New Zenith

The Monthly Newsletter of the Vectis Astronomical Society

Vol 25 Issue 4 — May 2017 *When Printed, this Newsletter costs VAS at least £1*

Society News

Smaller NZ This Month

This time of year is a very busy one for me as Easter marks the start of the tourist season. Unfortunately work comes first this month which means this New Zenith is a few pages shorter than usual as I struggle a bit to get a sensible work/life balance.

Hopefully next month as I get flooded with member contributions for the newsletter I'll manage to get back to 12 pages again ;)

Monthly Meetings

Our venue change for the monthly meetings seems to be settling down well with a definite increase in attendance.

That said, there is still room for more of you to come along. Given clear skies, the observatory can be opened after the meeting and we can perhaps view some of the things discussed during the meeting.

Another Open Night

Following on from the stargazing event with AONB and CPRE at the end of March. We are planning another later in 2017 which will be held on a Friday evening. Watch this space for more details next month.

Appeal for Help

If you have experience of Lottery grant application, please get in touch with the committee.

We have some interesting ideas for the future of VAS and need help with planning them.

Brian Curd
Editor New Zenith.

VAS Website: wightastronomy.org

Submissions or letters to New Zenith are always welcome and should be sent to:

The Editor, New Zenith
Carpenter's Cottage
Dennett Road
Bembridge
Isle of Wight PO35 5XF
Tel: **01983 872875** or email: **editor@wightastronomy.org**

Material for the next issue by the 6th of the month please.

The Vectis Astronomical Society and the Editor of the New Zenith accept no responsibility for advice, information or opinion expressed by contributors.

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Observatory Diary

Monday, 19.30hrs	Members Only and by arrangement Telescope and night sky training. Please contact Martyn Weaver 07855 116490
Thursday	Members (19.30hrs) and Public (20.00hrs). Informal meeting and observing

VAS Website: wightastronomy.org

Contents this Month

PLEASE NOTE:
All monthly meetings are now held at the Newchurch Pavilion next to the Observatory

2017 Monthly Meetings

Date	Subject	Speaker
Please check **wightastronomy.org/meetings/** for the latest information		
28 Apr	Radiation protection in space (for manned missions)	Dr Elizabeth Cunningham
26 May	Mapping orbits around black holes and neutron stars	Dr Diego Altamirano
23 Jun	"It's not all rocket science" - progression of The Needles 'Black Knight Rocket' site	Mike Kelleway
28 Jul	Pseudoastronomy: Planet X, Zetans, and Lost Civilisations	Stephen Tonkin
25 Aug	Annual General Meeting and Citizen Science	Chris Lintott
22 Sep	TBA	Graham Bryant
27 Oct	TBA	TBA
24 Nov	TBA	TBA

Observatory Visits Booked

Tues 9th May 19.00 - 21.00	Women's Institute

Just one booking for May so far but I have other interested parties choosing dates at the moment.

I am restricting visits to Mon and Tues wherever possible.

Please phone me for the current situation (number on the front page)

It would be appreciated if members could avoid using the observatory at these times.

VAS Contacts 2016/17

President	Barry Bates president@wightastronomy.org
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Membership Secretary	Norman Osborn members@wightastronomy.org
NZ Distribution	Graham Osborne
Others	Mark Williams, Nigel Lee & Stewart Chambers

