STARSCAN

Johnson Space Center Astronomical Society

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Letter from the President

Howdy Gang!!

Just wanted to thank all the dedicated folks who participated in the various Star Parties this past weekend. Saturday at the LPI had to be a scorcher for the ones viewing the sun! Later that evening turned out pretty good at Moody Gardens with quite a few visitors joining us for a peek through murky skies.

Prior to those two events, Al Kelly and I met Friday evening with some "Big Shots" in the Boy Scout Bay Area Council at Camp Karankawa (down near West Columbia). They treated us to dinner and a jaunt over to where the observatory will be built. That's right, "will" means that wheels are turning to get a new home for the 32" scope! Al and I led the group down to Danciger and out into the cow pasture where the scope lives. As the big door drops and the roof is cranked back from the structure, I could see the guests already getting excited. Al setup the scope and dropped in the eyepiece carousel and off we went!!! One of the visitors was a contractor who was on Al's heels the whole time trying to understand what it takes to construct an observatory. He took lots of pictures and asked plenty of questions. For the next couple of hours Al amazed us all with some of the favorites of the night. You just can't beat the view of a Globular cluster through a huge chunk of glass!!! M-51 more than filled the eyepiece and the spiral arms just reached out and slapped you!! Sorry, got carried away there. The folks from the Boy Scout Council REALLY want to make this effort happen!!!

32" Newtonian telescope in the Danciger observatory

The future site is a bit closer than Danciger and amenities like restrooms come with the deal!!! It took just one hour to drive from my home in Santa Fe to the Camp. The proposal for moving the scope looks really promising so far, so stay tuned for updates!!

Prez Bob

Letter From the Editor

Astronomically speaking, a lot has happened in the past month that is worthy of reporting. The Venus transit of the Sun, new discoveries by the Spitzer Space Telescope, and the Cassini-Huygens mission are but a few of the exciting stories. To fully report the club news, monthly SIG reports and these exciting news stories, the file size of the Starscan would be well beyond any practical size for Internet viewing, even with a high speed connection.

Since Paul Maley's informative and interesting report on the Venus Transit is deserving of an issue of its own, I have decided to publish it as a separate document. Therefore, the July issue of the Starscan has a Special Supplement: TRANSIT OF VENUS - EXPEDITION TO MAURITIUS.

I hope you enjoy this month's Starscan

Ken Lester
Starscan Editor

SPITZER SPACE TELESCOPE FINDINGS

PARALLELOGRAM-SHAPED GALACTIC REMNANTS FOUND IN CENTAURUS A

The elliptical galaxy, Centaurus A, is one of the brightest sources of radio waves, suggesting a super-massive black hole at its center. Fueling its radio activities is a small spiral galaxy which was devoured about 200 million years ago. Previous telescopic observations have revealed the galactic remnants as a long irregular bar of dust. Now, the infrared sensitive eyes of the Spitzer Space Telescope, have given astronomer's unprecedented detail of the remains of the spiral galaxy, which have been twisted and warped into a parallelogram-shaped structure. Astronomers have long thought that the merging of galaxies cause giant elliptical galaxies to form and grow. Churning inside the core of Centaurus A, the devoured galaxy is triggering new generations of star birth.

Image Credit: NASA/JPL-Caltech

These findings were presented at the annual meeting of the American Astronomical Society in Denver, Colorado on June 1st. The principal investigator for this research is Dr. Jocelyn Keene, an astronomer at JPL and CalTech.

RECIPE FOR LIFE FOUND IN NEW STAR SYSTEMS

A life-enabling cocktail of icy dust particles, water, methanol and carbon dioxide has been discovered in significant amounts circling new star systems by the Spitzer Space Telescope. This same cocktail of materials may be the origin of icy planetoids like comets which some scientist believe endowed Earth with the building blocks for life.

University of Rochester (N.Y.) scientists, Drs. Dan Watson and William Forrest identified the ices in five new stars in Taurus. While these organic materials have been seen in space before, this was the first time they were seen in the dust of planet-forming discs.

Spitzer has also found what may be the youngest planet detected so far. The dust disk surrounding CoKu Tau 4, a star barely one million years old, has a clearing or gap, possibly indicating a new planet has swept away the disc material.

In addition, Spitzer has also detected two of the farthest and faintest planet forming discs ever observed. A new image of the stellar nursery RCW 49, which is about 13,700 LY away, reveals that two of approximately 300 new stars have discs. RCW 49 is in Centaurus. "Preliminary data suggest that all 300 or more stars harbor discs, but so far we've only looked closely at two. Both were found to have discs," said Dr. Ed Churchwell of the University of Wisconsin, Madison, Wis., principal investigator of the RCW 49 research, with Dr. Barbara Whitney of Space Science Institute, Boulder, Colo.

CASSINI-HUYGENS UPDATE

MISSION STATUS REPORT

NEWS RELEASE: 2004-134
Media Relations Office
Jet Propulsion Laboratory
California Institute Of Technology
National Aeronautics And Space Administration

The Cassini spacecraft successfully performed a critical six minute trajectory correction maneuver May 27 to put it on course with its first encounter, Saturn's outermost moon Phoebe, set for June 11. The spacecraft is operating normally and is in excellent health.

"The maneuver is very critical for getting us into Saturn orbit because it is the first checkout of the bipropellant pressurization system after nearly five years of dormancy," said Todd Barber, propulsion engineer for Cassini at NASA's Jet Propulsion Laboratory, Pasadena, Calif. "It sets the stage for Saturn orbit insertion on June 30."

During the course of its trip, Cassini has traveled 3.4 billion kilometers (2.1 billion miles). "We couldn't have asked for a smoother ride," said Robert T. Mitchell, program manager for the Cassini-Huygens mission at JPL. "All the instruments are performing well, and for almost seven years we have traveled without any major hitches. The excitement is building as we are getting ready to put Cassini in orbit around the ringed planet." The orbiter has relied on three radioisotope thermoelectric generators to power all the electrical components, including the 12 science instruments. The European-built Huygens probe on board Cassini carries six instruments.

"If the road to Saturn were a highway, the Cassini orbiter would have passed the sign along the road that says 'Saturnian County line,'" said Jeremy Jones, chief navigator for the Cassini-Huygens mission at JPL. "The next exits are Phoebe, 9 million kilometers (5.4 million miles) ahead, Saturn 19 million kilometers (12 million miles) ahead."

Phoebe is an oddly shaped moon with a dark surface. It orbits in the opposite direction from the motion of most other bodies in the solar system. The backwards-revolution leads scientists to believe that it is an object captured from the distant Kuiper Belt, making it an interesting target. "The Phoebe flyby may offer the first glimpse of what the frigid bodies at the edge of the solar system look like," said Dr. Bonnie Buratti, scientist on the Cassini-Huygens mission at JPL. "These bodies, which include Pluto and its satellite Charon, are believed to be remnant objects left over from the formation of the planets 4.5 billion years ago."

After the Phoebe flyby, Cassini will be on course for Saturn. On June 30 (July 1 Universal Time), Cassini will become the first orbiter around Saturn. "The two Voyager and two Pioneer spacecraft flew by the planet and saw it from a distance for two or three days. With Cassini, we will be in the city limits for four years," said Dr. Dennis Matson, project scientist for Cassini at JPL. "The difference is like driving by the Grand Canyon versus stopping, getting off and enjoying the sights for a while."

On arrival, Cassini will begin a 96-minute burn designed to put the spacecraft into Saturn's orbit. As part of getting the spacecraft into orbit, Cassini will twice cross between known gaps in the rings. As a precautionary measure, the spacecraft will use its antenna as a shield to protect it from tiny article hits.

A prime target for Cassini and the piggyback Huygens probe built by the European Space Agency is

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the smoggy moon Titan. "In the 350 years since the discovery of Titan we have come to see it as a world with surprising similarities to our own, yet located almost 1.5 billion kilometers (900 million miles) from the Sun," said Dr. Jonathan Lunine, Huygens interdisciplinary scientist and professor of planetary science and physics at the University of Arizona, Tucson. "With a thick, nitrogen-rich atmosphere and possible hydrocarbon seas, Titan may harbor organic compounds important in the chain of chemistry that led to life on Earth."

