Happy New Year everyone.
Please note that we are moving the meeting from the first Sunday to the second due to January 3 being part of New Year’s weekend. Hope to “see” everyone on January 10.

I hope everyone had a pleasant holiday season. Let’s hope this new year brings all good things and that we are on our way back to normal. We look forward to the time when we can actually meet each other in person and give someone a hug instead of a fist bump, share an eyepiece and observe the sky with other members and the public. Yes, let’s hope for a safe, healthy and prosperous new year for everyone.

We greatly appreciate the opportunity to visit with Jeff Norwood at Camera Concepts in Stony Brook. This was a first as we got to see all the cool things that he has to offer. Remember that AOS members get a discount and Jeff is an honorary AOS member. He stands behind everything he sells and checks it out before it leaves the store and he’s local so no shipping fees, unless you want them.

Jason C continues to line up great presenters for our upcoming meetings as well. Thanks Jason. We are always looking for people who wish to share their research, observations, theories, techniques, etc. If you would like to be among this distinguished list, or know of someone who would, please contact Jason. For January 10, he’s lined up former Mid-Hudson Astronomical Club President and Solar System Ambassador Dr. Willie K. Yee 2nd - presenting our 2nd in a series of Cultural Astronomy Talks - Astronomical Skies of Asia. On
January 24, former Astronomical League President and now Vice President, currently 19,000 Members - Charles E. Allen ("Chuck") - Discussing the programs of the Astronomical League and What's In Store for 2021.

Some of the programs have been recorded. Contact Jason for information. We greatly appreciate all those who have graciously given us their time on a Sunday afternoon and for those who we will visit with in the upcoming months. Wishing everyone a safe and healthy New Year.

Friends are like stars. You don’t always see them, but you know they are always there!

Please, everyone, be safe and be careful. We will get together again at some point. Till then,

AOS 2021 Calendars

They are on order and should be in the mail soon. The pictures are fantastic. Thank you everyone who agreed to let us publish them. The size of the box has become constricted so we’re not able to add everything we wanted. See the list of dates elsewhere so you can add these important AOS and celestial events to your own calendars. They’ll be included over the next few months due to the size. Be advised that some dates are wishful thinking at this point, but we are hoping. We did order a few extras so if you didn’t get your order in already, contact Treasurer Harvey M ASAP. The cost is $18 and will be mailed.

Observing

The winter solstice is behind us, so the Sun is slowly beginning the journey higher in our sky, shortening the available night viewing time. Take advantage while you can.

In the midst of this crazy world, our intrepid Director of the Susan Rose Observatory on the grounds of Custer Institute in Southold, Bill C, with help from Jason C and Bill B, has continued to bring the night sky objects into view for the public using digital equipment to project images captured by the C14 within our dome onto a monitor outside. Thank you all. Sagamore Hill is waiting for us to be able to bring the night sky views back to their visitors as is the Jones Beach Nature Center. We are hoping that at some point in the not-too-distant future we will be back there with all our equipment. In the meantime, we are working on getting our club use permit back. Until we are sure that virus transmission won’t occur via eyepiece use, we’ll need to continue with digital equipment.

Try the monthly www.GlobeatNight.org program to help map light pollution. Work on one of the Astronomical League or AOS observing programs. If you need suggestions, let Sue know or put a note on the hotline. Until we get our club permit, we suggest that you purchase a Stargazing permit from the NYS Parks Dept. The permit is good from January 1–December 31 each year and is for the vehicle, regardless of the number of occupants.
clear Saturday nights under the auspices of our Director Bill C who uses digital equipment to provide magnified views of heavenly bodies as seen through or C14 SCT. He can always use extra help.

In less than 3 years, there will be an annular solar eclipse over the south and midwest. In a little less than 4 years, the US will once again be treated to a total solar eclipse, this time stretching from Mexico, up though the center of the country into Canada, over Buffalo, etc. It’s time to start making plans. Who wants to help with this? Contact Sue. Luckily, the partial annular on June 10, 2021 will be visible locally at sunrise. We will be there.

2021 Observer's Handbook from the RASC

To obtain this excellent annual publication you can go through the Astronomical League. AOS members are members of the AL and get a discount. Your name is on file because you get the Reflector Magazine from them. Go to the league’s online store for the US edition. S&H is additional.

