The ECLIPSE

April 2020

The Newsletter of the Barnard-Seyfert Astronomical Society

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From the President

Just when things had been clearing up, BAM!, we get hit with a worldwide pandemic and asked to stay at home. We have had to cancel all of our March events and it isn't looking good for April either. I don't know how long it will be before things get back to normal, so keep looking for those NSN or Google messages about BSAS events. I know a lot of people are missing the BSAS meetings and the fellowship that goes with them. Hang in there, things will get better, but please continue to follow all local, state, and national guidelines for "flattening the curve".

While we are stuck in isolation, we can still bring out our telescopes and do some backyard observing. So look for Venus this month in the Western skies at sunset near M45, the Pleiades. It is very bright right now and difficult to miss! Also, Saturn, Mars, and Jupiter are close together in the early morning skies. They are nearing the Southern meridian around sunrise. One of the favorite constellations, Orion, is still visible in the Southwest around sunset so take a last look at Orion for the year. While you are at it, check out the Beehive cluster in the constellation Cancer, or try to find the Leo triplet of galaxies in the constellation Leo. To have even more fun with this isolation, dig out your sky atlas and plan to find an object you have never seen before in a telescope. It should be an interesting challenge that will keep you occupied.

Please stay safe and be careful during this unprecedented time.

Clear skies and have a healthy month!

Keith Rainey

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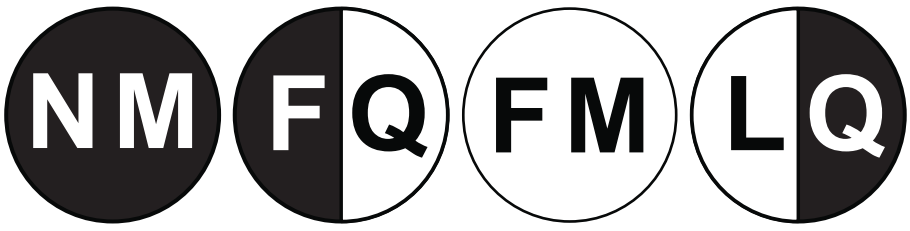
A SpaceX Falcon 9 rocket lifts off from Space Launch Complex 40 at Cape Canaveral Air Force Station in Florida at 11:50 p.m. EST on March 6, 2020, carrying the uncrewed cargo Dragon spacecraft on its journey to the International Space Station for NASA and SpaceX's 20th Commercial Resupply Services (CRS-20) mission. Dragon will deliver more than 5,600 pounds of science investigations and cargo to the orbiting laboratory. Credit: NASA/Tony Gray and Tim Terry



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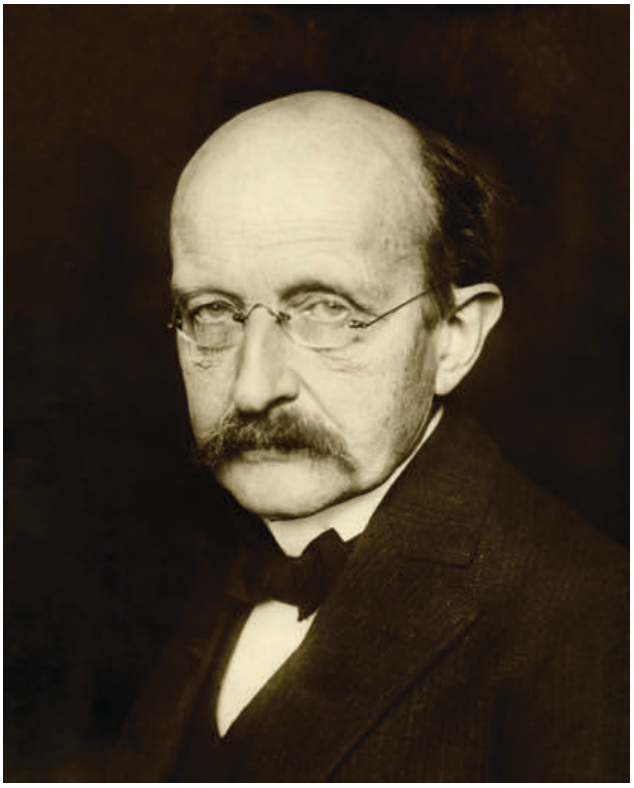
Happy Birthday Max Planck
by Robin Byrne



This month we honor a man who revolutionized physics. Max Karl Ernst Ludwig Planck was born in Kiel, Germany, on April 23, 1858. His family was very academic. Planck's father was a professor of law. Both his grandfather and great-grandfather were professors of theology. At the age of nine, Planck entered school, where his interest in math and physics soon became apparent. He also had a great interest in music and played the piano for the rest of his life. However, Planck decided that he could be more innovative in physics.

