nightwatch
Newsletter of the Pomona Valley Amateur Astronomers

I'm busier than Galileo in 1609. - ***Matt Wedel***

Volume 34 Number 5 ***nightwatch*** **May 2014**

President's Message

It's spring cleaning time for the club. Literally--the rent for our club storage space keeps going up, and it's no longer financially viable for us to keep the club gear in a rented space. Up until a couple of years ago we kept the club equipment in private spaces (read: members' garages), and we're going back to that. We're also going to sell off some unused eyepieces and telescopes, in particular the 8-inch and 12-inch "loaner" Dobsonian reflectors, and some Nagler and TeleVue widefield eyepieces. More details will be available at the general meeting this Friday, May 16.

Our speaker this month is Dr. Vatche Sahakian. His talk, "Peeking under the cosmic veil", will be about the discovery of gravitational waves in the cosmic microwave background. Dr. Sahakian earned his Bachelor's and Master's degrees in physics from McGill University before going on to the University of Chicago for a PhD in string theory. After graduating he did a postdoc at Cornell before joining the faculty of Harvey Mudd College. He has also been a research associate at Caltech. He blogs about physics and cosmology at http://schrodingersdog.net/.

Matt Wedel

PVAA General Meeting 4/11/14

Harold Maculsay started off the meeting asking for any nominations for the upcoming elections. It is truly amazing how quiet it can be in that room, which was not the Beckman Hall, but in the Shannah Center Building – room B460 on the Claremont College campus. (Right below the campus cafe.) We should be having our meetings back at Beckman hall for a while.

Gary Thompson talked about the upcoming Mount Wilson trip. PVAA is renting the scope for one full night on Saturday, September 7th. It is $100 per person, with a 25 person limit. Look through your scope at Mars. Very small. Now think of looking at Mars through a 60 inch scope. It is worth every penny. We have the “driver” of the scope point the 60” scope to anything within range. (It cannot look at the horizon.) Last time I had him point it at Pluto. Yes, even in a 60” it is dim and you can't make out a disk, BUT I can now cross it off my list. What do you have on your list that the 60” can bring in? The Orion Nebula is spectacular. Here is a picture I took with my little Panasonic camera that can go under water: (So IT WASN'T an astro-camera.) I am sure if I spent some more time with different exposures, I could have gotten an even better one.

Membership Dues are now due. $30/adult, $12/youth for the year, or $40/family. You can mail it in or bring it to the meeting. If you choose to mail it - Mail it to:

PVAA
PO Box 162,
Upland, CA 91785 - Make checks payable to PVAA.

PVAA General Meeting 4/11/14 continued

Our guest speaker for the evening is fellow PVAA member Dr. Joann Eisberg with the title of her presentation: "Are We Alone in the Universe? The Search for Another Earth" She started out with a little history starting with Thomas Digges. Thomas was an English mathematician and astronomer. He presented and explained the Copernician system, but believed the stars were not part of a fixed shell of the Copernician model, but infinitely many stars at varying distances. This was in 1576.

A few years later Giordano Bruno, the Italian Dominican Friar, proposed that the sun was just another star moving in space, and claimed the universe contained an infinite number of inhabited worlds, orbiting other stars. The Roman Inquisition found him guilty of denying the Trinity, divinity of Christ and Transubstantiation. On February 17th, 1600 Giordano was burned at the stake in Rome. After his death he gained considerable fame, and became regarded as a martyr for science.

In 1644 Rene Descartes, a French philosopher and mathematician; known for the often quoted “I think, therefore I am”, also believed and published that every star is the center of its own system.

In March of 1781 William Herschel discovered the first new planet not known to the ancients. He tried to name it after King George, but “Uranus” was the name that stuck. Just think of it – the first planet ever found! In 1782 he was appointed “The King's Astronomer.” He later built his largest telescope, called the “40-foot telescope.” It had a 49 1/2” primary mirror. On its first night of use he discovered a new moon of Saturn. He discovered a second moon of Saturn within a month. He also discovered 2 moons of Uranus, and measured the axial tilt of Mars. He also discovered the Martian polar ice caps changed size with the planet's seasons. Herschel also discovered Infrared radiation by passing sunlight through a prism, and measuring the temperature of all the colors. He was amazed that it showed a higher temperature than visible light. He concluded there must be a form of light beyond the visible spectrum.

