THE OBSERVER

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New Horizons flies Past Ultima Thule on New Year's Day

Just after midnight, New Year's Day 2019, the New Horizons spacecraft will make its closest approach to the Kuiper Belt object known as Ultima Thule. The craft will be well over four billion miles away from Earth at the time, the farthest that any craft has traveled to explore another planetary object. Although images of Ultima Thule will not be released until January 2 or 3, NASA will have live streaming of the event on its website. Five years ago, New Horizons made history by being the first spacecraft to fly past Pluto. Over the next several years, it may explore other objects in the Kuiper Belt system.

New Horizons image by NASA

Observer Quote of the Month-

"Fritz, leave the Moon to the lovers!"

Mt. Wilson Observatory astronomer Milton Humanson to Fritz Zwicky, who, in the 1950s, proposed sending a spaceship to the Moon.

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Central Valley Astronomers

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Several Lesser Known, But Still Great Winter Objects-

In this issue, I focused on Orion as one of the best winter views. But the winter skies also offer a host of other objects. Here are a few that might be overlooked among all the beautiful objects in the winter skies

NGC 2283-this is a small, but beautiful, barred spiral galaxy in Canis Major, just south of Sirius. It has a magnitude of 12.2.

M36-this little cluster in Auriga is often overshadowed in the rush to observe its better known companions M35, M37, and M38, but it's a great sight to see on a dark winter night. It is also called the Pinwheel Cluster.

Like, M36, M34 in Perseus is also often overshadowed by the other bright clusters in that constellation. At a magnitude of 5.5, it is at the very limit of being seen with the unaided eye. It is also known as NGC 1039.

Number of exoplanets found as of December 2018-3,946

How many more are out there?

Tens of thousands? Hundreds of thousands?

Profiles in Astronomy

James Van Allen 1914-2006

Van Allen was born and raised in Mount Pleasant, Iowa, and did his undergraduate work at Iowa Wesleyan College. While there, he was an assistant on Richard Byrd's second Antarctic expedition in 1933. He attended graduate school at the University of Iowa, receiving a doctorate in astronomy in 1939. During World War II, Van Allen worked for the Carnegie Institute doing military research, and later served as a naval officer in the South Pacific. After the war, he was a professor at Johns Hopkins University, and also briefly worked at the Brookhaven National Laboratory on Long Island. In 1951, he returned to Iowa, as chairman of the astronomy and physics department at the University of Iowa, a position he held until he retired in 1985.

Van Allen was one of the first to realize the potential and promise of rocketry in astronomy and space sciences. In the 1950s, he and his students at Iowa used sounding rockets carrying instrument packages to study the upper atmosphere and the outer space beyond it. He originated the idea of the International Geophysical Year, 1957-58, as a way to study the space well above the Earth's atmosphere, and encouraged the development of Earth orbiting satellites as scientific platforms. Explorer I, the first successful U.S. satellite, launched on January 31, 1958, was largely his idea and design. It carried detectors, also of his design, that discovered the two radiation belts that circled the Earth, now known as the Van Allen Belts. Van Allen also designed and participated in the programs of a number of other early scientific satellites, all of which contributed to knowledge of the upper atmosphere and beyond it. He played a major role in designing the scientific packages for the Mariner program spacecraft to Mars and Venus, the Pioneer 11 and 12 spacecraft, the Voyager spacecraft to the outer planets, and the Galileo mission to Jupiter. (above-William Pickering, then the director of the Jet Propulsion Laboratory; Van Allen; and Wernher von Braun holding a full scale model of Explorer 1 at a press conference the morning after its launch.)

Van Allen won a number of awards for his researches, including the Presidential Medal of Freedom, the gold medal from the Royal Astronomical Society, and the National Medal of Science. An asteroid and a crater on the Moon are named after him.
Source-Wikipedia

Astronomy Short

John Wheeler, the Princeton University physicist who developed the term Black Hole and also came up with the idea of quantum foam, lived not too far from Albert Einstein in Princeton, and often went over to his house to debate physics and cosmology. One story about Wheeler goes to the effect that his cat got out of the house one day and roamed around the neighborhood. The cat eventually wandered into Einstein's yard; Einstein recognized it, went and got it, and called Wheeler. Wheeler walked down to Einstein's house to retrieve the cat, and when he got there, he picked it up and asked, "Well, what did you learn about relativity today?"

What's New in Space

Space-X's BFR Moves Forward

Underneath a huge white tent at the Port of Los Angeles in Southern California, Elon Musk's Space-X is building something, and all bets are that it's the massive, otherworldly, planetary rocket he's been talking about for years, commonly known as the BFR, for Big Falcon Rocket(or as Musk likes to put it in his colorful way, "Big F...king Rocket").*Over the past few months, details of it have been given out, it's really being built, and it may be launched as early as 2022.

The BFR will be a two part system, standing 387 feet tall. The booster rocket will be almost two hundred feet long and use seven of Space-X's newly developed Raptor engines, which will be powered by liquid oxygen and liquid methane, and deliver over eleven million pounds of thrust. The BFR spaceship will be 180 feet long, have three rear fins, two of which are adjustable, and two adjustable front ones. It, too, will use seven raptor engines, and its outer skin and many of its inner parts will be made of lightweight carbon-composite materials. Both parts are designed to be reusable, and will land the way that Space-X's Falcon boosters do today.