Image 1 — NASA/JPL/Space Science Institute

Six months after reaching Saturn, Cassini will release the wok-shaped Huygens probe towards Titan on Dec. 24, 2004 (Dec. 25 Universal Time). The event will be by far the most distant descent of a robotic probe on another object in the solar system. On Jan. 14, 2005 (Jan. 15 Universal Time), Huygens will enter Titan's atmosphere, deploy its parachute, and begin its scientific observations of Titan.

The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency, and the Italian Space Agency. The Jet Propulsion Laboratory, a division of the California Institute of Technology in Pasadena, manages the Cassini-Huygens mission for NASA's office of Space Science, Washington, D.C. JPL designed, developed and assembled the Cassini orbiter.

For the latest images and more information about the Cassini- Huygens mission, visit http://saturn.jpl.nasa.gov.

IMAGES OF PHOEBE

The three images of Phoebe were taken by the Cassini space craft on June 11th, 2004. They show probable evidence of an ice-rich body overlain with a thin layer of dark material.

Image 2 — NASA/JPL/Space Science Institute

In image 1, the sharply-defined crater at above center exhibits two or more layers of alternating bright and dark material. Imaging scientists on the Cassini mission have hypothesized that the layering might occur during the crater formation, when ejecta thrown out from the crater buries the pre-existing surface that was itself covered by a relatively thin, dark lag deposit over an icy mantle.

Image 2 is a mosaic of two images. Small bright craters in the image are probably fairly young features. This phenomenon has been observed on other icy satellites,

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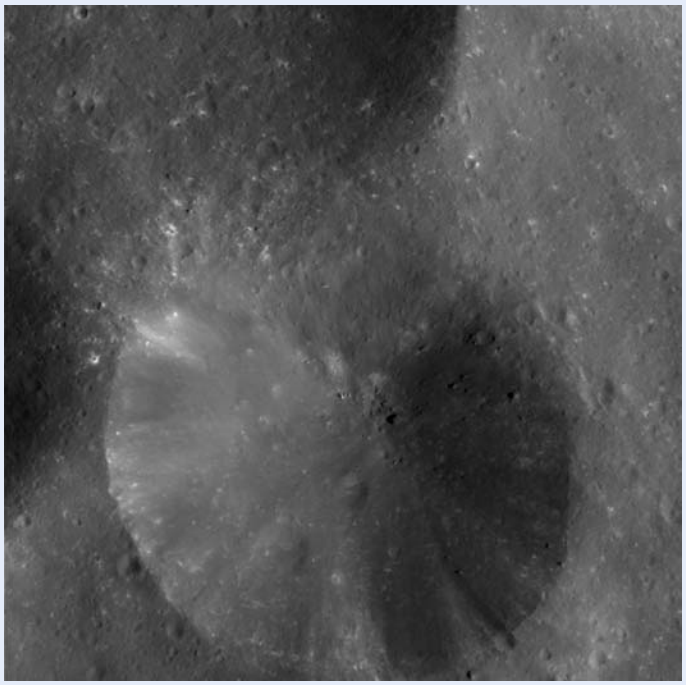
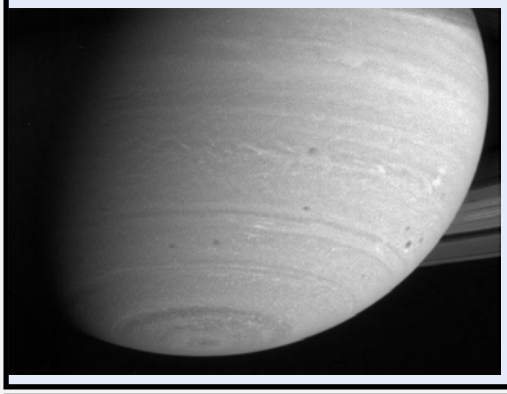


Image 3 — NASA/JPL/Space Science Institute

such as Ganymede at Jupiter. When impactors slammed into the surface of Phoebe, the collisions excavated fresh, bright material -- probably ice -- underlying the surface layer. Further evidence for this can be seen on some crater walls where the darker material appears to have slid downwards, exposing more light-colored material. Some areas of the image that are particularly bright - especially near lower right - are over-exposed.

Image 3 is a high-resolution image of Phoebe showing a 13-kilometer (8-mile) diameter crater with a debris-covered floor. Part of another crater of similar size is visible at left, as is part of a larger crater at top and many scattered smaller craters. The radial streaks in the crater are due to down slope movements of loose fragments from impact ejecta. Also seen are boulders ranging from about 50 to 300 meters (160 to 990 feet) in diameter. The building-sized rocks may have been excavated by large impacts, perhaps from some other region of Phoebe rather than the craters seen here. There is no visible evidence for layering of ice and dark material or a hardened crust in this region, as on other parts of this moon.



STORMS AND FEATHERY CLOUDS

Saturn's southern hemisphere shows dark spots and wisps of high clouds in this image. Note the boomerang shape of the patterns in the mid-latitude bands. The image was taken with the Cassini narrow angle camera in the near infrared on May 8, 2004, from a distance of 28.1million kilometers (17.5 million miles). Image scale is 168 kilometers (104 miles) per pixel. The image has been enhanced to aid visibility.

Image Credit:NASA/JPL/Space Science Institute

NEW COMET — SWAN (C/2004 H6)

Australians, Michael Mattiazzo, Andrew Pearce, and Colin Drescher, using Mattiazzo's CCD astrometry on May 16th, 21st and 25th, have detected a comet that was first suspected on low-resolution images taken with the SOHO spacecraft's SWAN ultraviolet camera. The comet will probably stay visible as an 8th magnitude object, visible from anywhere in the world during July.

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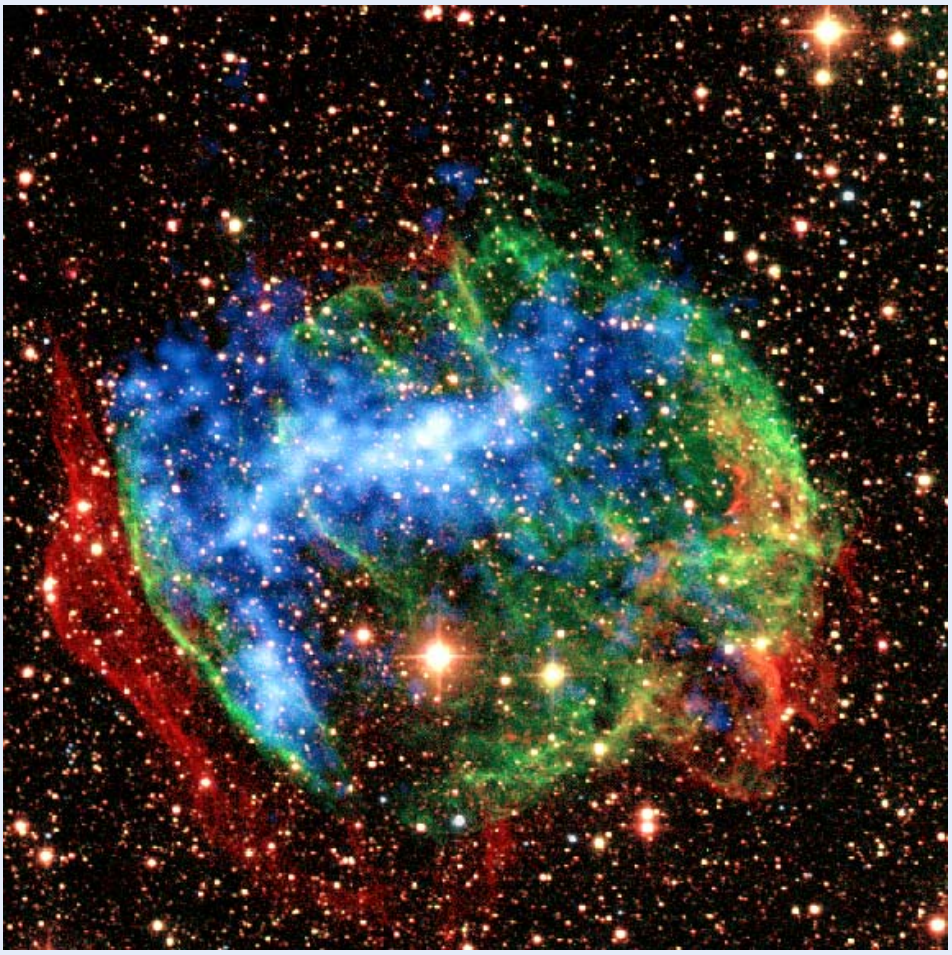
Smoking Gun Found for Gamma-Ray Burst in Milky Way