City of Stars Tour

Many of you may have heard of my City of Stars tours, the “mostly walking” excursions sponsored by the AOS, to visit astronomy-related sites in Manhattan. These tours were inspired by an article written by Dr. Neil deGrasse Tyson in the January 2002 issue of Natural History magazine. Tom L and Linda P have created a Facebook page, City of Stars - New York City, in which they have expanded Tyson’s original list to 42 sites. They are mostly in Manhattan but are also in surrounding areas, with brief descriptions, photos, maps, and links for further information. We hope you will visit City of Stars - New York City! If you see any
and others. The exhibition is fantastic.

**Astronomical League Special Observing Award**
The Astronomical League is excited to announce that they will be offering a Special Observing Award to commemorate the Great Conjunction of Jupiter and Saturn on December 21, 2020. Check out their site for complete information and requirements. The deadline for submission is February 21, 2021.

**NASA & Astronomical League Special Observing Challenge**
The Astronomical League has been working with NASA to bring you Observing Challenges. These are opportunities to participate in events associated with space missions to objects within the Solar System. These challenges have certificates signed by the Astronomical League President and Associate Director for Science, Heliophysics Science Division (HSD), Goddard Space Flight Center. New opportunities will be added as new milestones for various missions occur. Follow the instructions at the observing challenge web page.

**Free Online Course on The Sun at The Open University**
The Sun dominates our lives by defining our day, but how much do you know and understand about it? This free course will help you to explore the workings of what, from Earth, appears to be the brightest star in our universe by looking at its structure and the main processes taking place within it. You will also examine the phenomenon of sun spots.

**Upcoming Online Presentations**
Stony Brook University First Friday of the Month Astronomy Presentation. Sign up here.

Explore Scientific's "Explore Alliance Live" is a daily live video simulcast featuring engineers and technical representatives from Explore Scientific, including the show's host Scott Roberts, the company's Founder and President. To learn more about their programs you can visit their YouTube channel and playlists.

**Observing Projects and Useful Websites**
- Skyscrapers Observing Projects for January
- The Night Sky This Month Astronomy Magazine Sky This Week
- Sky & Telescope Magazine
- In-the-Sky.org
- Globe at Night
- EarthSky
- NASA JPL: What's Up Each Month

**Southern Skies Scope Services**
Amateur astrophotographer Martin Pugh operates two observatories on his rural property in New South Wales, Australia. He offers the following services:
- Telescope hosting with a complimentary pier and onsite 24x7 technical support (Pugh).
- Telescope rental. Complete, high end imaging platforms ready to go
- Southern hemisphere data subscription services to a 17" Planewave CDK.
- For more information contact Martin Pugh at mpastro2001@yahoo.co.uk

**DID YOU KNOW?**
Neptune has only completed one orbit around the Sun since its discovery. In fact, it takes 165 years and did so in 2011!

**A SLIP OF COMET**
I am like a slip of comet, Scarce worth discovery, in some corner seen Bridging the slender difference of two stars, Come out of space, or suddenly engender'd By heady elements, for no man knows; But when she sights the sun she grows and sizes And spins her skirts out, while her central star Shakes its cocooning mists; and so she comes To fields of light; millions of travelling rays Pierce her; she hangs upon the flame-cased sun, And sucks the light as full as Gideons's fleece; But then her tether calls her; she falls off, And as she dwindles shreds her smock of gold Between the sistering planets, till she comes To single Saturn, last and solitary; And then she goes out into the cavernous dark.

So I go out: my little sweet is done: I have drawn heat from this contagious sun: To not ungentle death now forth I run.

Gerard Manley Hopkins
Member Astro Photos

NGC 5139
Joe M

Moon
Terry B

Caldwell 11
Joe M

Caldwell 23
Joe M

Sun spots
John K

Caldwell 50
Joe M

Gemind
Bill B
Check Your Sky’s Quality with Orion!

By David Prosper

Have you ever wondered how many stars you can see at night? From a perfect dark sky location, free from any light pollution, a person with excellent vision may observe a few thousand stars in the sky at one time! Sadly, most people don’t enjoy pristine dark skies. Knowing your sky’s brightness will help you navigate the night sky.

The brightness of planets and stars is measured in terms of apparent magnitude, or how bright they appear from Earth. Most visible stars range in brightness from 1st to 6th magnitude, with the lower number being brighter. A star at magnitude 1 appears 100 times brighter than a star at magnitude 6. A few stars and planets shine even brighter than first magnitude, like brilliant Sirius at -1.46 magnitude, or Venus, which can shine brighter than -4 magnitude! Very bright planets and stars can still be seen from bright cities with lots of light pollution. Given perfect skies, an observer may be able to see stars as dim as 6.5 magnitude, but such fantastic conditions are very rare; in much of the world, human-made light pollution drastically limits what people can see at night.