On September 17, Musk announced that Japanese billionaire fashion designer Yasaku Maezawa will be the first passenger aboard the BFR, which may make a circumlunar trip as early as 2023. As the passenger compartment of the BFR is capable of holding up to one hundred people, Maezawa said that he will take as many as eight of his friends with him on the week-long trip. Speculation is that Musk, although he said nothing at the time, may go with them. Many in the aerospace industry believe that Maezawa was chosen because he agreed to provide some of the financing for the BFR project. Estimates are that it will initially cost over $5 billion; Musk, while wealthy, does not appear to have that much money on his own, and is looking for outside investment. He may even entice NASA to come in on the project, especially if the Orion-MPCV-SLS system is further delayed beyond its 2021 initial launches. Musk's and Space-X's timeline for the BFR is initial test launches in 2022, the Maezawa Moon mission in 2023, and possible manned Mars missions as early as 2025. Space-X's schedule is to have a permanent Mars base by 2030, with regular BFR flights to and from the Red Planet by that time. Many say that Musk has an impossible plan, but he's been told that before, and in the process has vaulted Space-X up to the head of the aerospace race.

Editor's note-This article was originally written in August 2018. In November 2018, the BFR was given the official name of Starship. Also, Elon Mosk announced, among other things, that he is considering going on the first manned Mars trip aboard the Starship, now as early as 2024.

2019-The 50th anniversary of the Apollo Moon Landings

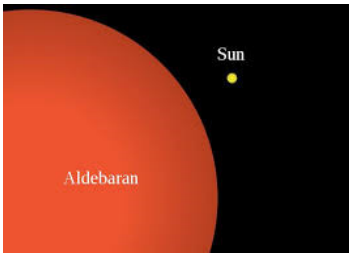
2019 will mark the 50th anniversary of the Apollo 11 Moon landing(has it really been that long?). The Observer will have a special issue on the moon landings in the summer, and will also have articles devoted to America's going back to the Moon, as early as 2024.Stay tuned for trips to both the past and the future!

Star Stories

Aldebaran

Aldebaran is the brightest star in the constellation Taurus, the Bull; it is also known as Alpha Tauri. It is an orange giant, about 100 hundred times the size of the Sun, and is classified as a K3 star. It has an apparent magnitude of .86 and an absolute magnitude of -.64, with a slight variability. Aldebaran is about 65 light years from Earth

William Hershel was the first modern astronomer to seriously study Aldebaran, and in 1783 found that it has a faint magnitude 11 companion star. In 1888, Sherburne Burnham found that this companion star is actually a double, and also discovered a very faint magnitude 14 star which is also a companion to Aldebaran. In 1993, an object eleven times the size of Jupiter was found to be orbiting Aldebaran; scientists are still debating whether this is a planet, a dwarf star, or perhaps only stellar oscillations. Studies in 2015 indicated a planetary body about 6 times the size of Jupiter, but this has yet to be confirmed.



The name *Aldebaran* comes from Arabic and means "the first star," because of its position in appearing before the Pleaides. Like many other bright stars, Aldebaran was well known to the ancients. To the early Hindus, it was known as Rohini, "the Red One," and to the Persians, it was Tascheter. The Greeks called it "Lampidas, the "torch bearer." In Medieval Europe, it was sometimes called Cor Tauri, "the Heart of the Bull."

Source: Wikipedia

The Winter's Best Constellation

Has to be Orion, of course. With two dazzling stars, Betelguese and Rigel, one of the best known nebulas in the sky, M42, an an awesome looking horsehead Nebula, and the everfamiliar Belt of three stars, Orion dominates the winter sky. Always a nice sight to see on a winter's evening.

Part of a continuing series on lesser known-but still important-astronomical observatories throughout the world

Boyden Observatory

The Boyden Observatory has a unique history. It was founded by an American university, was located in Peru for many years, then moved to South Africa, where it still is today. It is currently owned and managed by the physics depart of the University of the Free State in Bleomfontien, South Africa, and is located near Maselspoort, about fifteen miles from Bloemfontein. It conducts scientific research, has a strong outreach program for the general public, and hosts amateur astronomy groups, who use some of the telescopes.

Boyden Observatory was established in 1889 by the physics department of Harvard University. It was named after Uriah Boyden, who bequeathed a large sum of money for astronomical research, and was originally located near Lima, Peru, and then moved to Arequipa, Peru. In 1927, it was moved to South Africa, to better observe the southern skies. In 1954, the University of the Free State took over management of the observatory, and in 1976 became the sole owners.

Today, the observatory has two operational scientific telescopes, and two others that are for public use. The main telescope is a 1.5 meter reflector known as the Rockefeller Telescope, and is used for general astronomy research. A second telescope is a .4 meter reflector that is remotely operated and is used to find and study unusual phenomena, such as supernovas and gamma ray bursts. The observatory also has a .3 meter Alvan Clark refractor which was originally at the Mount Wilson Observatory in Southern California, and is now used for public astronomy events. A .2 meter solar telescope is used for public outreach as well. Two other telescopes at the observatory are no longer used.

The Boyden Observatory has had a long history of discoveries. In the late 1800s, Edward Pickering, the director of the Harvard Observatory, discovered a moon of Saturn, now named Phoebe. In the 1930s Harlow Shapely discovered the Sculptor and Fornax galaxies, among many other objects, at Boyden. As well, a number of asteroids have been discovered at the observatory over the years.

Source-Wikipedia

Above-the 1.5 meter telescope and building at Boyden

From The Observer Archives

"The Light Stuff"

From Richard Iannelli, *The Devil's New Dictionary*

Astronomy-The science of celestial bodies making use of measurements and figures as incomprehensible to the average being as the defense budget

January-National Date Correction Month, where everyone everywhere at least once makes the mistake of putting the wrong year on a letter, check., or homework assignment

February-The month in which resolutions are revised and reedited

Cosmos-The universe conceived as an orderly and harmonious system, due primarily to the lack of government intervention

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