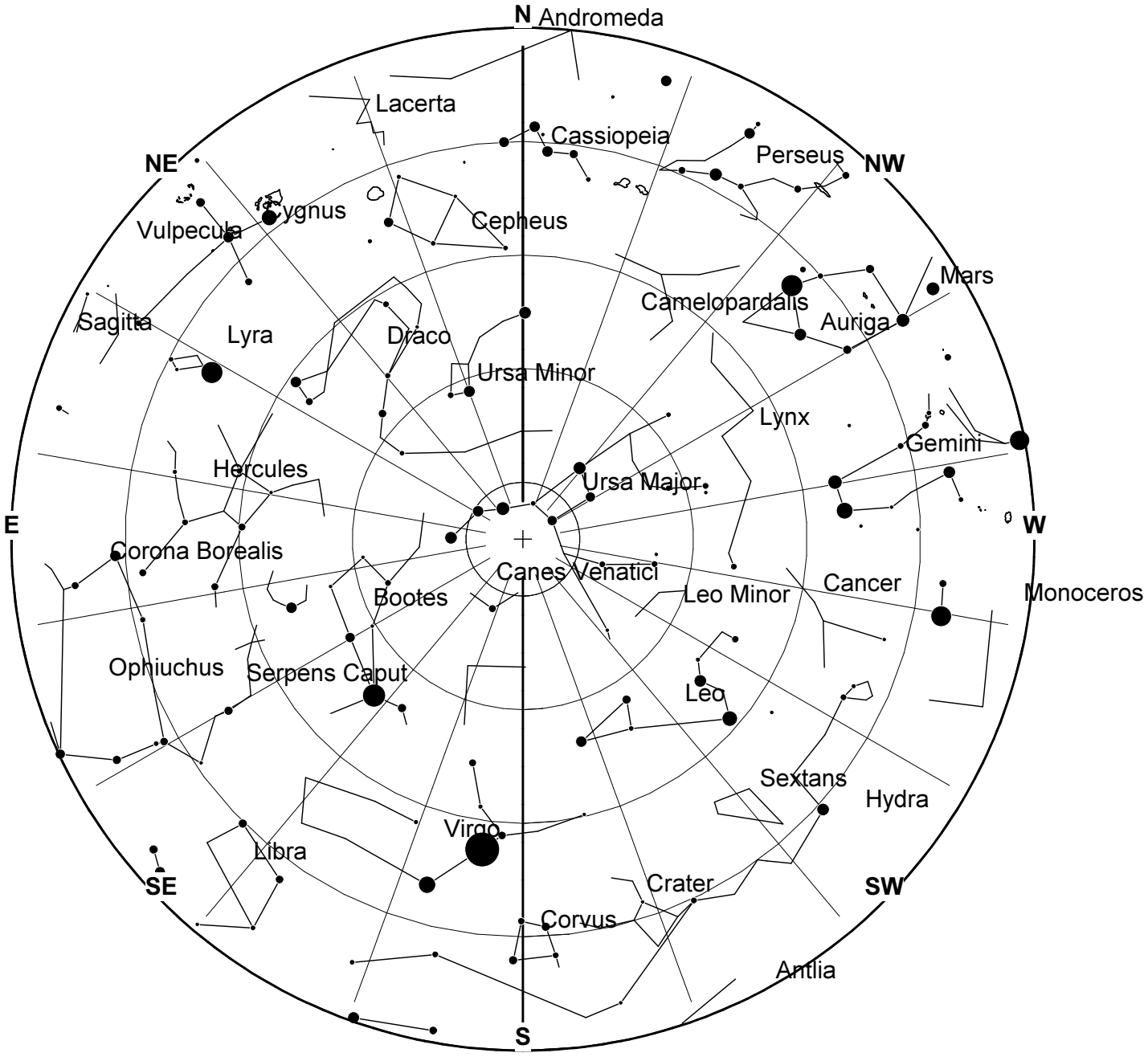
Important

Members using the observatory MUST enter a line or two in the Observatory Log Book.

On several occasions, lights, heaters and the Meade LX200 have been left on!

When leaving, please ensure all is secure and all lights, heaters and telescopes are TURNED OFF.

May 2017 Sky Map



View from Newchurch Isle of Wight UK - 2200hrs - 15 May 2017

Jupiter is the fifth planet from the Sun and the largest in the Solar System. It is a giant planet with a mass one-thousandth that of the Sun, but two and a half times that of all the other planets in the Solar System combined. Jupiter and Saturn are gas giants; the other two giant planets, Uranus and Neptune are ice giants. Jupiter has been known to astronomers since antiquity. The Romans named it after their god Jupiter. When viewed from Earth, Jupiter can reach an apparent magnitude of -2.94, bright enough for its reflected light to cast shadows, and making it on average the third-brightest object in the night sky after the Moon and Venus.