Your sky’s limiting magnitude is, simply enough, the measure of the dimmest stars you can see when looking straight up. So, if the dimmest star you can see from your backyard is magnitude 5, then your limiting magnitude is 5. Easy, right? But why would you want to know your limiting magnitude? It can help you plan your observing! For example, if you have a bright sky and your limiting magnitude is at 3, watching a meteor shower or looking for dimmer stars and objects may be a wasted effort. But if your sky is dark and the limit is 5, you should be able to see meteors and the Milky Way. Knowing this figure can help you measure light pollution in your area and determine if it’s getting better or worse over time. And regardless of location, be it backyard, balcony, or dark sky park, light pollution is a concern to all stargazers!

How do you figure out the limiting magnitude in your area? While you can use smartphone apps or dedicated devices like a Sky Quality Meter, you can also use your own eyes and charts of bright constellations! The Night Sky Network offers a free printable Dark Sky Wheel, featuring the stars of Orion on one side and Scorpius on the other, here: bit.ly/darkskywheel. Each wheel contains six “wedges” showing the stars of the constellation, limited from 1-6 magnitude. Find the wedge containing the faintest stars you can see from your area; you now know your limiting magnitude! For maximum accuracy, use the wheel when the constellation is high in the sky well after sunset. Compare the difference when the Moon is at full phase, versus new. Before you start, let your eyes adjust for twenty minutes to ensure your night vision is at its best. A red light can help preserve your night vision while comparing stars in the printout.

Did you have fun? Contribute to science with monthly observing programs from Globe at Night’s website (globeatnight.org), and check out the latest NASA’s science on the stars you can - and can’t - see, at nasa.gov. The Dark Sky Wheel, showing the constellation Orion at 6 different limiting magnitudes (right), and a photo of Orion (left). What is the limiting magnitude of the photo? For most observing locations, the Orion side works best on evenings from Jan-March, and the Scorpius side from June-Aug.
What’s Up, Doc? †
January 2021

Dr. Aaron B. Clevenson, Observatory Director, Insperity Observatory

This document tells you what objects are visible this next month for many of the Astronomical League Observing Programs. If you are working on one of the more advanced Observing Programs, then I assume that you are also probably tracking where your objects are all the time. This concentrates on the more common and starter level Observing Programs.

Naked-Eye Observing Programs

**Meteors** – any night, any time, anywhere; the darker the sky the better. Major showers are in **BOLD**:

<table>
<thead>
<tr>
<th>Shower</th>
<th>Duration</th>
<th>Maximum</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quadrantids</td>
<td>1/1 to 1/10</td>
<td>1/3</td>
<td>Major</td>
</tr>
<tr>
<td>Zeta Aurigids</td>
<td>12/11 to 1/21</td>
<td>12/31 &amp; 1/1</td>
<td>Minor</td>
</tr>
<tr>
<td>January Bootids</td>
<td>1/9 to 1/18</td>
<td>1/16 to 1/18</td>
<td>Minor</td>
</tr>
<tr>
<td>Alpha Centaurids</td>
<td>1/28 to 2/21</td>
<td>2/8</td>
<td>Minor</td>
</tr>
<tr>
<td>Delta Cancriids</td>
<td>12/14 to 2/14</td>
<td>1/17</td>
<td>Minor</td>
</tr>
<tr>
<td>Canids</td>
<td>1/13 to 1/30</td>
<td>1/24 &amp; 1/25</td>
<td>Minor</td>
</tr>
<tr>
<td>Eta Carinids</td>
<td>1/14 to 1/27</td>
<td>1/21 &amp; 1/22</td>
<td>Minor</td>
</tr>
<tr>
<td>Eta Crucrids</td>
<td>1/11 to 1/22</td>
<td>1/16 &amp; 1/17</td>
<td>Minor</td>
</tr>
<tr>
<td>January Draconids</td>
<td>1/10 to 1/24</td>
<td>1/13 to 1/16</td>
<td>Minor</td>
</tr>
<tr>
<td>Rho Geminids</td>
<td>12/28 to 1/28</td>
<td>1/8 &amp; 1/9</td>
<td>Minor</td>
</tr>
<tr>
<td>Alpha Hydrids</td>
<td>1/15 to 1/30</td>
<td>1/20 &amp; 1/21</td>
<td>Minor</td>
</tr>
<tr>
<td>Alpha Leonids</td>
<td>1/13 to 2/13</td>
<td>1/24 to 1/31</td>
<td>Minor</td>
</tr>
<tr>
<td>Gamma Velids</td>
<td>1/1 to 1/17</td>
<td>1/5 to 1/8</td>
<td>Minor</td>
</tr>
</tbody>
</table>

**Constellations, Northern Skies** – any night, any time, anywhere, the darker the sky the better.
Last Chance: Cygnus, Lyra, Vulpecula, Sagitta, Delphinus, Equuleus, Aquarius, Piscis Austrinus.
Transit: Camelopardalis, Perseus, Aries, Taurus, Eridanus, Fornax.
New Arrivals: Lynx, Ursa Major, Leo Minor, Cancer, Canis Minor, Monoceros, Canis Major, Columba.