CXC Press Release: 04-05 June 02, 2004

Whitney Clavin: Spitzer Science Center, Jet Propulsion Laboratory, Pasadena, Calif.
Steve Roy: Marshall Space Flight Center, Huntsville, AL
Megan Watzke: Chandra X-ray Observatory Center, CfA, Cambridge, MA

Combined data from NASA's Chandra X-ray Observatory and infrared observations with the Palomar 200-inch telescope have uncovered evidence that a gamma-ray burst, one of nature's most catastrophic explosions, occurred in our Galaxy a few thousand years ago. The supernova remnant, W49B, may also be the first remnant of a gamma-ray burst discovered in the Milky Way. W49B is a barrel-shaped nebula located about 35,000 light years from Earth. The new data reveal bright infrared rings, like hoops around a barrel, and intense X-radiation from iron and nickel along the axis of the barrel.



Credit: X-ray: NASA/CXC/SSC/J. Keohane et al.; Infrared: Caltech/Palomar/ J.Keohane et al.

"These results provide intriguing evidence that an extremely massive star exploded in two powerful, oppositely directed jets that were rich in iron," said Jonathan Keohane of NASA's Jet Propulsion Laboratory at a press conference at the American Astronomical Society meeting in Denver. "This makes W49B a prime candidate for being the remnant of a gamma ray burst involving a black hole collapsar."

"The nearest known gamma-ray burst to Earth is several million light years away - most are billions of light years distant - so the detection of the remnant of one in our galaxy would be a major breakthrough," said William Reach, one of Keohane's collaborators from the California Institute of Technology.

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According to the collapsar theory, gamma-ray bursts are produced when a massive star runs out of nuclear fuel and the star's core collapses to form a black hole surrounded by a disk of extremely hot, rapidly rotating, magnetized gas. Much of this gas is pulled into the black hole, but some is flung away in oppositely directed jets of gas traveling at near the speed of light.

An observer aligned with one these jets would see a gamma-ray burst, a blinding flash in which the concentrated power equals that of ten quadrillion Suns for a minute or so. The view perpendicular to the jets is a less astonishing, although nonetheless spectacular supernova explosion. For W49B, the jet is tilted out of the plane of the sky by about 20 degrees.

Four rings about 25 light years in diameter can be identified in the infrared image. These rings, which are due to warm gas, were presumably flung out by the rapid rotation of the massive star a few hundred thousand years before the star exploded. The rings were pushed outward by a hot wind from the star a few thousand years before it exploded.

Chandra's image and spectral data show that the jets of multimillion-degree-Celsius gas extending along the axis of the barrel are rich in iron and nickel ions, consistent with their being ejected from the center of the star. This distinguishes the explosion from a conventional type II supernova in which most of the Fe and Ni goes into making the neutron star, and the outer part of the star is what is flung out. In contrast, in the collapsar model of gamma ray bursts iron and nickel from the center is ejected along the jet.

At the ends of the barrel, the X-ray emission flares out to make a hot cap. The X-ray cap is surrounded by a flattened cloud of hydrogen molecules detected in the infrared. These features indicate that the shock wave produced by the explosion has encountered a large, dense cloud of gas and dust.

The scenario that emerges is one in which a massive star formed from a dense cloud of dust, shone brightly for a few million years while spinning off rings of gas and pushing them away, forming a nearly empty cavity around the star. The star then underwent a collapsar-type supernova explosion that resulted in a gamma-ray burst.

The observations of W49B may help to resolve a problem that has bedeviled the collapsar model for gamma-ray bursts. On the one hand, the model is based on the collapse of a massive star, which is normally formed from a dense cloud. On the other hand, observations of the afterglow of many gamma-ray bursts indicate that the explosion occurred in a low-density gas. Based on the W49B data, the resolution proposed by Keohane and colleagues is that the star had carved out an extensive low-density cavity in which the explosion subsequently occurred.

"This star appears to have exploded inside a bubble it had created," said Keohane. "In a sense, it dug its own grave."

NASA's Marshall Space Flight Center, Huntsville, Ala., manages the Chandra program for the Office of Space Science, NASA Headquarters, Washington. Northrop Grumman of Redondo Beach, Calif., formerly TRW, Inc., was the prime development contractor for the observatory. The Smithsonian Astrophysical Observatory controls science and flight operations from the Chandra X-ray Center in Cambridge, Mass.

Mars Global Surveyor Images

Text and images credit: NASA/JPL/Malin Space Science Systems

PHOBOS

Mars has two natural satellites, or moons, Phobos and Deimos. On 1 June 2003, the Mars Global Surveyor (MGS) spacecraft was slewed eastward to capture these views of the inner moon, Phobos, shortly before it set over the afternoon limb. Phobos orbits Mars about 3 times a day at a distance of about 6,000 km (3,728 mi). About 0.006 times the size of Earth's Moon, Phobos is a potato-shaped object with dimensions approximately 27 by 22 by 18 kilometers (about 17 by 14 by 11 miles).

The first picture (with Phobos circled) shown here is a color composite of four MGS Mars Orbiter Camera (MOC) wide angle images; the second view is a MOC narrow angle image, taken at the same time as the wide angle views, showing details on the surface of the tiny moon.

Phobos is one of the darkest objects in the Solar System. Thus, four wide angle images were obtained to make the picture of Phobos over the martian limb: a pair of red and blue wide angle images was acquired for the limb, and a pair of separate images were required to see Phobos. The wide angle images illustrate the fact that Phobos is mostly colorless (dark gray); the faint orange/red hue in the wide angle picture is a combination of slight differences in the focal lengths of the blue and red cameras and the orange/red illumination provided by reflection of sunlight off Mars. To a person standing on Phobos, the red planet would fill most of the sky.

The high resolution image (right) was taken at the same time as the wide angle view. MGS was