*This article is licensed under the **GNU Free Documentation License**.*
It uses material from the Wikipedia article "Jupiter".

May 2017 Night Sky

Moon Phases

New	First Qtr	Full	Last Qtr
			
25th	3rd	10th	19th

Planets

Mercury

Mercury starts as a very poor morning apparition during the last week of the month. It will be very difficult to see as it rises at best an hour before the sun and is only about 5° above the horizon at sunrise. It can be found midway between Venus and the Sun.

Venus

Look low down in the east from about 04:30 until full daylight to see the brightest of the planets; Venus.

Mars

Mars is now lost against the bright twighlight sky. It will re-appear again later in the year in the morning sky where it will remain until it again makes a dash for the western sky in the summer of next year.

Jupiter

As the sky darkens after sunset the bright object in the southern sky is Jupiter. A pair of binoculars will show the Galilean moons and a small telescope the cloud bands; here the larger the aperture the better to see the details.

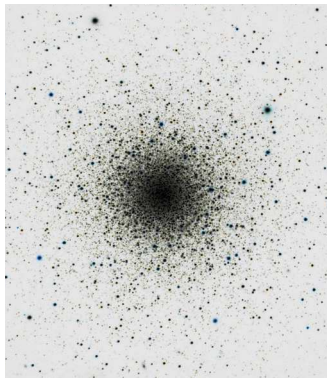
Saturn

From about midnight until daybreak Saturn can be found low in the southern sky. It is now in the middle of the summer Milky Way where there are no nearby bright stars. It is rather too low in the sky where the turbulence in the atmosphere may seriously disturb the image quality. If the air is still, the shadow of the planet may be seen against the rings, which are at the moment well open.

Uranus & Neptune

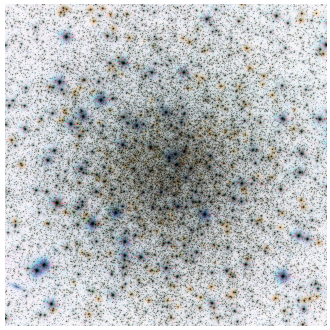
Both outer planets are lost in the glare of the Sun this month.

Deep Sky



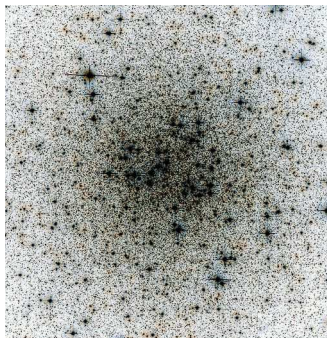
M3 Globular Cluster RA 13h 42m Dec 28° 22' mag 7

Messier's first original discovery, this is a showpiece globular cluster with stars extending across an area greater than that of the full Moon. M3 contains more variable stars than any other globular.



M5 Globular Cluster RA 15h 19m Dec 2° 3' mag 6

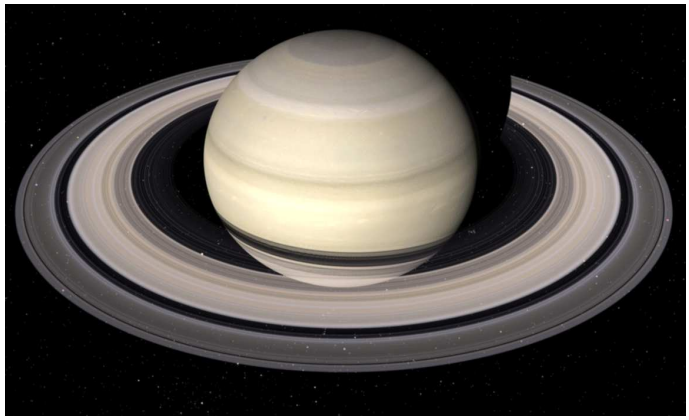
Easily visible as a fuzzy patch through binoculars M5, at 13,000,000,000 years old is one of the most ancient of these star clusters that surround our galaxy. The telescopic view is of a bright, slightly squashed core surrounded by numerous well resolved halo stars.