Binocular Observing Programs

**Binocular Messier** – Monthly highlights include:
- Easy – 31, 34, 35, 36, 37, 38, 39, 41, 42, 44, 45, 46, 47, 48, 50, 52, 67, 103
- Medium – 33, 78, 79, 81, 82
- Hard – 1, 32, 97
- Big Binoculars – 77, 108, 110

**Deep Sky Binocular** – Monthly highlights include:
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 43, 44, 46, 49, 50, 51, 54, 56, 58, 62, 64, 65, 67, 70, 73

Other Observing Programs

**Messier** In addition to those listed under Binocular Messier, check out: 43, 74, 76

**Caldwell**
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25, 28, 30, 31, 33, 39, 41, 43, 44, 46, 49, 50, 51, 54, 56, 58, 62, 64, 65, 67, 70, 73

**Double Star**
2, 3, 5, 6, 8, 16, 19, 21, 23, 24, 27, 28, 30, 32, 33, 34, 40, 42, 46, 47, 49, 50, 53, 55, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 75, 76, 77, 78, 79, 80, 81, 82, 83, 85, 89, 95, 99
Solar System and Lunar Observing Programs

**Solar System** – These are the tasks that can be done this month:

**Sun** – Any clear day is a good time to get those sunspots.

**Moon**:
- The Maria requirement can be done any time the moon is visible. Look after 1/19 and before 1/5 for the fullest views.
- The Highlands requirement can be done at the same time.
- The Crater Ages requirement is best done on 1/18 or 1/19.
- The Scarps requirement is best done on 1/20.
- Occultations occur all the time, the bright ones can be found on the internet. Objects disappear on the East side of the moon.

Venus and Pluto are not visible in the evening sky this month.

Sunset is at 18:13 CT.

Mercury is in Capricornus and sets at 19:16 CT by mid-month.

Mars is in Aries and sets at 00:25 CT by mid-month.

Jupiter is in Capricornus and sets at 18:52 by mid-month.

Saturn is in Capricornus and sets at 18:40 by mid-month.

Uranus is in Aries and sets at 23:38 by mid-month.

Neptune is in Aquarius and sets at 23:37 by mid-month.

Pluto is in Aquarius and sets at 23:2 by mid-month.

**Asteroids** – Course Plotting and Measuring Movement requirements can be done at any time on any asteroid. See above to identify the bright ones this month.

Lunar Key timings are indicated below: (New Moon, 1/12 at 0502 CST)
- 4 days, 1/16
- 7 days, 1/19
- 10 days, 1/22
- 14 days, 1/26

Old moon in new moons arms – before 0502 CST on 1/15, 10% illuminated. (72 hr > New)

New moon in old moons arms – after 0502 CST on 1/9, 10% illuminated. (72 hr < New)

Waxing Crescent – before 2102 CST on 1/21, 4% illuminated. (40 hr > New)

Waning Crescent – after 0502 CST on 1/10, 4% illuminated. (48 hr < New)

**The Astronomical League Observing Programs** (Most of the AL Observing Programs are listed here*):

- Active Galactic Nuclei
- Asterisms
- Binocular Double Star
- Caldwell
- Dark Nebulae
- Earth Orbiting Satellite
- Globular Clusters
- Local Galaxy Group & Neighborhood
- Messier
- Open Clusters
- Radio Astronomy
- Southern Skies Telescope
- Universe Sampler
- Adv. Binocular Double Star
- Asteroids
- Binocular Messier
- Carbon Star
- Dark Sky Advocate
- Flat Galaxy
- Herschel 400
- Lunar
- Meteors
- Outreach
- Sketching
- Steller Evolution
- Urban

- Astronomy Before the Telescope
- Binocular Variable Star
- Comets
- Deep Sky Binocular
- Galaxy Groups & Clusters
- Herschel II
- Lunar II
- Mars
- Nova
- Occultations
- Planetary Nebulae
- Planetary Transit
- Solar System Observers
- Southern Skies Binocular
- Sunspotters
- Variable Star

**The Master Observer Progression**

**The Astronomical League Herschel Society**

* - Although some clubs are not detailed in this “What's Up Doc?” handout, you can get information on many of their objects by using the “What's Up Tonight, Doc?” spreadsheet (version 4.1). To get your copy, talk to the Doc, Aaron Clevenson, by sending an email to aaron@clevenson.org. It is also available through the AL website.