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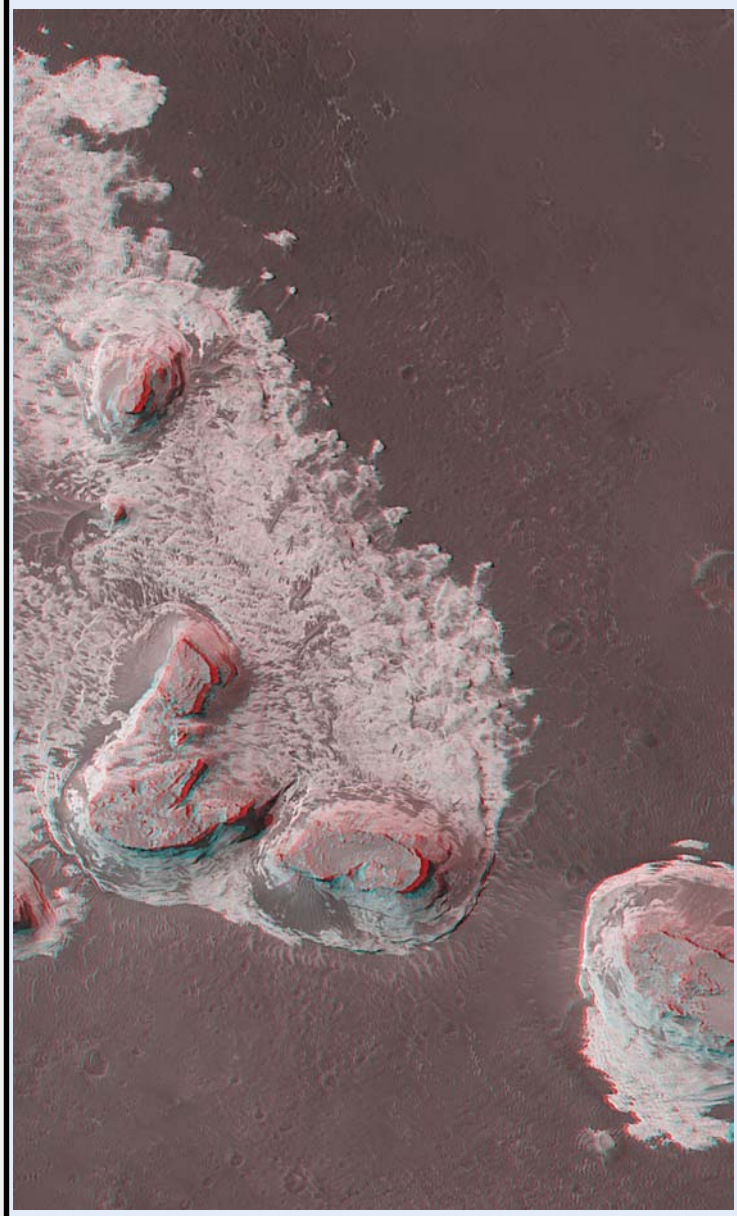
about 9,670 kilometers (6,010 miles) from Phobos when the picture was taken. At this distance, the image resolution is about 36 meters (118 ft.) per pixel; the maximum dimension of Phobos as seen in this image (the diagonal from lower left to upper right) is just over 24 km (15 mi). This is the "trailing" hemisphere, the part of Phobos that faces opposite the direction that the moon orbits Mars. This is a part of Phobos that was not seen by MOC in 1998, when MGS made several close flybys of the tiny moon.

The rows of grooves and aligned pits on Phobos are related to, and were probably caused by, a large meteor impact that occurred on the side of Phobos that is not seen here. That large crater, Stickney, was named for the maiden name of the wife of the astronomer that discovered Phobos and the other Martian satellite, Deimos, in 1877, Asaph Hall.

MONUMENT VALLEY



Northern Terra Meridiani, near the intersection of the martian equator and prime meridian, is a region of vast exposures of layered rock. A thermal image from the Phobos 2 orbiter in 1989 showed these materials to be anomalously cool during the daytime, an observation very suggestive of dense, hardened materials like rock. Mars Global Surveyor (MGS) Mars Orbiter Camera (MOC) images of this region show layered material exposed in cliffs, buttes, and mesas that in some ways resemble the rock outcrops of northern Arizona and southeastern Utah in North America (e.g., Monument Valley, Canyonlands, Zion National Park, Four Corners).

MGS MOC Extended Mission operations have included several hundred opportunities for the spacecraft to be rolled off-nadir (i.e., at an angle other than "straight down") to take pictures that repeat earlier MOC coverage. These repeat images, because they are taken from a different angle, can be combined with the original picture to produce a stereoscopic ("3-D") view.

The image shown here is a composite of two pictures, the first taken October 23, 2000, the second acquired by pointing the spacecraft off-nadir on May 15, 2001. This view shows four

Red/Bue 3D glasses required

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buttes and a pinnacle (near left-center) composed of eroded, layered rock. The four buttes are each capped by the remains of a single layer of rock that is harder than the materials beneath it. It is the presence of this *caprock* that has permitted these buttes to remain standing after surrounding materials were eroded away. Like the buttes of Monument Valley in the Navajo Nation on the Arizona/Utah border, these are believed to consist of sedimentary rocks, perhaps deposited in water or by wind, though some scientists have speculated that they could be made of thick accumulations of volcanic ash. The image covers an area approximately 3 km (1.9 mi) across and is illuminated by sunlight from the left. To see the image in 3-D, red (left-eye) and blue (right-eye) "3-D" glasses are required.

Comparison of the Best Viking and Reduced Resolution MOC Images

In the comparison above, the best Viking image has been enlarged to 3.3 times its original resolution, and the MOC images have been decreased by a similar 3.3 times, creating images of roughly the same size. In addition, the MOC images have been geometrically transformed to a more overhead projection (different from the mercator map projection of the preceding images) for ease of comparison with the Viking image. The left image is a portion of Viking Orbiter 1 frame 070A13, the middle image is a portion of MOC frame 22003 shown normally, and the right image is the same MOC frame but with the contrast reversed (that is, light features were forced to be dark, and dark features were forced to be light) to simulate the approximate lighting conditions of the Viking image.

Malin Space Science Systems and the California Institute of Technology built the MOC using spare hardware from the Mars Observer mission. MSSS operates the camera from its facilities in San Diego, CA. The Jet Propulsion Laboratory's Mars Surveyor Operations Project operates the Mars Global Surveyor spacecraft with its industrial partner, Lockheed Martin Astronautics, from facilities in Pasadena, CA and Denver, CO. The MOS image web site is http://www.msss.com/moc_gallery/.

SUPER-MASSIVE BLACK HOLES DISCOVERED

Lurking behind clouds of dust, in galaxies far, far away, European researchers have discovered 30 previously unknown super-massive black holes. The findings suggest that there maybe between two times and five times as many of these black holes as previously thought. These black holes are consuming mass quantities of matter of their host galaxies. A giant torus of dust and gas surrounds and obscures the black hole, making detection difficult. All galaxies studied were edge-on, adding to the difficulty of black hole detection.

They were found using the Astrophysical Virtual Observatory, a database of observations from various telescopes. Data from the Hubble Space Telescope, Chandra, and the European Southern Observatory's Very Large Telescope was analyzed to produce the findings. The black holes were deduced by studying emissions in various wavelengths of the electromagnetic spectrum.

Charlie's Challenge

Charles Hudson

THIS MONTH'S CHALLENGE

In a recent address to the Society, Paul Maley described an upcoming solar eclipse as both total and annular.

Science Stumper #65: How is this possible?

Answer will be published in the August issue…

LAST MONTH'S CHALLENGE

Both Mercury and Venus can have transits as viewed from the Earth, and the frequency of these transits depend on the orbital elements of the planet. The following table summarizes some of the more important ones:

Planet	Inclination of orbit (deg)	Period of orbit (days)	Mean distance from Sun, AU
Mercury	7.00	87.970	0.387
Venus	3.39	224.70	0.723
Mars	1.85	686.98	1.524

Science Stumper #64: As seen from the Earth, are the transits of Mercury or of Venus more common? As seen from Mars, how would the frequency of transits of Earth compare with the frequency of transits of Mercury and Venus as seen from Earth?

Answer to Science Stumper #64: Mercury has transits about every 13 years with a few extra thrown in at abut 3.5 year intervals. Venus has four transits every 243 years, or an average of about one every 61 years. Thus the transits of Mercury are at least four times as common as transits of Venus.

For a transit to occur, the transiting planet must be in conjunction with the Sun. The much shorter orbital period of Mercury means that it passes between the Earth and the Sun (without necessarily being in a direct line) three times a year, while Venus does this only once every 1.6 years. The result is that Mercury has almost exactly 5 times as many conjunctions with the Sun as Venus does. When a conjunction with the Sun occurs, then there is a certain probability of a transit, if the ratio of the periods of the planet and of Earth is irrational. This probability depends on two things: the distance of the planet from the Sun and the inclination of the orbit of the planet. The inclination matters, because the smaller the inclination is, the less stringent the requirement is that both the Earth and the transiting planet be in the line of nodes With a smaller inclination, Venus has the edge by that criterion.