Percival Lowell, using his personal 24” refractor telescope, fanned the imagination with canals on Mars built by intelligent beings. He also searched for 'Planet X' that was thought to exist because of irregularities in the orbits of Neptune and Uranus. Eventually his observatory found a new planet (now the dwarf-planet) Pluto.

Writer Edgar Rice Burroughs wrote many science-fiction books about Mars and Venus, with intelligent beings inhabiting both planets. (Burroughs is most famous for his creation of Tarzan. - The city of Tarzana, CA was created in 1927 around land that he owned.)

Then our intelligent life possibilities on Mars bubble burst with the first successful fly-by of Mars with Mariner 4, followed by Viking 2 in 1976 and then the rover missions. (We are still hoping for some sub-subterranean life on the planet.)

Still we hold out the possibility of life in Europa or Enceladus. Frank Drake came up with an equation, now known as “Drake's Equation” for how many intelligent civilizations are currently out there. The Drake Equation:

$$N = R_* \cdot f_p \cdot n_e \cdot f_\ell \cdot f_i \cdot f_c \cdot L$$

where :

N = the number of civilizations in our galaxy with which radio-communication might be possible

and

R* = the average rate of star formation in our galaxy

f_p = the fraction of those stars that have planets

n_e = the average number of planets that can potentially support life per star that has planets

f_l = the fraction of planets that could support life that actually develop life at some point

f_i = the fraction of planets with life that actually go on to develop intelligent life (civilizations)

f_c = the fraction of civilizations that develop a technology that releases detectable signs of their existence into space

L = the length of time for which such civilizations release detectable signals into space

Now we have photographed other planets orbiting other stars, detected other planets through radial velocity (star wobble – and blue/red shift of the star's light), and transiting planets. - The Kepler telescope used the dip-in-light transit method for finding planets. This method is very limited, as the planets' orbit have to be in line with our line of sight. (If the moon was perfectly in line with Earth's orbit with the sun, we would have a solar eclipse every month.) Kepler's field of view is about 100,00 time larger than Hubble's. It looked at ~250,000 stars of which ~100,000 were 'good' stars. (Not variable.) On February 26th, 2014 Kepler had confirmed 961 planets with an additional 3,845 candidates still waiting to be confirmed. It was also recently confirmed a planet 10% larger than Earth in the 'habitable zone' of a star. - Close enough for water to be liquid, and not boil away. On Earth, everywhere water naturally occurs, there is life.

SETI has concentrated its searches on such planets.

Gary Thompson

What's Up? - Oddities Down Under

Down under by the South Celestial Pole, are the oddest constellations. Added by 17th and 18th century chart makers they're small, dim and never look like what they're supposed to be.

Constellations partially visible from the northern skies have classical names. There's Argo (the ship of Jason Of Golden Fleece fame). It sails in the Milky Way of an Egyptian horizon. Here's our second brightest star, Canopus. A giant star named after an Egyptian navigator. This Argo ship was so large it was subdivided into Puppis (poop deck),Vela, (sail), Pyxis (ship's compass) and Carina (keel).

Argo contains many clusters like the Southern Pleiades. Here's an enormous gas nebula, the Eta Carina Nebula. Once called the Keyhole Nebula, it became more famous for Eta Carina one of the largest known stars. Eta Carina is so oversized it periodically explodes and reforms to explode again.

Below this Argo ship are faint fishy constellations. There's Volans (flying fish), and Dorado (a golden ocean fish not the goldfish bowl type). Dorado is notable because is contains a Milky Way satellite galaxy, the Large Magellanic Cloud. This companion galaxy has a colossal spidery gaseous nebula called the Tarantula. Our two satellite galaxies were discovered by navigator Ferdinand Magellan and held interest because they were always in the southern sky (there being no southern pole star).

Additional formless constellations include little reptiles, Chamaeleon and Hydrus (a small sea snake, we already have a giant one in Hydra). Here is the only insect in the night sky, tiny Musca (fly). Many birds Grus (Crane) Pavo (Peacock, with our only English named star, Peacock Star), and a very sketchy Apus (bird of paradise). Apus in Latin means "without feet". This happened because feathery specimens were delivered by natives to collectors with the lumpy feet cut off. The best bird is Tucana (Toucan) because it contains both a enormous globular star cluster (47 Tucana, originally classified as a star) and the second satellite galaxy, the Small Magellanic Cloud.

