Ogden Astronomical Society • Ogden Utah

THE STAR DIAGONAL

THE JOURNAL OF THE OGDEN ASTRONOMICAL SOCIETY

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The President's Message

With summer starting we are to June, the last meeting until September. The Monte Cristo camp-outs in July and August will take the place of the meetings those months. The June meeting program will be the NOVA video, Death Star; it details the source of large Gamma ray bursts detected 30 years ago.

We had a great time at the Dead Horse Point camp-out. The weather wasn't as cooperative as we would have liked but we did get some good viewing in Friday night until about 1:00AM Saturday morning. Almost everyone spent the days traveling around and seeing the sights.

We are ready to place the order for the shirts and sweatshirts, we have made arrangements with Screen Printers Plus in North Ogden. We won't be able to get an exact price until we place the order but it should be within the estimate. We will collect the money when we deliver them to you. I will take orders now, and until the June 10th meeting, and then place the order the next day, June 11th. I will have the catalog at the meeting and we can answer any questions. If you can't make it to the meeting let me know before then, so I can include you in the order. You have the choice of embroidered or screen print on any item, large or small logo. We will get a discount for a large order now, they will do individual items later on but the cost will be a little more.

We have arrangements with the Ogden Bay Bird refuge for the Star Party June 19th. It will be at the South entrance in Hooper, access is from 7500 west and about 5000 south. There won't be any charge for us or the public. We will talk about set up details later.

Thanks,
Lee Priest, President
Ogden Astronomical Society

OAS Minutes, 6 May 04

(Because of the Dead Horse Point star party, the May OAS meeting was held on the frist Thursday of the month, 6 May, instead of the usual second Thursday.

I was away on business travel, so I missed this meeting. Dave Dunn very kindly took the following minutes.
Jim Seargeant)

OAS President Lee Priest opened the meeting at 7:30.

Announcements:

Deadhorse Point Star Party May 14-15. Group site is available for camping.

Lakeview Elementary School Star Party May 11.

Midland Elementary School Star Party May 21.

Public Star Party and the Ogden Dinosaur Park May 22.

Monte Cristo July 15-17 and August 12-14.

Grand Canyon Star Party June 12-19. See Deloy and Karen for more information.

Doug had 2 T-shirts and one hat to sell.

Business:

We are working to get Shirts and Sweatshirts with our logo embroidered on them. Several options are available. Lee has been talking with one company that only does embroidery. An alternate company was suggested that does both silkscreen and embroidery. Lee is going to check that out because it would be good to get both options. It was also suggested that we get patches made.

Lee requested volunteers for the nominating committee. After a moment of silence, the following volunteered.

Dave Dunn
David Varney
Dale Hooper

Dave Dunn also mentioned that he would accept nomination for the Secretary position that is being vacated. (Way to go Dave! - Jim Sgt, the vacating Secretary.)

Several members suggested that the club should obtain a reasonably sized Dobsonian telescope to be loaned out to members. It was suggested that it should be a 10" telescope similar to the Orion SkyQuest. It was agreed that it was a good idea. More research will be done on which telescope we should buy.

A discussion was also held on having the club purchase some binoculars and a parallelogram mount. A vote was taken and approved the purchase of some 15X70 binoculars the next time they are seen on sale for about $60. If anyone notices the ad, they are to contact Doug Say and he will go purchase the binoculars. He will also build the mount. Dave Dunn will donate an old equatorial mount tripod that will be used as part of the mount.