The distance to the planet also matters. One way to think about this is to ask, while the Earth is in the line of nodes, is the transiting planet within the cone whose dimensions are defined by the diameter of the Sun at one end and by the diameter of the Earth at the other. Obviously, the closer the transiting planet is to the Sun, the more likely the planet is to be within the cone.

It is not completely clear whether an observer on Mars is more or less likely to observe a Transit of Earth than an Earth based observer is to observe a transit of Venus. Inferior conjunctions occur less frequently, once every 2.1 years with Mars. Besides that, the Sun's diameter, as seen from

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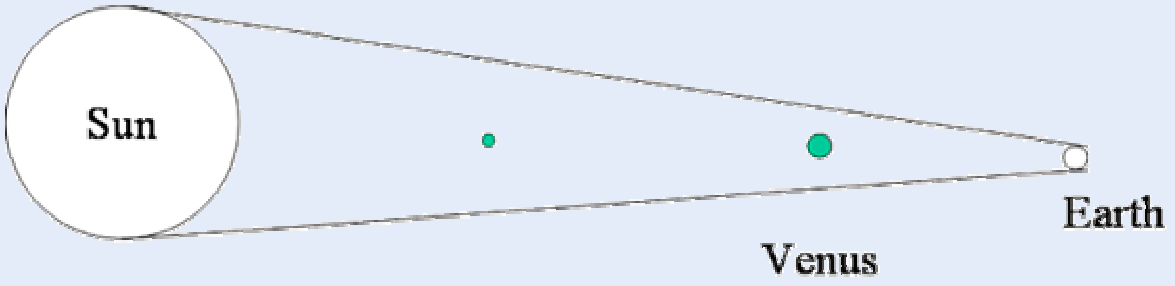
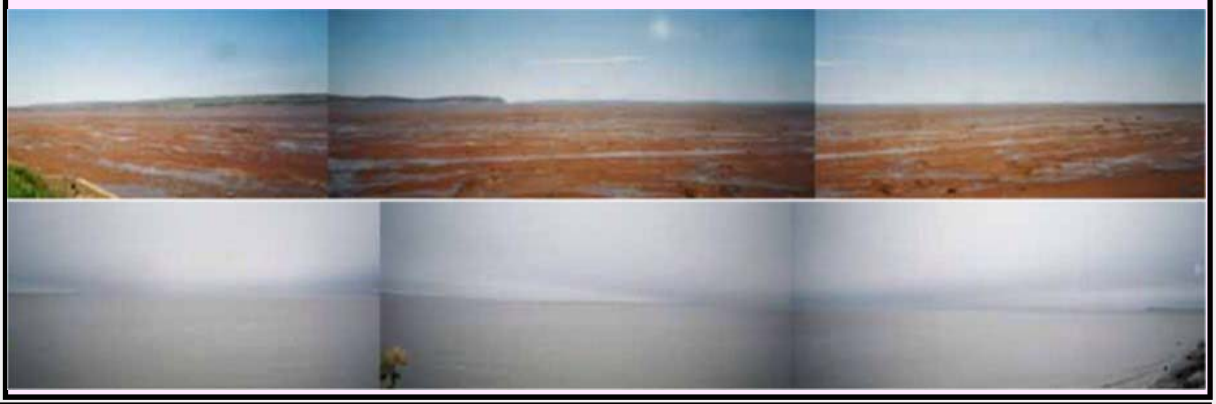
Mars, is only about one third of a degree as compared to half a degree as seen from the Earth. Thus, the cone is narrower. Counterbalancing those effects is the smaller obliquity of Mars' orbit.



Venus Transit From Nova Scotia

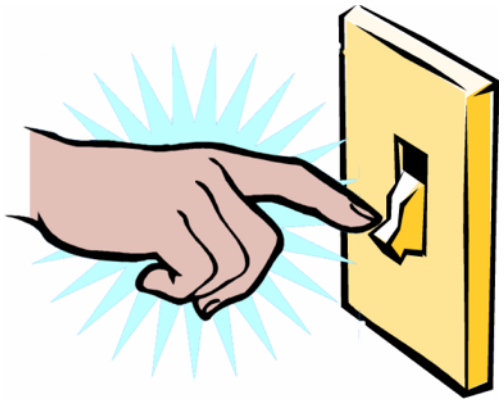
Kelley Knight

The June 8th transit of Venus across the Sun was clouded out in Nova Scotia. JSCAS members Kelley Knight and Scott Ewart along with well known Houston amateur astronomers Buster and Barbara Wilson, had traveled to Nova Scotia to witness this rare event. The Blomidon View Motel was home to Kelley Knight during her attempt to view the Venus transit from Grand Pré. Grand Pré is on the coast of the Minas Basin, which is the eastern extremity of the Bay of Fundy. The highest tides on Earth occur in the Minas Basin where the average tide range is 12 meters with a maximum range of 16 meters. Kelley took this series of photos to show the extreme range of tides. The bottom series of images also illustrates how bad their luck was on the day of the transit.



Help turn off the lights...

Join the
International Dark-Sky Association (IDA)
http://www.darksky.org
"To preserve and protect the nighttime environment and our heritage of dark skies through quality outdoor lighting."



Astronomy 101

Protecting Your Scope in the Field

Ken Lester

As amateur astronomers, we have the opportunity to attend some really great star parties, spanning multiple days, and joined by dozens to hundreds of our fellow astronomers. If you attend one of these star parties, you will want to come prepared to leave your telescope equipment assembled throughout the duration of the star party. Assembling and disassembling your equipment each day gets very tiring, especially if you have equipment which must be precisely polar aligned with every use.

The question then is what preparations need to be made so you can leave your scope assembled the entire trip? To answer that question you must ask yourself, what am I protecting my equipment from? The main things that you need to protect your telescope from are:

- Dust
- Rain/moisture
- Sun/heat

There is another consideration, but I'll get to it a little later.

Some star parties, like the Texas Star Party (TSP), are held in very dusty environments. There is no way to protect your equipment from dust while you are using your scope. However, you can minimize the dust accumulation by keeping your equipment covered during down times. I'm not saying you need to cover things up when you take a coffee break. That's not practical. However, when you quit for the night, you will want to cover your scope up.

Even in far west Texas, there is the possibility of rain and dew, so you will want to protect your equipment from moisture. Again, cover the scope when not in use. You will also want to protect your electronic components by unplugging the A/C power cords from the power source. A good rain storm could accumulate water around your extension cord plugs enough to short out electronics.

Unless you are observing the Sun, keep your equipment covered during the day. You will want to reduce the amount of heat that can buildup in mirrors, and optical tubes as much as possible. Hot mirrors can physically distort, giving poor images. The cooler you can keep your telescope, the faster it will cool down at night and the quicker you will have distortion free viewing. A proper cover will keep your telescope cool during the day.

From the above discussions, you can see that covering your telescope will protect it from dust, heat and moisture. Now the question is, with what should I cover my telescope? The cover you select should address each of the three things from which you want to protect your scope. You could put a portable canopy over your telescope. That would keep out the rain and Sun, but would do nothing for the dust. No you will want to completely cover your scope with a fitted cover or a tarp.

There are several commercially available telescope covers. The "Desert Storm" reflective Mylar covers are best at reflecting the Sun's rays. They also protect against rain and dust. A white or blue cover made from denier polyurethane coated nylon works well against the Sun, rain, and dust. Check out AstroSystems (http://www.astrosystems.biz/) and Telescope: Cases and Covers (http://www.casesandcovers.com/) for commercial telescope covers.

If you want to avoid the cost of the commercially available covers, then consider getting a large tarp. Be sure it's large enough to fully cover the scope. You can use bungee cords or rope to secure the

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tarp. A white or silver tarp is best for reflecting the Sun's rays. Dark materials will absorb the Sun's heat and are to be avoided. If possible, select a waterproof or water resistant material that will "breath". This will prevent moisture buildup.

