intend to move any currently useful information to our new website.

For meetings, drive in the south entrance road and go around behind the main building. Park in the lot about halfway down the building and go in the back door and turn down the hall to your left to find the library.

For Star Parties at the Dome, drive in the north entrance road all the way past the north side of the main high school building, through a gate, and on to park near our Dome.

H&K directions

CCAS hosts a dinner gathering for the speaker (if available), members and friends on meeting nights (just before the meeting) at the South Yarmouth Hearth & Kettle restaurant at 5:45pm; (the meetings begin at 7:30 at D-Y.) Please join the group to dine and talk about all things interesting, especially astronomy, before our meeting. The H&K is at 1196 Rt 28, South Yarmouth, about a half mile west of the Station Avenue/Main Street intersection with Rt 28 (stop light). **NOTE:** Since Covid, we have a mix of fully remote and hybrid in-person+ remote meetings. Check the newsletter and/or website to see what the format is each month! There are no dinners when the meeting is fully remote.