David Dunn

Dead Horse Point Report

The OAS 3rd annual Deadhorse Point Star Party was a fun trip this year. I think that all of those that were able to attend enjoyed the observing and site-seeing. We spent a few hours on Thursday and Friday night observing. We enjoyed viewing Comet Neat, which was visible naked eye and was hanging around the Beehive Cluster. It had a very large, bright core and, in binoculars, a short tail. We were also able to see a lot of Galaxies and Nebulas. We were joined for some observing by Debbie Whittaker and Jim Gibson from the Utah-Astronomy email group. On Thursday night, Debbie gave us a great view of the Ring Nebula at about 350X in her 15" Obsession telescope. It was very nice. The sky must have been very steady. I had her try it again the next night and it wasn't as nice. The Dunn family went to Natural Bridges on Thursday. We had a nice hike and on the way back out to the main highway we visited the Turner Wash Indian Ruins. They were beautiful cave dwellings. They were definitely worth the 250 mile round trip ride from Moab. We went to Arches on Saturday and enjoyed another fun day of hiking a picture taking. I think this is a trip that my family really looks forward to because of the site-seeing opportunities in the area. Hopefully OAS will continue this tradition.

David Dunn

Upcoming Events

10 Jun 7:30 PM	OAS meeting, Ott Planetarium, WSU
19 June	Public Star Party, Ogden Bay Bird refuge
12 - 19 June	Grand Canyon Star Party
15-17 Jul	Monte Cristo
12-14 Aug	Monte Cristo

(We haven't heard from East Canyon or Rockport yet.)

Society for Astronomical Sciences Symposium on Telescope Sciences - Big Bear, CA

I've long been interested in what amateurs can do to make observations useful to professional astronomers and am a member of the International Amateur-Professional Photoelectric Photometry (IAPPP). The main focus of the IAPPP has been photoelectric (photomultiplier tube based) photometry (precision brightness measurement) of variable stars. In recent years, the instruments have evolved as solid state photometers and CCD cameras have become available, but photometry of variable stars has remained the main objective. The Western wing of the IAPPP has held a symposium annually in Big Bear, California in the days just before the RTMC Astronomy Expo. The IAPPP Western Wing has now renamed itself the Society for Astronomical Sciences (SAS) and expanded it's interest to include several additional areas of amateur-professional partnership. (http://www.socastrosci.org) I attended this year's symposium and several of the presentations sounded extremely interesting and do-able by amateurs with modest equipment, including the following, adapted from this year's agenda:

Near Earth Object Photometry to support shape modeling
Amateur photometry to support radar imaging
Extrasolar transit research by amateurs
Asteroid occultation observing

Many of these programs involve CCD photometric measurements in the visual band (without filters, which greatly reduces cost and complexity) and timing observations using inexpensive video cameras. I'll

report in more detail on these programs in the future, hopefully after I try them out.

This was a very enjoyable and interesting symposium. And, I won a Meade f/6.3 focal reducer in the drawing!

Jim Seargeant

RTMC Astronomy Expo

It's been many years since I made it to the RTMC. This time the combination of the SAS Symposium and the RTMC was too much to pass up. Originally the Riverside Telescope Makers Conference, the early emphasis really was on the telescope making. Competition was often intense; it was a mark of high distinction to be awarded a RTMC ribbon. The telescope making aspect of the RTMC has been declining and the commercial presence increasing for several years, though, and in 2000 the official name was changed to the "RTMC Astronomy Expo". This year there were only about six amateur built telescopes on display in the main field.

This year, Clestron put out a telescope that really grabbed attention, their 20" corrected Dall-Kirkham. I'd seen some hints of this scope on the internet, but was surprised to see it in the glass, metal, and carbon fiber. We got a look through it one night, but the haze and bright moon limited us to Jupiter - not the best object for this machine. There was quite a bit of glare; it may have been that the optics were not yet coated. It will be interesting to see how this beast works as a CCD imaging instrument.

Also very interesting were the lovely Mathis (http://www.mathis-instruments.com/) German equatorial mounts. They had two of their GEMs there, I believe a MI-500 and MI-750. Big, beefy mounts! I'd love to find a used baby brother to these mounts, the MI-250 by Mountain Instruments, to replace my LX200 for imaging.

I spent considerable time discussing with Don Clement the focuser that he designed and is selling (http://www.clementfocuser.com/pages/1/index.htm). It uses a unique mechanism to provide smooth, linear, and rigid control of a camera (or eyepiece) over a considerable range of motion. It looks a bit different from your usual focuser but works beautifully.