A clear plastic drop cloth will do nothing to keep heat out. In fact, it can actually have a green house effect, raising the temperature under the cover. It can also cause condensation, something to be avoided.

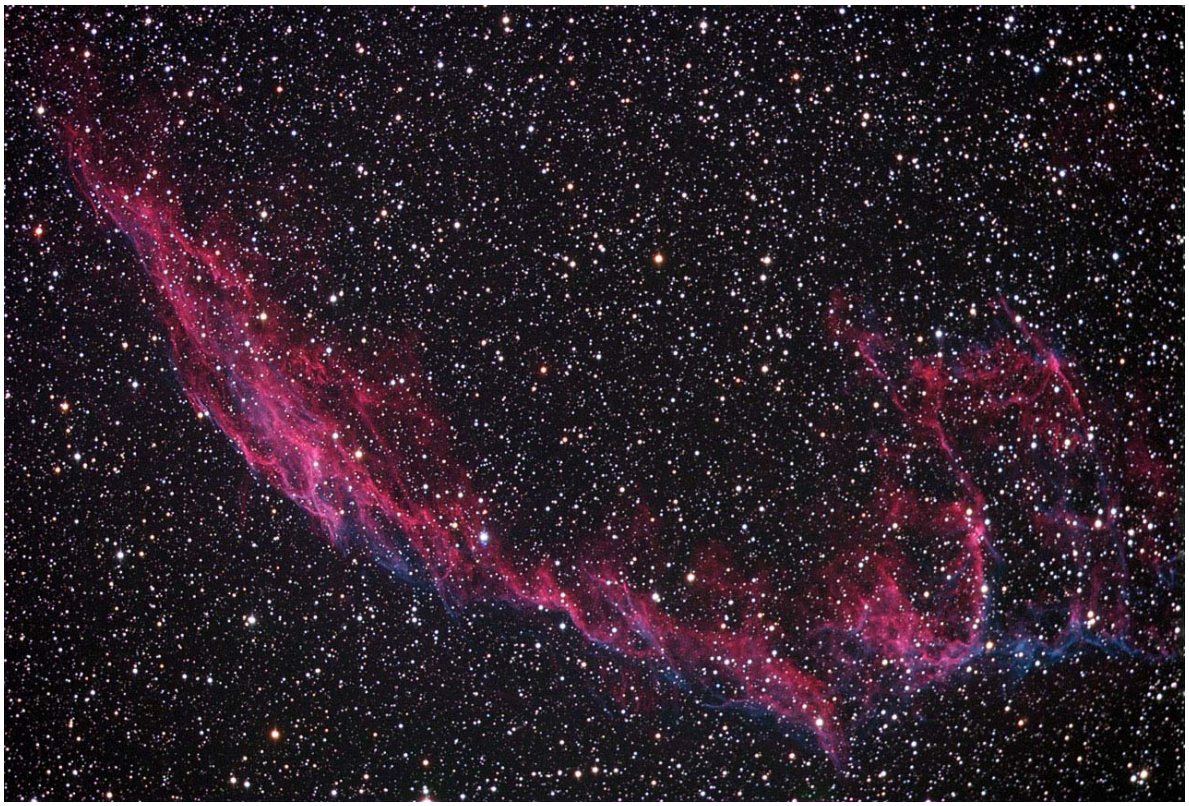
Besides dust, heat, and moisture, there is another concern for protecting your scope in the field. A sudden and powerful gust of wind can blow over even large telescopes. TSP is famous for its dust devils that can knock over telescopes. If your telescope is on a tripod, anchor it to the ground with ropes and stakes. If you have a large Dobsonian, store the tube horizontally then secure the end of the tube to the ground with a stake and rope to prevent the tube from being wiped around in the wind.

Finally, If the weatherman predicts severe storms, go ahead and disassemble your equipment and store it in a safe, dry place. Its better to be safe than sorry.

Avoid heat absorbing dark colors (left and above left). In the picture above, the back half of this scope is properly covered with a breathable denier polyurethane coated nylon. The front have is covered with clear plastic, which promotes heat and condensation. Do not use clear plastic to cover your scope!

These two scopes are properly covered. The scope cover on the left is made of denier polyurethane coated nylon. The one on the right is reflective Mylar.

MEMBER'S GALLERY



Veil Nebula in Cygnus
Randy Brewer©

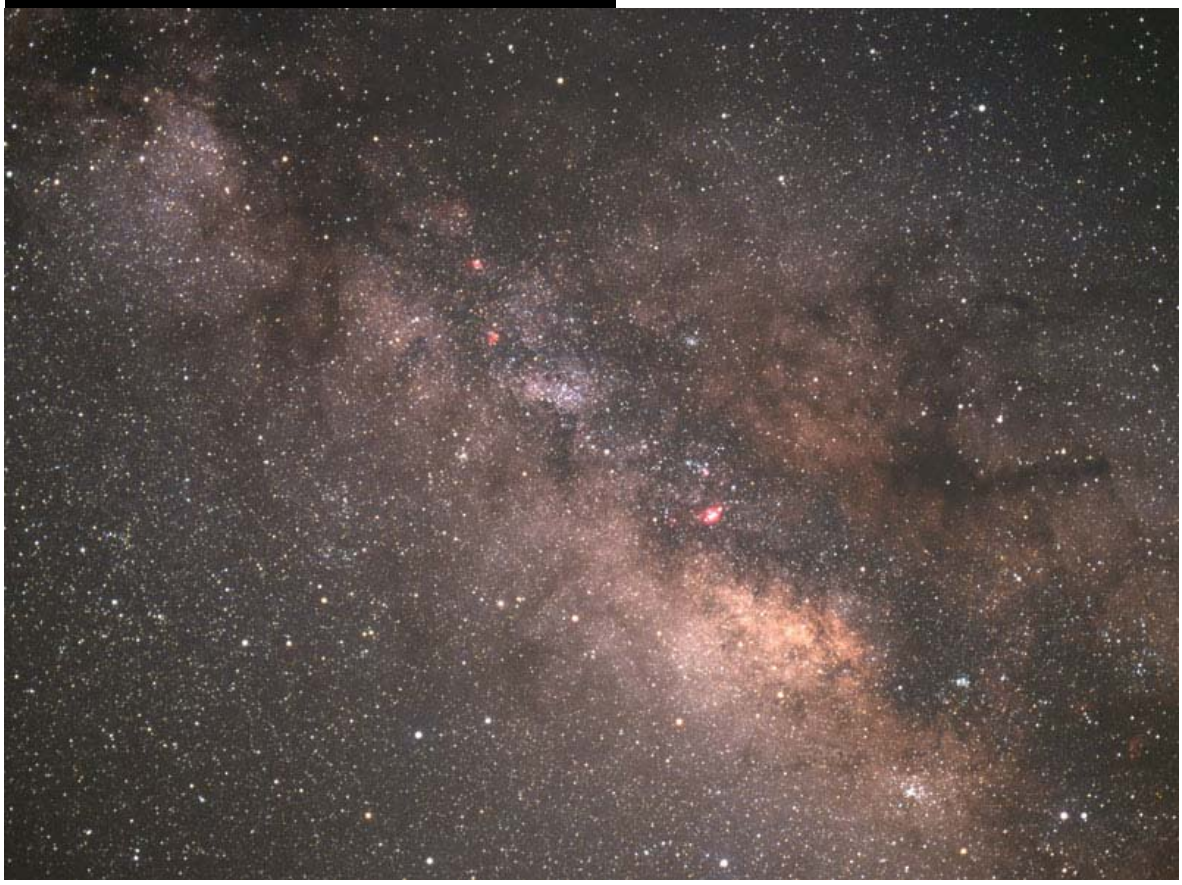
Taken on May 17, 2004 from TSP 2004 in Ft. Davis with the FCT-150 @ F/5. LRGB = (60:15:15:15) minutes.