In 1874, Planck entered the University of Munich to study physics, despite being told by an advisor that there was nothing new to discover in the field. After a few years, he moved to the University of Berlin, where his teachers included Helmholtz and Kirchoff. He went back to Munich to work on his doctorate, which Planck received in 1879 at the age of 21. His thesis was on the second law of thermodynamics.

After graduation, Planck was appointed a teaching position at the University of Munich, where he remained until 1885. At that time he was appointed to a chair in Kiel, which he held for four years. In 1887, after the death of Kirchoff, Planck was given the chair of theoretical physics at the University of Berlin. He remained in this position for 38 years, until his retirement in 1927.

Planck's earliest work dealt with such areas as thermodynamics, entropy, thermoelectricity, and the theory of dilute solutions. Then he became interested in radiation processes, and, in particular, the distribution of energy from a blackbody, which is an object that radiates energy solely due to its temperature (like a star). This distribution is hill-shaped, with a peak at one wavelength. The problem was that classical physics could not explain it. Planck found a relationship between energy and the wavelength of radiation. This was based on the radical idea that energy comes in discrete packages, called quanta. Using this explanation, in 1900 Planck modified the ideas already discovered by Wien and Rayleigh to reproduce the curve created by a blackbody. This was the beginning of modern physics.

Planck's ideas were not immediately accepted. The turning point came when quanta were used by others to explain different phenomena. In particular, Einstein's use of

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Max Planck, continued

quanta to explain the photoelectric effect (for which he received the Nobel Prize), and Niels Bohr's use of quanta to calculate the positions of the spectral lines of hydrogen. In 1918, Planck was awarded the Nobel Prize for Physics for his work.

Despite Planck's success professionally, his personal life was more tragic. In 1909, his first wife, Marie, died, leaving him with two sons and twin daughters. His oldest son, Karl, was killed in action during World War I. Both daughters died while giving birth, one in 1916, and the other two years later.

Planck made no further major contributions to physics. He held many administrative positions, and did continue to study areas such as optics, thermodynamics, statistical mechanics, and physical chemistry. Planck was also the first prominent physicist to endorse Einstein's special theory of relativity. Planck was held in high esteem by not only his colleagues, but by everyone who met him. He was so highly regarded that he was allowed to meet personally with Hitler to express his opinions against Germany's racial policies. The fact that he survived such a meeting says much about his stature at the time.

World War II was a difficult time for Planck. His home was destroyed by bombings of Berlin. Meanwhile, Planck was not the only member of his family to disagree with Hitler's policies. His remaining son, Erwin, was one of the people involved in the unsuccessful attempt to assassinate Hitler on July 20, 1944. Because of his involvement, Erwin was brutally executed by the Gestapo in 1945. The death of Erwin broke Planck's spirit. He moved with his second wife and her children to Gottingen, where he died a few years later on October 4, 1947.

Max Planck turned the world of physics upside-down with the idea of quantum levels of energy. Meanwhile his private life had its own share of earth-shattering destruction. Perhaps the two are in some way related. The kind of great mind that can make the leap to something completely unheard of, may also reside in the kind of person who faces many risks. It is not unusual to see the story of a great man with a tragic life. But whether it is despite of tragedy, or because of tragedy, Max Planck paved the way for a new field of physics and a better understanding of the world around us. For that, we are all very grateful.

References:

Planck Web Page
Max Planck - Biography Web Page
Biography of Max Planck by Raul Barron Web Page

This picture captures the Milky Way streaking across the skies above the Chilean Atacama Desert. Dark wisps of interstellar dust form a turbulent mix with the bright glow of hot gas and billions of stars, creating a scene reminiscent of the thick smoke trail of a rocket after launch.