† - “What’s Up Doc?” is used with permission from Warner Bros. Entertainment Inc.

To be added to our monthly distribution list, send an email to aaron@clevenson.org and ask to be added.

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2021 Astro Calendar Dates-More Dates Next Month

AOS Meetings-Jan 10, Feb 7, Mar 7, April 11, May 2, June 6, Sept 12, Oct 3, Nov 7, Dec 5

ALCON-Aug 4-7 in ABQ

Astromacy Festival on the National Mall-June 19

Cross Quarter Days-Feb 2, May 1, Aug 1, Nov 1

Daylight Savings Time-starts Mar 14, ends Nov 7

Earth’s Aphelion-Jan 2, Earth’s Perihelion-July 5

Eclipses-May 26 Total Penumbral Lunar Eclipse, June 10 Partial 72% Annular Solar Eclipse, Nov 18-19 Partial Lunar Eclipse, Dec 4 Total Solar Eclipse (South Pole)

Global Astronomy Month-April each year

Globe at Night- https://www.globeatnight.org

January 4-13 February 3-12 March 5-14 April 3-12
May 2-11 June 1-10 June 30-July 9 July 30-August 8

International Dark Sky Week April 4-11

International Observe the Moon Night-Oct 16 International SUN-day-June 20

JBNC Member Nights Jan. 8, 9, 15, 16, Feb. 5, 6, 12, 13, Mar. 5, 6, 12, 13, Apr. 2, 3, 9, 10, 21, May 5, 7, 8, 14, 15, 26, June 4, 5, 10am, 11, 12, Jul. 2, 3, 9, 10, 30, 31, Aug. 6, 7, 12, Sept. 3, 4, 10, 11, Oct. 1, 2, 8, 9, 16, 29, 30, Nov. 5, 6, 18, 26, 27, Dec. 3, 4

Manhattanhenge May 29, 30, July 11, 12 Messier Marathon- Mar 13

Meteor Showers

Moon-phase Dates

<table>
<thead>
<tr>
<th>New Moon</th>
<th>First Quarter</th>
<th>Full Moon</th>
<th>Third Quarter</th>
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<tbody>
<tr>
<td>Jan 6</td>
<td>Jan 20</td>
<td>Jan 28</td>
<td>Feb 4</td>
</tr>
<tr>
<td>Feb 11</td>
<td>Feb 19</td>
<td>Feb 27</td>
<td>Mar 5</td>
</tr>
<tr>
<td>Mar 13</td>
<td>Mar 21</td>
<td>Mar 28</td>
<td>Apr 4</td>
</tr>
</tbody>
</table>

Moon-Blue Aug 22
Moon-Micro May 11, Nov 19, Dec 18
Moon-Super April 26, May 26
Moon-Lunar X April 19, Mar 20, May 18, July 16, Sept 13, Nov 11

National Astronomy Weeks-May 10-16, Oct 4-10
National Astronomy Day-May 15 & Oct 9
Northeast Astronomy Forum- April 10-11
Rockland/AOS Summer Star Party-Aug 6-15

Seasons

Spring (Vernal) Equinox-Mar 20 Fall (Autumnal) Equinox-Sept 22
Summer Solstice-June 20 Winter Solstice-Dec 21
Stellafane Convention-August 5-8. World Space Week Same Every Year Oct 4-10

Stars on Sunday at Hofstra-Feb 7, Mar 7, Apr 11, Oct 3, Nov 7, Dec 5

Astronomical Events by Date

Jan 1 View M41
Jan 9 Conjunction of Mercury and Saturn
Jan 11 Conjunction of Jupiter and Mercury, Conjunction of the Moon and Venus
Jan 14 Conjunction of the Moon and Mercury, View M47
Jan 21 Conjunction of the Moon and Mars, Conjunction of Mars and Uranus
Jan 23 Mercury at greatest elongation east
Jan 23 Saturn at superior conjunction
Jan 28 Jupiter at superior conjunction
Jan 30 View M44
Feb 8 Mercury at inferior conjunction
Feb 10 Conjunction of the Moon and Saturn
Feb 18 Conjunction of the Moon and Mars
Feb 19 View M81