The busy chart makers felt it was time for the arts and sciences to be honored. This lead to a lot of technological "tool" constellations. So we have optical instruments, Telescopium, and Microscopium. But there is also Reticulum (A Reticle, the eyepiece grid portion of a telescope), Horologium (Clock), Fornix (Furnace), and Caelum (Chisel). Maybe the chisel goes with the constellation of Sculptor, or Pictor (Painter). A suspicious lack of imagination seems to be shown by chart makers instruments, Norma (draftsman's square), Circinus (a drawing kind of compass, there is already a ship's compass, Pyxis) and Triangulum Australae (southern triangle). Right on the South Pole is Octans (octant, used by navigators as was the more northernly Sextans). Also near the South Pole is one of the oddest down under, Mensa (table). The only constellation named after a geographical feature. The French astronomer Nicolas Louis de Lacaille (one of the chart makers) named it after Table Mountain Observatory near Cape Town in South Africa where he worked. It's one of the smallest and dimmest of all constellations.

On the positive side, this southern region contains some notable bright constellations and stars. Centaurus (centaur) contains two remarkable deep sky objects. Largest of globular star clusters, Omega Centauri (originally classified as a star), and Centaurus A, a powerfully radiating disturbed galaxy. They are both visible from Southern California. But farther south are Alpha and Beta Centauri, two first magnitude feet stars. Alpha Centauri (also called Rigel Kentaurus, centaur's foot) is the closest star to our Sun (4.3 light years). Our third brightest star, it's a close double. It also has a red dwarf companion, Proxima (approximately our closest star).

Near by is the famous (it appears on the flags of five nations) Crux (southern cross). This small but religiously inspired constellation contains three first magnitude stars alphabetically called Acrux, Becrux, and Gacrux. Along with Alpha and Beta Centauri this is the closest concentration of (five) first magnitude stars in our sky. This is the southern polar equivalent of the Big Dipper. It's almost always visible in the southern sky.

In December of 2013 there appeared, near Beta Centauri, another overlooked event. Nova Centauri 2013 (pictured) brightened briefly from 5.5 magnitude to 3.3, making it the brightest naked eye nova in recent times.

Lee Collins

The Hottest Planet in the Solar System

When you think about the four rocky planets in our Solar System—Mercury, Venus, Earth and Mars—you probably think about them in that exact order: sorted by their distance from the Sun. It wouldn't surprise you all that much to learn that the surface of Mercury reaches daytime temperatures of up to 800 ° F (430 °C), while the surface of Mars never gets hotter than 70 ° F (20 °C) during summer at the equator. On both of these worlds, however, temperatures plummet rapidly during the night; Mercury reaches lows of -280 °F (-173 °C) while Mars, despite having a day comparable to Earth's in length, will have a summer's night at the equator freeze to temperatures of -100 °F (-73 °C).

Those temperature extremes from day-to-night don't happen so severely here on Earth, thanks to our atmosphere that's some 140 times thicker than that of Mars. Our average surface temperature is 57 °F (14 °C), and day-to-night temperature swings are only tens of degrees. But if our world were completely airless, like Mercury, we'd have day-to-night temperature swings that were hundreds of degrees. Additionally, our average surface temperature would be significantly colder, at around 0 °F (-18 °C), as our atmosphere functions like a blanket: trapping a portion of the heat radiated by our planet and making the entire atmosphere more uniform in temperature.

But it's the second planet from the Sun -- Venus -- that puts the rest of the rocky planets' atmospheres to shame. With an atmosphere **93 times as thick as Earth's**, made up almost entirely of carbon dioxide, Venus is the ultimate planetary greenhouse, letting sunlight in but hanging onto that heat with incredible effectiveness. Despite being nearly twice as far away from the Sun as Mercury, and hence only receiving 29% the sunlight-per-unit-area, the surface of Venus is a toasty 864 °F (462 °C), with no difference between day-and-night temperatures! Even though Venus takes hundreds of Earth days to rotate, its winds circumnavigate the entire planet every four days (with speeds of 220 mph / 360 kph), making day-and-night temperature differences irrelevant.