In contrast to the tempestuous sight above, a tower at ESO's Paranal Observatory stands serenely beneath the evening sky. Paranal is home to the Very Large Telescope (VLT), a ground-breaking observatory composed of four Unit Telescopes and four movable Auxiliary Telescopes. The telescopes can be used in different combinations to form an interferometer, combining the light they collect and allowing astronomers to study the Universe in spectacular resolution.

The VLT has achieved many scientific firsts over the years, including tracking individual stars orbiting the centre of the Milky Way at unprecedented speeds. This indicated the presence of a powerful gravitational field, providing evidence that a supermassive black hole — named Sagittarius A* — lurks there.

Credit: ESO/Y. Beletsky

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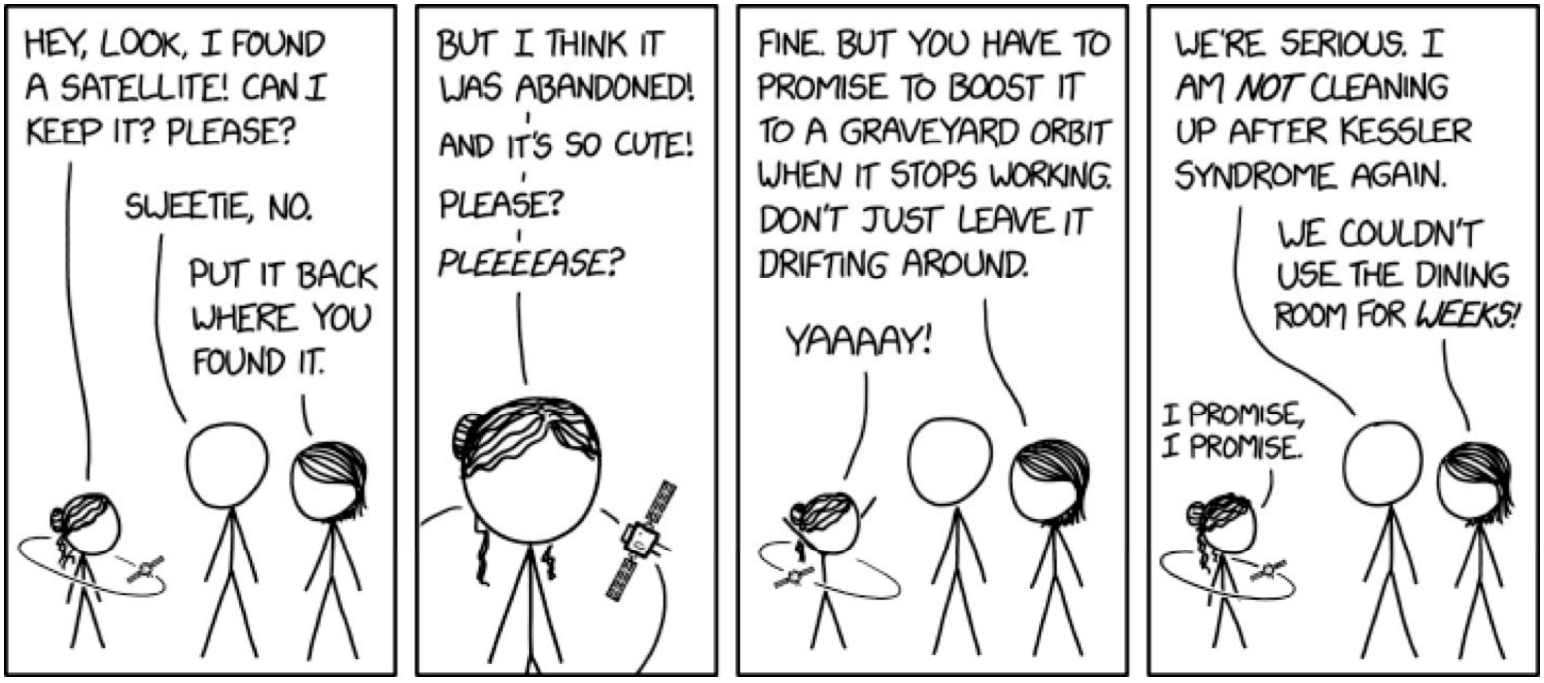
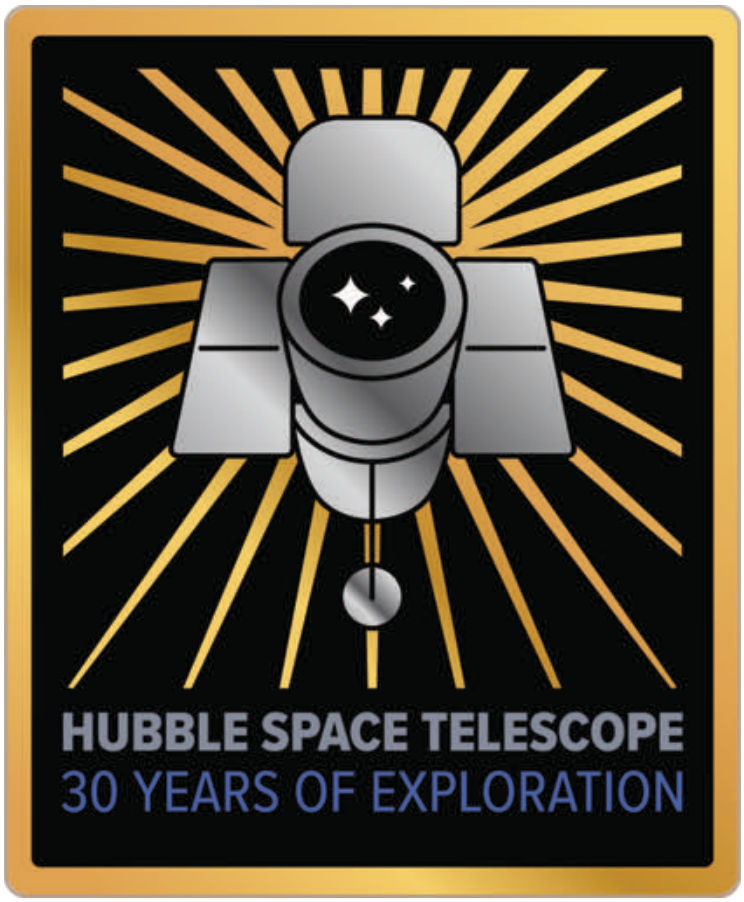