It was great fun checking out all the amateur work and commercial displays. Wayne Sumner was there as well as several SLAC members and I had a wonderful time visiting with Jerry Foote and discussing his latest projects (http://www.scopecraft.com/).

Jim Sgt

The Star Diagonal

This copy of The Star Diagonal is considerably delayed. My apologies. We usually get it out shortly after the first of each month and always before the OAS meeting on the second Thursday. This month I finished my editing on 4 June and started up the computer agin on the 5th to do the printing. Dead computer. Blue screen of death, disk drive not available. This is not a good thing. No newsletter.

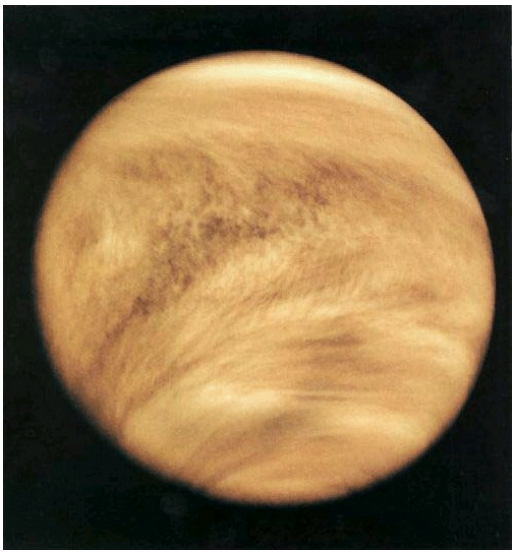
Well, after a much advice and a borrowed hard disk from Cliff Peterson, I got it all running again. None of the data had been corrupted.

So, the June copy of the Star Diagonal is late, but it is out at last. My thanks to Lee and Dave for their contributions and to Cliff for the help!

Jim Seargeant, OAS Secretary

Encyclopedia: Venus (planet)

Venus is the second planet from the Sun, named after the Roman goddess Venus. It is a terrestrial planet, very similar in size and bulk composition to Earth; it is sometimes called Earth's "sister planet" as a result of this similarity. Sometimes (inaccurately) referred to as the "morning star" or the "evening star", it is by far the brightest "star" in the sky. Because Venus is closer to the Sun than Earth is, it is always in roughly the same direction as the Sun, so on Earth it can only be seen just before sunrise or just after sunset.



Orbital characteristics			
Avg Dist from Sol	0.72333199 AU		
Mean radius	108,208,930 km		
Eccentricity	0.00677323		
Revolution period	224.701 days		
Synodic period	583.92 days		
Avg. Orbital Speed	35.0214 km/s		
Inclination	3.39471°		
Number of satellites	0		
Physical characteristics			
Equatorial diameter	12,103.6 km		
Surface area	4.60×10^{8} km^2		
Mass	4.869×10^{24} kg		
Mean density	5.24 g/cm^3		
Surface gravity	8.87 m/s^2		
Rotation period	-243.0187 days		
Axial tilt	2.64°		
Albedo	0.65		
Escape Speed	10.36 km/s		
Surface* temp. (K)	min*	mean	max
	228	737	773
(*min temperature refers to cloud tops only)			
Atmospheric characteristics			
Atmospheric pressure	9321.9 kPa		
Carbon dioxide	96%		
Nitrogen	3%		
Sulfur dioxide Water vapor Carbon monoxide Argon Helium	trace		

Physical characteristics

Atmosphere

Venus has an atmosphere consisting mainly of carbon dioxide and a small amount of nitrogen, with a pressure at the surface about 90 times that of Earth (a pressure equivalent to a depth of 1 kilometer under Earth's ocean). This enormous CO_2-rich atmosphere results in a strong greenhouse effect that raises the surface temperature approximately 400˚C above what it would be otherwise, causing temperatures at the surface to reach 500˚C. This makes Venus's surface hotter than Mercury's, despite being nearly twice as distant from the Sun and only receiving 75% the solar irradiance (2660 W/m^2). Due to the thermal inertia and convection of its dense atmosphere, the temperature does not vary significantly between the night and day sides of Venus despite its extremely slow rotation (less than one rotation per Venusian year). Winds in the upper atmosphere circle the planet in only 4 days, helping to distribute the heat.