M53 Globular Cluster RA 13h 13m Dec 18° 7' mag 8.5

Lying some 60,000 light years away very few stars can be resolved in this cluster without the use of a large telescope. Through smaller instruments and binoculars it looks like a tailless comet.

Peter Burgess



Watch Milky Way's Stars Move 5 Million Years into the Future

Astronomers have transformed star data from the Gaia and Hipparcos missions into a video that predicts stellar motions millions of years from now.

It's tempting to think of stars as our still companions in the night. But they're not still at all — stars are moving all the time. It's just that most of them zoom about the galaxy on timescales too long for humans to appreciate. (Barnard's Star and Cygnus 61 make for two notable exceptions.)

This video from the European Space Agency takes that appreciation down to our scale, predicting stellar motions 5 million years into the future based on data from the Gaia and Hipparcos spacecraft.

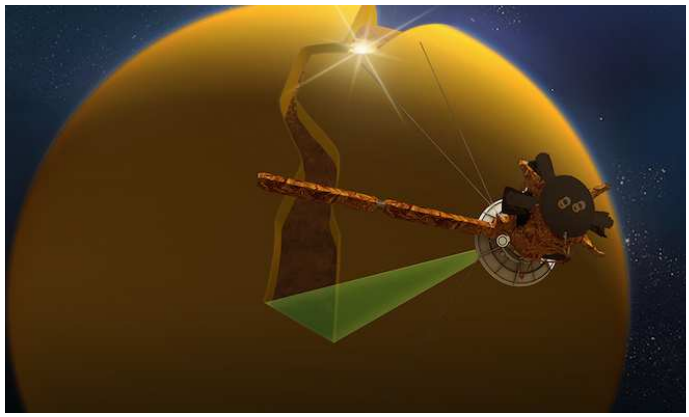
Since July 2014 Gaia has repeatedly photographed the entire sky with the aim of eventually determining precise distances to more than 1 billion stars across the galaxy. Gaia does this by looking for parallax, the slight apparent motion of stars that's actually due to the spacecraft's motion in its orbit. (Hold a finger in front of your eyes, then view it with one eye at a time — your finger will appear to move due to the same perspective effect.)

By measuring precise positions, Gaia also sees stars' proper motions, their movement across the sky. Doppler shifts in spectra measured by other surveys provide the stars' movement toward and away from Earth, so ultimately we'll have not just the distances but also the full 3D motion of each of these stars.

That said, Gaia's still very much in the middle of its mission: The full dataset isn't expected until 2022. So astronomers don't have distances and proper motions from Gaia alone just yet. Instead, they're calculating this information based on early Gaia images, along with previous data from the Hipparcos mission.

http://www.skyandtelescope.com/

Cassini sails by Saturn's moon Titan for last time



NASA's Cassini spacecraft sped by the moon Titan on Saturday, using the hazy world's gravity to slingshot the probe on a trailblazing trajectory to explore the region between Saturn's hydrogen-helium atmosphere and the planet's famous rings for the first time.

Closing out an era of discovery that gave scientists their first glimpses of Titan's seas, weather patterns and rippling sand dunes, Cassini sailed around 608 miles (979 km) above the moon at 0608 GMT (2:08 a.m. EDT) Saturday.

The encounter served a dual purpose: Gather the mission's final bits of close-up data on Titan, and reshape Cassini's orbit to make the first passage inside Saturn's rings.