Hubble at 30: Three Decades of Cosmic Discovery
by David Prosper



The Hubble Space Telescope celebrates its 30th birthday in orbit around Earth this month! It's hard to believe how much this telescope has changed the face of astronomy in just three decades. It had a rough start -- an 8-foot mirror just slightly out of focus in the most famous case of spherical aberration of all time. But subsequent repairs and upgrades by space shuttle astronauts made Hubble a symbol of the ingenuity of human spaceflight and one of the most important scientific instruments ever created. Beginning as a twinkle in the eye of the late Nancy Grace Roman, the Hubble Space Telescope's work over the past thirty years changed the way we view the universe, and more is yet to come!

We've all seen the amazing images created by Hubble and its team of scientists, but have you seen Hubble yourself? You actually can! Hubble's orbit – around 330 miles overhead -- is close enough to Earth that you can see it at night. The best times are within an hour after sunset or before sunrise, when its solar panels are angled best to reflect the light of the Sun back down to Earth. You can't see the structure of the telescope, but you can identify it as a bright star-like point, moving silently across the night sky. It's not as bright as the Space Station, which is much larger and whose orbit is closer to Earth (about 220 miles), but it's still very noticeable as a single steady dot of light, speeding across the sky. Hubble's orbit brings it directly overhead for observers located near tropical latitudes; observers further north and south can see it closer to the horizon. You can find sighting opportunities using satellite tracking apps for your smartphone or tablet, and dedicated satellite tracking websites. These resources can also help you identify other satellites that you may see passing overhead during your stargazing sessions.