There are strong 350-kilometer-per-hour winds at the cloud tops but winds at the surface are very slow, no more than a few kilometers per hour.

However, due to the high density of the atmosphere at Venus's surface, even such slow winds exert a significant amount of force against obstructions. The clouds are composed of sulfur dioxide and sulphuric acid droplets and cover the planet completely, obscuring any surface details. The temperature at the tops of these clouds is approximately -45˚C. The official mean surface temperature of Venus, as given by NASA, is 464˚C. The minimal value of the temperature, listed in the table, refers to cloud tops - on surface the temperature is never below 400˚C.

Surface features

Venus has slow retrograde rotation, meaning it rotates from east to west instead of west to east as all other known planets in the solar system do. It is not known for sure why Venus is different in this manner, although it may be the result of a collision with a very large asteroid at some time in the distant past. In addition to this unusual retrograde rotation, the periods of Venus's rotation and of its orbit are synchronized in such a way that it always presents the same face toward Earth when the two planets are at their closest approach (5.001 Venusian days between each inferior conjunction). This may be the result of tidal locking, with tidal forces affecting Venus's rotation whenever the planets get close enough together, or it may simply be a coincidence.

Venus has two major continent-like highlands on its surface, rising over vast plains. The northern highland is named Ishtar Terra and has Venus's highest mountains, named the Maxwell Montes after James Clerk Maxwell, which surround the plateau Lakshmi Planum. Ishtar Terra is about the size of Australia. In the southern hemisphere is the larger Aphrodite Terra, about the size of South America. Between these highlands are a number of broad depressions, including Atalanta Planitia, Guinevere Planitia, and Lavinia Planitia. With only the exception of Maxwell Montes, all surface features on Venus are named after real or mythological females. Due to Venus's thick atmosphere, which causes meteors to decelerate as they fall toward the surface, no impact crater smaller than about 3.2 km in diameter can form.

Nearly 90% of Venus's surface appears to consist of recently-solidified basalt lava, with very few meteor craters. This suggests that Venus underwent a major resurfacing event recently. The interior of Venus is probably very similar to that of Earth: an iron core about 3000 km in radius, with a molten rocky mantle making up the majority of the planet. Recent results from the Magellan gravity data indicate that Venus's crust is stronger and thicker than had previously been assumed. It is theorized that Venus does not have mobile plate tectonics like Earth does, but instead undergoes massive volcanic upwellings at regular intervals that inundate its surface with fresh lava; the oldest features present on Venus seem to be only around 800 million years old, with most of the terrain being considerably younger (though still not less than several hundred million years for the most part). Recent findings suggest that Venus is still volcanically active in isolated geological hot spots.

Venus has no magnetic field, possibly due to its slow rotation being insufficient to drive an internal dynamo of liquid iron. As a result, the solar wind impacts directly on Venus's upper atmosphere. It is thought that Venus originally had as much water as Earth, but that under the Sun's assault water vapor in the upper atmosphere was split into hydrogen and oxygen, with the hydrogen escaping into space due to its low molecular mass; the ratio of hydrogen to deuterium (a heavier isotope of hydrogen which doesn't escape as quickly) in Venus's atmosphere seems to support this theory.

Venus was once thought to possess a moon, named Neith after the mysterious goddess Sais (whose veil no mortal raised), first observed by Giovanni Domenico Cassini in 1672. Sporadic sightings of Neith by astronomers continued until 1892, but these sightings have since been discredited (they were mostly faint stars that happened to be in the right place at the right time) and Venus is now known to be moonless.