Centaurus A — NGC 5128
Randy Brewer©

"This is really cool galaxy just above Omega Centauri. I quickly grabbed this image of it just before packing my scope and leaving TSP. One of these days I will shoot it long and deep to get a better image of it." Taken from TSP 2004 in Ft. Davis on May 22, 2004 with the FCT-150 @ F/5. LRGB = (15:15:15:15) minutes.

Largest Full Moon of 2004
Becky Ramotowski©

Three digital images stacked. Contrast and cropping done in Photo Shop.



Sagittarius Region of the Milky Way
Shane Ramotowski©

This photo was taken on May 21, 2004 at Ft. Davis, Texas during the Texas Star Party. It was a 30 minute exposure with a Mamiya 645 Pro TL with 80mm f/2.8 lens (at f4.0) on Fuji Provia 400 slide film (medium format 645). RGB histograms equalized in VueScan, Levels equalized in Photoshop.

Tour de Forts

Ken Lester

Mark Stine of the Texas Bicycle Coalition organized the first annual Tour de Forts, a Fort McKavett to Presidio de San Saba bicycle tour held on June 12th. The event was to featured a star party at Fort McKavett after the ride on Saturday night. The star party was organized by Ken Fraley, a regular attendee of our JSCAS Fort McKavett events.

In anticipation of a good turn out of bicyclists, Ken asked for some back up support from JSCAS members. Matt Hommel, myself and my wife Lisa decided that some dark skies were in order and agreed to help. On Thursday before the event, we heard that there were only 8 cyclists signed up for the ride. The weather forecast for the Fort McKavett area predicted severe storms on Saturday night. Since Matt and his family were only going to be there the one night, he wisely bowed out. However, to satisfy our lust for adventure, Lisa and I still made the trip.

Not being satisfied with just a trip to the fort, we stopped off in Fredericksburg on Friday to eat German food, shop and tour the Wildflower Farm just east of town. We picked up some very different door prizes for our next JSCAS meeting. **Must be present to win.**

Friday evening, the sky was clouded over and it didn't look good for observing. However, as so often happens at the fort, the clouds cleared off at dusk and we had a really nice evening of viewing. The small number of cyclists showed great enthusiasm for their astronomical tour of the heavens. Between Ken Fraley's 8" Coulter and Lisa's 16" Dob, we gave a really great star party. We started with the multiple star systems Albireo, the double-double in Lyra, the quadruple star Nu Scorpii, and Mizar and Alcor in the handle of the big dipper. They were shown the globular clusters Omega Centauri, M13, M5, and M4. We added M57, the Ring Nebula, and some galaxies, M51 and the Leo Triplet. I pointed out the "white cloud" coming out of the teapot of Sagittarius. There were some who had never seen the Milky Way. They were awed by the Lagoon and Omega nebulas. They even got to see Jupiter and the Galilean moons.

After the cyclists retired for the evening, the astronomers continued to observe until about 1 AM. We were joined by Leslie Logan and her two boys who had arrived at dusk to spend some relaxing time at the fort. The seeing was fairly steady and the sky was clear. A very light breeze kept us cool but didn't effect the observing. It was one of the better nights at the fort. We really hated to retire, but it had been a long day.

The Friday night star party wasn't on the official schedule of the biking event. However, it's fortunate that we had good weather, because Saturday night a front did blow through. There were powerful guts of wind, lightning, some rain, and complete cloud cover. Die hard Ken Fraley, said that after the front blew through at 3 A.M. if cleared off nicely. By that time, I was fast asleep.

Mark Stine says this will be an annual event. Next year's event promises to have even more riders. A star party will continue to be a part of the event.

Star Party News

Lisa Lester

Saturday, June 19, 2004 was a busy day for JSCAS club members! First there was the LPI Family Space Day Solar event. Chris Randall, Ed & Eleta Malewitz, and Dolly & Randy Brewer all showed up with scopes to show the Sun to everyone. Ken & I came and talked to people and helped with the scopes but we never set up our scope. Later, Lisa and Matt Hommel arrived with their two girls. The girls enjoyed all of the hands on activities that LPI had to offer and while seasoned observers of the night sky; this was their first opportunity to do any solar observing! They know to take your time at the eyepiece and that encouraged others to take their time and really look at the detail in the sunspots. It was very hot but we got smart and came inside the Great Room to cool off between groups of observers. The number of visitors was less than their previous events but it was Father's Day weekend. LPI took care of us by providing plenty of cold water and they had Blue Bell ice cream for everyone! The next Family Space Day will be on July 17th from 10:00 until 2:00pm and the theme will be Rockets. If you know anything about rockets and would like to help, let me know and I'll get you in touch with the right person at LPI.

LPI Space Day

Above, (L to R) Ken Lester, Lisa Lester, Chris Randall, Dolly Brewer, Randy Brewer, Eleta Malewitz, and Ed Malewitz. Photo by LPI staff

Above right, children lined up to see the sun spots. Photo by Matt Hommel

Right, inside LPI's inflatable planetarium. Photo by Matt Hommel

Later that same day, it was time for a road trip to Galveston. We had our first successful Public Star Party of the year at Moody Gardens! Ken and I loaded up two scopes and headed down to our new site with plenty of electrical cords! Ed & Eleta and the Hommels came to their second event of the day too. Bob Taylor, Drel Seltzer, John Gorduk, the Nickels, and three people who I'm sorry to say I can't recall their names were also there! Luckily, Eleta took on Chris Randall's job of getting people to sign in & then later jot down what they observed. We had a great crowd of interested observers! At first, everyone was showing Jupiter with its bands & the Galilean moons. Of course Jupiter is always a crowd pleaser but that night it was extra special. Not only was the Great Red Spot visible but also three of the moons were on one side of the planet in a triangular shape instead of their normal line. As the night progressed, those who stayed and revisited Jupiter could see the moons

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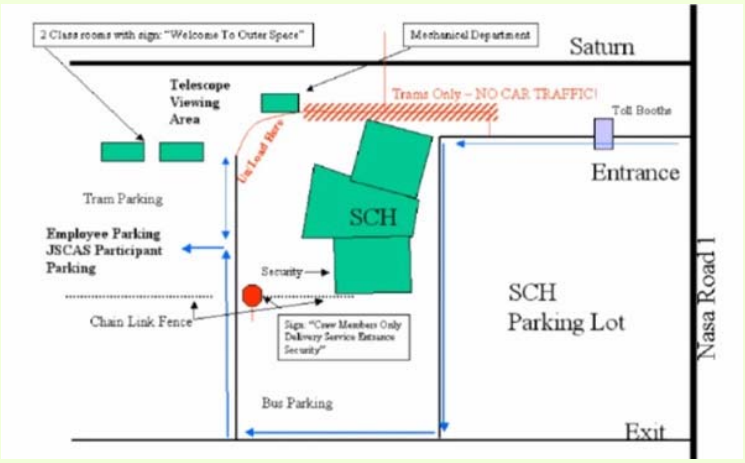
moved into a line. Everyone clapped when the crew at Moody Gardens was able to turn out the lights on the nearby road and the skies became a lot darker! Some of the other objects that the public was able to observe were Comet Neat, Alberio, M13, M57, the Double Double in Lyra, and the Double Star in the Handle of the Big Dipper (Alcor & Mizar). Everyone was having such a great time that there were still people wanting to observe at 11:00pm! Best of all, there were very few mosquitoes to bother observers and even though it had rained the ground was firm and dry.

In July, we have one event scheduled. It will be Tuesday, July 13th at Space Center Houston. This is a private star party for the LiftOff 2004 Conference. They will have 30 middle and high school teachers attending the conference from 7 states. The star party will be located on the hill behind Space Center Houston. We should plan to arrive between 8:15pm and 8:45pm depending on how long it takes different people to set up their equipment. The sun sets just before 9:00. This would give people time to come out at dusk and start talking to JSCAS members about the equipment and astronomy while waiting for the stars to come out! I'm working with maintenance at Space Center Houston to get the electricity set up as we have done in the past. Ken will be there with the electrical cords but I have two big events on my plate that day so I hope that some of you will be able to join Ken in sharing our love of astronomy with these teachers so that they can hook more students into becoming observers. We planned a star party for conference participants last year but got rained out. Hopefully that won't happen again this year.