NASA has a dedicated site for Hubble's 30th's anniversary at bit.ly/NASAHubble30. The Night Sky Network's "Why Do We Put Telescopes in Space?" activity can help you and your audiences discover why we launch telescopes into orbit, high above the interference of Earth's atmosphere, at bit.ly/TelescopesInSpace. Amateur astronomers may especially enjoy Hubble's images of the beautiful objects found in both the

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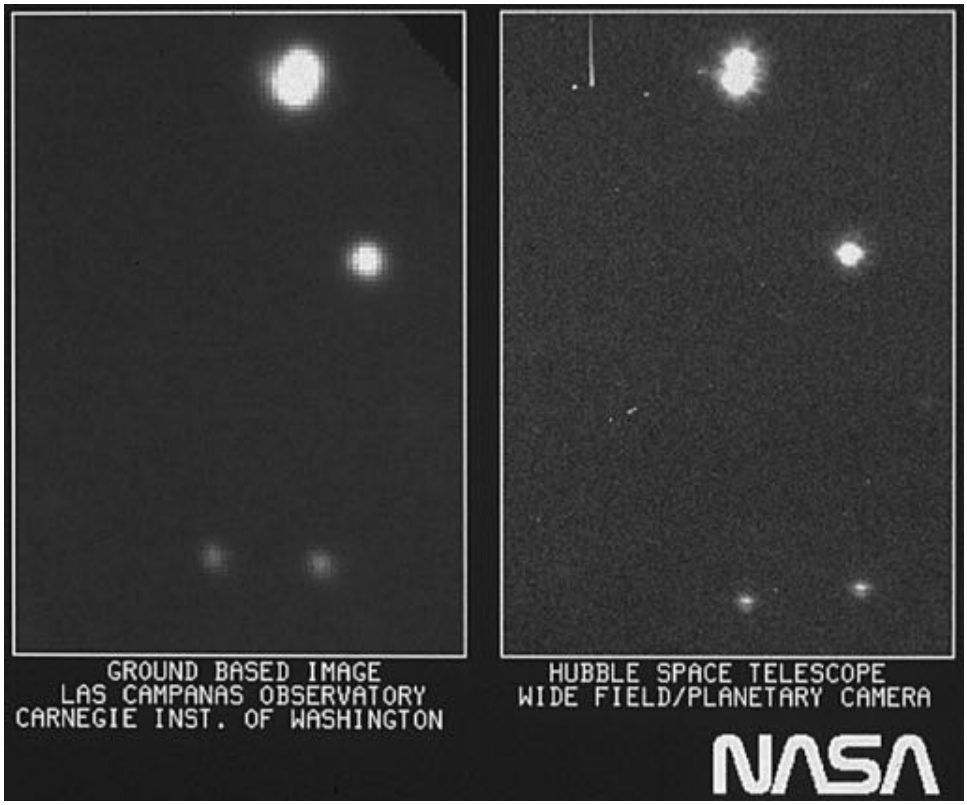
Dim Delights in Cancer, continued

Caldwell and Messier catalogs, at bit.ly/HubbleCaldwell and bit.ly/HubbleMessier. As we celebrate Hubble's legacy, we look forward to the future, as there is another telescope ramping up that promises to further revolutionize our understanding of the early universe: the James Webb Space Telescope!

Discover more about the history and future of Hubble and space telescopes at nasa.gov.



Hubble's "first light" image. Even with the not-yet-corrected imperfections in its mirror, its images were generally sharper compared to photos taken by ground-based telescopes at the time. Image Credit: NASA

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. 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!

There were no BSAS meetings during March 2020.

This scene of stellar creation, captured by the NASA/ESA Hubble Space Telescope, sits near the outskirts of the famous Tarantula Nebula. This cloud of gas and dust, as well as the many young and massive stars surrounding it, is the perfect laboratory to study the origin of massive stars.

The bright pink cloud and the young stars surrounding it in this image taken with the NASA/ESA Hubble Space Telescope have the uninspiring name LHA 120-N 150. This region of space is located on the outskirts of the Tarantula Nebula, which is the largest known stellar nursery in the local Universe. The nebula is situated over 160,000 light-years away in the Large Magellanic Cloud, a neighboring irregular dwarf galaxy that orbits the Milky Way.

Credit: ESA/Hubble, NASA, I. Stephens

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.

Barnard-Seyfert Astronomical Society

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.