Catch the hottest planet in our Solar System all spring-and-summer long in the pre-dawn skies, as it waxes towards its full phase, moving away from the Earth and towards the opposite side of the Sun, which it will finally slip behind in November. A little atmospheric greenhouse effect seems to be exactly what we need here on Earth, but as much as Venus? No thanks!

Dr. Ethan Siegel

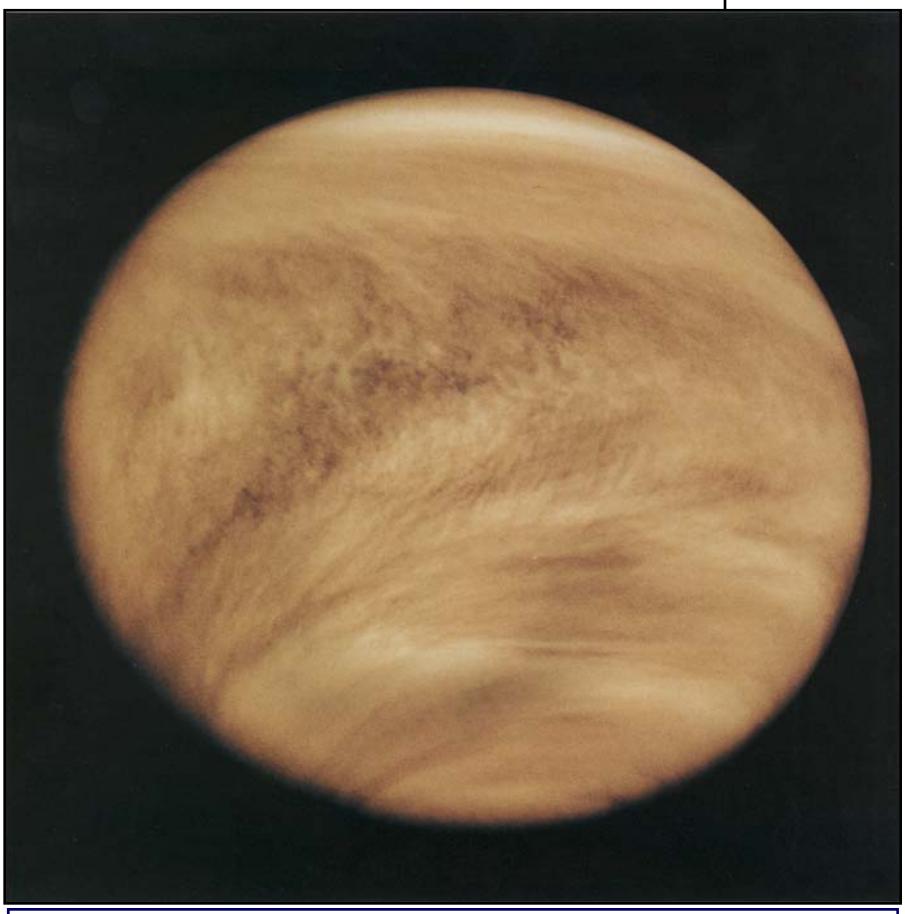

Image credit: NASA's Pioneer Venus Orbiter image of Venus's upper-atmosphere clouds as seen in the ultraviolet, 1979.

Check out these ***"10 Need-to-Know Things About Venus"***: http://solarsystem.nasa.gov/planets/profile.cfm?Object=Venus.

Kids can learn more about the crazy weather on Venus and other places in the Solar System at NASA's Space Place: http://spaceplace.nasa.gov/planet-weather.

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Club Events Calendar

May 16, General meeting, Vatche Sahakian
May 22-26, RTMC

June 5, Board meeting, 6:15
June 13, General meeting
June 28, Star Party, White Mountain, Bishop

July 3, Board meeting, 6:15
July 11, General meeting
July 26, Star Party, Mt Baldy, Cow Canyon Saddle

August 7, Board meeting, 6:15
August 15, General meeting
August 23, Star Party

September 4, Board meeting, 6:15
September 12, General meeting
September 20, Star Party
September 27, Mt Wilson Observing

October 2, Board meeting 6:15
October 10, General meeting
October 25, Star Party

October 30, Board meeting, 6:15
November 7, General meeting
November 22, Star Party

December 4, Board meeting, 6:15
December 5, Christmas Party, Sizzlin' Skillets 7:00pm
No scheduled Star Party