Exploration of Venus

Historical observations

Venus is the most prominent astronomical feature in the morning and evening sky on Earth, and has been known of since before recorded history. One of the oldest surviving astronomical documents, from the Babylonian library of Ashurbanipal around 1600 BC, is a 21-year record of the appearances of Venus (which the early Babylonians called Nindaranna). The Assyrians called Venus Dil-bat or Dil-i-pat, in ancient Egypt it was the special star of the mother-god Ishtar, and the Chinese knew it as Jin xing. Venus was the most important celestial body observed by the Maya, who called it Chak ek, "the Great Star", and considered it a representation of Quetzalcoatl; they apparently did not worship any of the other planets. (See also Maya calendar.) Early Greeks thought that the evening and morning appearances of Venus represented two different objects, calling it Hesperus when it appeared in the western evening sky and Phosphorus when it appeared in the eastern morning sky. They soon came to recognize that both objects represented the same planet, however; Pythagoras is given credit for this realization. In the 4th century BC, Heraclides Ponticus proposed that both Venus and Mercury orbited the Sun rather than Earth. The name Venus comes from the Roman goddess of love and beauty.

Because its orbit takes it between the Earth and the Sun, Venus as seen from Earth exhibits visible phases in much the same manner as the Earth's Moon. Galileo Galilei was the first to observe the phases of Venus in December 1610, an observation which supported Copernicus's then-contentious heliocentric description of the solar system. He also noted changes in the size of Venus's visible diameter when it was in different phases, suggesting that it was farther from Earth when it was full and nearer when it was a crescent. This also strongly supported the heliocentric model.

Transits of Venus, when the planet crosses directly between the Earth and the Sun' visible disc, are important astronomical events. The first such transit was observed on December 4, 1639 by Jeremiah Horrocks and William Crabtree. A transit in 1761 observed by Mikhail Lomonosov provided the first evidence that Venus had an atmosphere, and the 19th century observations of parallax during its transits allowed the distance between the Earth and Sun to be accurately calculated for the first time. The previous set of transits of Venus occurred within the interval of 1874 - 1882, and the next set of transits will occur in the period of 2004 - 2012.

In the 19th century, many observers stated that Venus had a period of rotation of roughly 24 hours. Itallian astronomer Giovanni Schiaparelli was the first to predict a significantly slower rotation, proposing that Venus was tidally locked with the Sun (as he had also proposed for Mercury). While not actually true for either body, this was still a reasonably accurate estimate. The near-resonance between its rotation and its closest approach to Earth helped to create this impression, as Venus always seemed to be facing the same direction when it was in the best location for observations to be made. The rotation rate of Venus was finally determined with confidence in 1961, using the Goldstone Radio Telescope in California. The fact that it was retrograde was not confirmed until 1964, however.

Venus-observation spacecraft

On March 1, 1966 the Venera 3 Soviet space probe crashed on Venus, becoming the first spacecraft to land on the planet's surface.

The first successful Venus probe was the American Mariner 2 probe, which flew past Venus in 1962. It established that Venus has no magnetic field and confirmed the planet's rotation rate.

The Soviet Union sent a number of atmospheric probes and landers, with Venera 9 and 10 each returning a single black-and-white photograph of Venus's surface in 1975 and Venera 13 and 14 returning a number of colour photographs from Venus's surface in 1982. In 1985 the Soviet Vega 1 and 2 probes each deployed a sensor-laden balloon in Venus's atmosphere in addition to placing landers on the surface. No lander survived for more than about two hours before failing under Venus's intense surface heat and pressure.

On August 10, 1990, the US Magellan probe arrived at its orbit around the planet and started a mission of detailed radar mapping. 98% of the surface was mapped with a resolution of approximately 100m before the craft, on October 11, 1994, plunged to the surface as planned and partly vaporized; some sections are thought to have hit the planet's surface.

Edited and provided by
Mark Durrwachter

Dead Horse Point