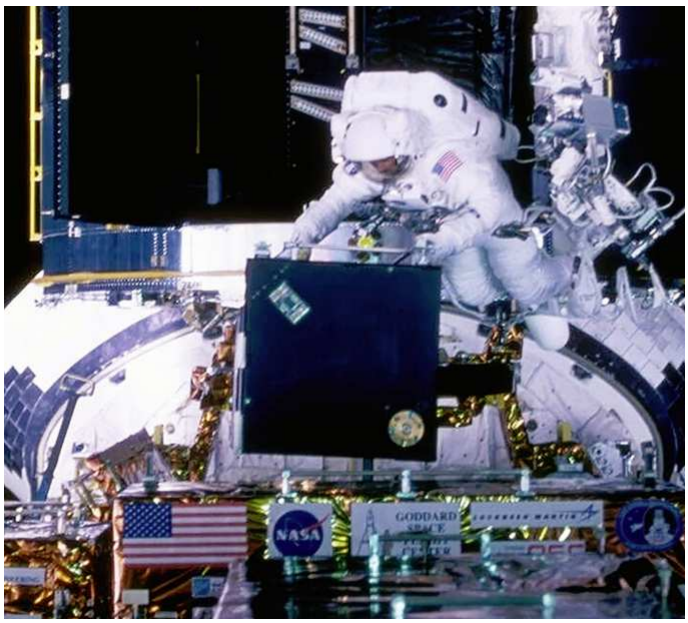
Saturday's flyby was be the last time scientists will capture detailed observations of Titan for at least a decade, and perhaps much longer. Cassini's scientific sensors planned to gather information on Titan's lakes and seas, study the moon's atmosphere, probe the interaction between Titan's ionosphere and Saturn's magnetic field, and take a sequence of pictures.

"Cassini's up-close exploration of Titan is now behind us, but the rich volume of data the spacecraft has collected will fuel scientific study for decades to come," said Linda Spilker, the mission project scientist at the Jet Propulsion Laboratory in Pasadena, California.

Researchers will spend the coming weeks and months analysing data from Saturday's flyby, which sent Cassini past Titan at a relative speed of about 13,000 mph (21,000 kilometres per hour).

Much more at: ***https://astronomynow.com/***

What Has The Hubble Space Telescope Ever Done For Us?



Astronaut Steve Smith carefully removes STIS from the protective enclosure that carried it into orbit aboard the Space Shuttle Discovery. Credits: NASA/ESA

20 years ago in February 1997, astronauts installed STIS (Space Telescope Imaging Spectrograph) on the Hubble telescope during the second servicing mission. The highly versatile and productive instrument combines a camera with a spectrograph, which separates light into its component colors—or wavelengths — to provide a "fingerprint" of the object being observed. This tells us about the object's temperature, chemical composition, density, and motion. Spectrographic observations also reveal changes in celestial objects as the universe evolves. STIS has also pioneered the field of high-contrast imaging—the art of capturing faint objects (such as planets, disks, and outflowing jets) next to very bright ones (such as the stars they accompany). The instrument is sensitive to a wide range of wavelengths of light, from ultraviolet through the optical and into the near-infrared. STIS science has illuminated a multitude of different astronomical topics. Below are some examples, but this is not meant to be an exhaustive list.

Determining the Masses of Black Holes in the Centers of Galaxies

Astronomers used STIS to conduct a census of more than 30 galaxies to look for evidence of massive black holes at their centers. STIS precisely measures the speed of gas and stars around a black hole, and this yields information about its mass. The findings presented a broad picture of a galaxy's evolution and its relationship to the growth of the massive central black hole. Hubble evidence favors the idea that titanic black holes did not precede a galaxy's birth, but instead co-evolved with the galaxy by trapping a surprisingly exact proportion of the mass of the central hub of stars and gas in that galaxy.

Tracing the Evolution of the Intergalactic Medium

Astronomers have long sought the vast quantities of hydrogen that were cooked up in the Big Bang but that somehow seemingly managed to disappear. This gas accounts for nearly half of the "normal" matter in the universe—the rest is locked up in galaxies. In an extensive search of the nearby universe, astronomers using STIS have definitively found this missing matter in the space between the galaxies. Called the intergalactic medium, this space extends from just outside our Milky Way galaxy to the most distant regions of space observed by astronomers. STIS observations of the local intergalactic medium showed that the missing hydrogen is still out there in very diffuse clouds in between the galaxies. This confirmation sheds new light on the large-scale structure of the universe and provides information on how galaxies built up over time. It also confirms fundamental models of how so much hydrogen was manufactured in the first few minutes of the universe's birth in the Big Bang.

Understanding the Components of the Galactic Halo

A halo of very hot gas surrounds the Milky Way galaxy. Because the gas is so highly energized, or ionized, it is only visible in spectral features seen in ultraviolet wavelengths with an instrument like STIS. With its extremely high spectral resolution, STIS looks at the spectral features of the atoms in each of the many layers of gas to help scientists identify and understand the complexity of the halo structure. Besides the very hot gas that is trapped in the halo, some gas is falling into the Milky Way from the area between galaxies, known as the intergalactic medium. Other gas in the halo comes from star formation in the disk of the Milky Way. Supernovae and winds from stars can blow this material out of the plane of the Milky Way, up into the Galactic halo. This gas cools and gets denser, and some of it rains back down in what is often described as "the Galactic fountain." STIS helps scientists understand these complex processes.

Unravelling the Structure of the Interstellar Medium

The interstellar medium is everything between the stars. It's typically very low-density material, which is extremely difficult to study. With its ultraviolet sensitivity

and exceedingly high spectral resolution, STIS is a premier instrument for understanding this space. Scientists use stars or other bright sources as background light to view the intervening material. They "see" it indirectly through the absorption of the background light. The interstellar medium is not entirely uniform. There are places it is denser, places where it is less dense, and different clumps move at different velocities. STIS provides the fine velocity information to analyze the details of the interstellar medium. Using STIS, scientists can determine the physical conditions and separate out components from different densities and types of gas along the line of sight.

Characterizing the Atmosphere of a World around Another Star

Astronomers using STIS made the first direct chemical analysis of the atmosphere of a planet orbiting another star. This opened up an exciting new phase of extrasolar planet exploration, where astronomers can compare and contrast the atmospheres of planets around other stars, and search for chemical biomarkers of life beyond Earth. The planet orbits a sun-like star called HD 209458. Its atmospheric composition was probed when the planet passed in front of its parent star, allowing astronomers for the first time ever to see light from the star filtered through the planet's atmosphere. Scientists detected the presence of sodium in the planet's atmosphere. They actually saw less sodium than predicted for the Jupiter-class planet, leading to one interpretation that high-altitude clouds in the alien atmosphere may have blocked some of the light.

Imaging the Dust Disk around Beta Pictoris

In 1984, Beta Pictoris was the first star discovered to host a bright disk of light-scattering circumstellar dust and debris. Ever since then, the 20-million-year-old star has been an object of intense scrutiny with Hubble and with ground-based telescopes. Astronomers used STIS in 1997 and 2012 to take the most detailed pictures to date of the large, edge-on, gas-and-dust disk. Astronomers found that the disk's dust distribution had barely changed over 15 years, despite the fact that the entire structure is orbiting the star like a carousel.

Finding Evidence for Water on Jupiter's Moons

Identifying liquid water on other worlds is crucial in the search for habitable planets beyond Earth. STIS imaging shows suspected water plumes erupting from Jupiter's icy moon Europa. Astronomers observed these finger-like projections while viewing Europa's limb as the moon passed in front of Jupiter. Europa is a plausible place for life to have developed beyond Earth. If the venting plumes originate in a subsurface ocean, they could act as an elevator to bring deep-sea water above Europa's surface, where visiting spacecraft could sample it, study its habitability, and even look for life. This offers a convenient way to access the chemistry of that ocean without drilling through miles of ice.

Detecting Monster Stars in a Massive Star Cluster

R136 is a very massive and young dense star cluster in the Tarantula Nebula within the Large Magellanic Cloud, a neighbouring galaxy to our Milky Way. Only Hubble can resolve the individual stars in the dense core, which is only a few light-years across and less than 2 million years old. Astronomers used STIS to obtain ultraviolet spectra of the individual hot luminous stars in the core and showed in 2016 that there are nine stars with masses over 100 times the mass of the sun. The detected stars are not only extremely massive, but also extremely bright. Together these nine stars outshine the sun by a factor of 30 million. This discovery has led astronomers to examine the 20 years' worth of STIS observations available in the Mikulski Archive for Space Telescopes (MAST) for further examples of monster stars in more distant star clusters. Some have recently been found in the dwarf galaxy NGC 5253, and the search continues for more examples.

Unlocking the Secrets of the Massive Star Eta Carinae

The volatile, erupting pair of massive stars called Eta Carinae has long intrigued astronomers. In 2009, STIS analyzed the ejecta from an eruption seen in the late nineteenth century, resolving the chemical information along a narrow section close to the binary. The resulting spectrum showed iron and nickel that had been cast off in the nineteenth century. STIS also revealed the interior material being carried away by the ongoing, colliding winds from Eta Car A, the primary star, and those of Eta Car B, a hotter, less massive star. A very faint structure, seen in argon, is evidence of the interacting winds excited by ultraviolet radiation from Eta Car B. Eta Car A is one of the most massive and luminous stars visible in the night sky. Because of the star's extremely high mass, it is unstable and uses its fuel very quickly, compared with other stars. Such massive stars also have short lifetimes, and astronomers expect that Eta Carinae will explode as a supernova within a hundred thousand years.

More at: ***www.nasa.gov/hubble***

THE BACK PAGE

LINKS, COMMENTS AND OBSERVATIONS

The True Meaning of 42

In The Hitchhiker's Guide to the Galaxy, the supercomputer Deep Thought is built by a race of hyper-intelligent alien beings to determine the answer to "life, the universe, and everything."

Deep Thought determines that the answer is, somewhat anticlimactically, "42". It sounds like a joke, but is there more to this answer?

Douglas Adams was an unabashed computer nerd and knew a heck of a lot about programming language and coding. In programming, an asterisk is commonly used to translate as "whatever you want it to be".

In ASCII language, the most basic computer software, "42" is the designation for an asterisk. A computer, Deep Thought, was asked what the true meaning of life was.

It answered as a computer would: 42 = "anything you want it to be". ***Genius***.

Read much more at: ***https://www.quora.com/***

The Galaxy Song

OK, so it might be a little inaccurate in places, politically incorrect and maybe "not safe for work" (it does contain a swearword at the end), but it's still very clever and it gets to the essence of things pretty quickly.

Wikipedia has a whole page dedicated to the song and even includes a ***link to a cover version of the original voice by Prof. Stephen Hawking!***

https://en.wikipedia.org/wiki/Galaxy_Song

Make a new resolution?

Yes it's well past January but it's not too late to make a change. Instead of spending 20 minutes on Social Media each couple of hours, why not do something worthwhile?

Have a look at ***TED*** instead.

TED *is a nonprofit devoted to spreading ideas, usually in the form of short, powerful talks (18 minutes or less).* ***TED*** *began in 1984 as a conference where Technology, Entertainment and Design converged, and today covers almost all topics — from science to business to global issues — in more than 100 languages.*

Hours of truly worthwhile entertainment for free at: ***https://www.ted.com/***

Observatory

When visiting the VAS observatory, for your own safety, please bring a torch. Also, please make sure you close and lock the car park gate if you are the last to leave - if you need the combination to the lock, please contact a member of the committee.

Articles Needed

New Zenith needs letters, articles, reviews or pictures related to astronomy. Contributions to the Editor at the email or postal address on the front page.

"Physics is, hopefully, simple. Physicists are not"
Edward Teller

"Hunger means something entirely different from the sharp end of the cutlery"
Dr Who

"The passage of my life is measured out in shirts"
Brian Eno

"Knowledge speaks, but wisdom listens"
Jimi Hendrix

"There comes a time in life when you need to stop reading other people's books and write your own"
Albert Einstein