Houston Area Astronomy Clubs

Brazosport Astronomy Club
Meets the Third Tuesday of the month, 7:45PM
At the Planetarium
400 College Drive
Clute, Texas
For more information, contact Judi James at the Planetarium
979-265-3376

Fort Bend Astronomy Club http://www.fbac.org/
Meets the third Friday of the month, 7:00 p.m.
First Colony Conference Center
3232 Austin Pkwy
Sugar Land, Texas

Houston Astronomical Society http://spacsun.rice.edu/~has/
Meets the first Friday of the month, 8:00 p.m.
University of Houston, University Park
Science and Research Building, room 117

North Houston Astronomy Club http://www.astronomyclub.org/
Meets the fourth Friday of the month, 7:30 p.m.
In the Teaching Theater at Kingwood College
20000 Kingwood Drive
Kingwood, Texas

Visual Observing

Chris Randall

★ **SSO**: (Solar System Objects) Summary for the 15 July 04

Object	Const	Mag	% Ill	Rise Time	Transient	Set Time
Sun	Gem	-26.7	100	06:31	13:26	20:21
Moon	Gem	--	2	04:40	12:02	19:26
Mercury	Leo	0.0	62	08:29	15:09	21:52
Venus	Tau	-4.5	28	03:55	10:38	17:22
Mars	Cnc	1.8	99	08:08	14:52	21:39
Jupiter	Leo	-1.8	99	10:36	16:53	23:14
Saturn	Gem	0.9	100	06:07	13:02	20:00
Uranus	Aqr	5.7	100	22:41	04:19	09:58
Neptune	Cap	7.8	100	21:31	02:54	08:17
Pluto	Ser	13.8	99	17:34	23:06	04:35
2001 Q4 Neat	Uma	6.3	91	06:15	16:37	03:03
2003 K4 Linear	Boo	6.8	90	12:49	20:38	04:24
2004H6 Swan	Cet	8.1	87	00:40	06:14	11:48

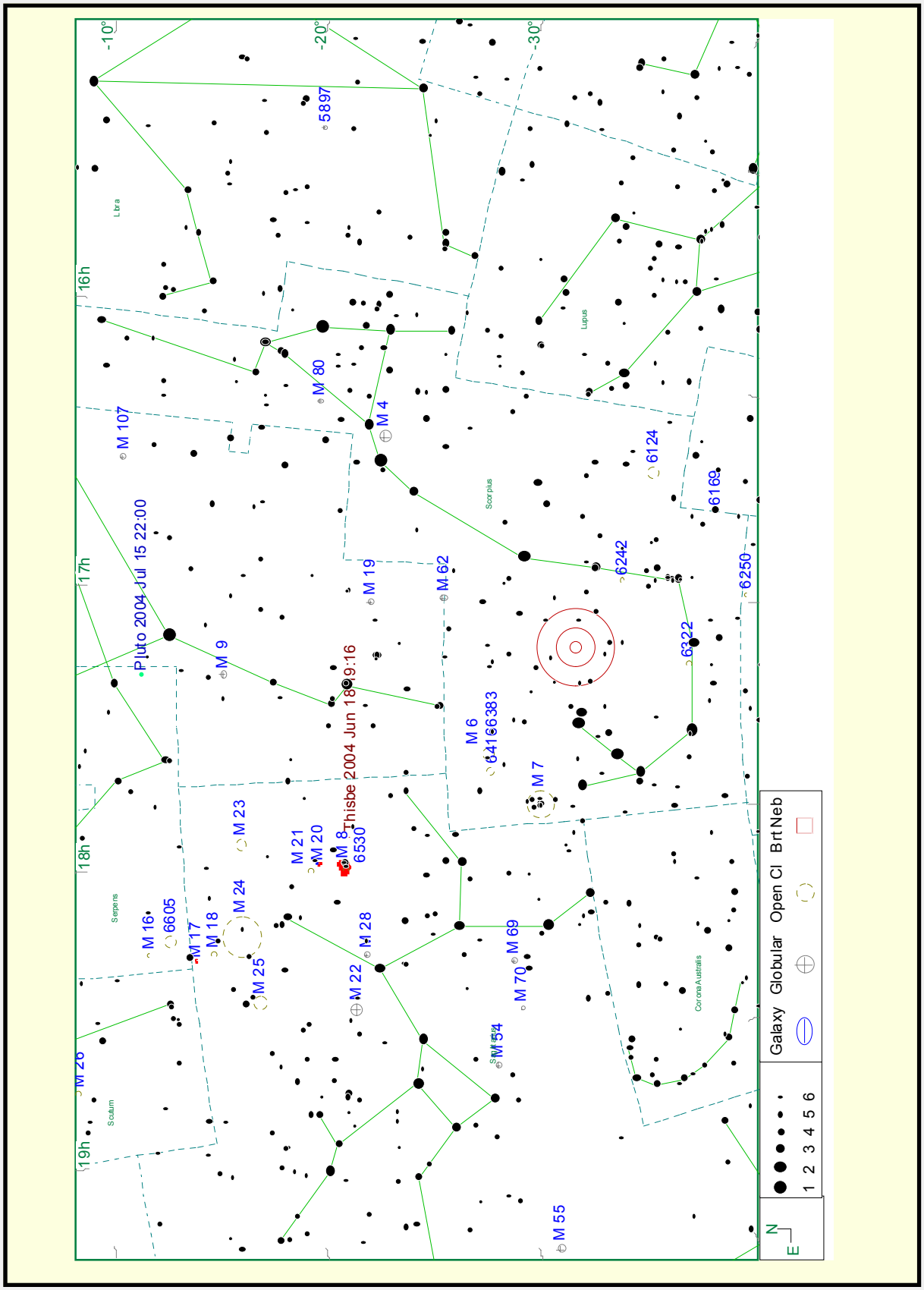
Highlighted times denote daylight events.

★ **BSO**: (Bright Sky Objects)
NGC 6475 (M 7, Cr 354) – Open Cluster in Scorpius, Magnitude 3.3, Size 80'.
IC 4665 (Cr 349, Mel 179)– Open Cluster in Ophiuchus, Magnitude 4.2, Size 40'.
NGC 6405 (M 6, Cr 341, Butterfly Cluster) - Open Cluster in Scorpius, Magnitude 4.2, Size 30'.
NGC 6124 (C 75, Cr 301, Mel 145) – Open Cluster in Scorpius, Magnitude 5.8, Size 29'.

★ **DSO**: (Dark Sky Objects)
NGC 6543 (C 6, Cat's Eye Nebula) – Planetary Nebula in Draco, Magnitude 8.8, Size 20".
NGC 6210 – Planetary Nebula in Hercules, Magnitude 9.3 (P), Size 30".
IC 4593 – Planetary Nebula in Hercules, Magnitude 10.9 (P), Size 30".
NGC 6341 (M 92) – Globular Cluster in Hercules, Magnitude 6.5, Size 14'.

★ **CDMP:** (Chris' Don't Miss Pick)
NGC 6302 (C 69) - Bug or Bipolar Nebula — Is a Planetary Nebula in Scorpius, Magnitude 9.6 (v), and Size 85" x 44". It lies about 4,000 light-years away in the Scorpius. With an estimated surface temperature of about 250,000 degrees C, the central star of this particular planetary nebula is exceptionally hot though -- shining brightly in ultraviolet light but hidden from direct view by a dense torus of dust. Cutting across a bright cavity of ionized gas, the dust torus surrounding the central star is nearly edge-on to the line-of-sight. Surprisingly, minerals including water ice, along with complex hydrocarbon molecules have been detected in this hot star's dusty cosmic shroud.

NGC6302 Al Kelly©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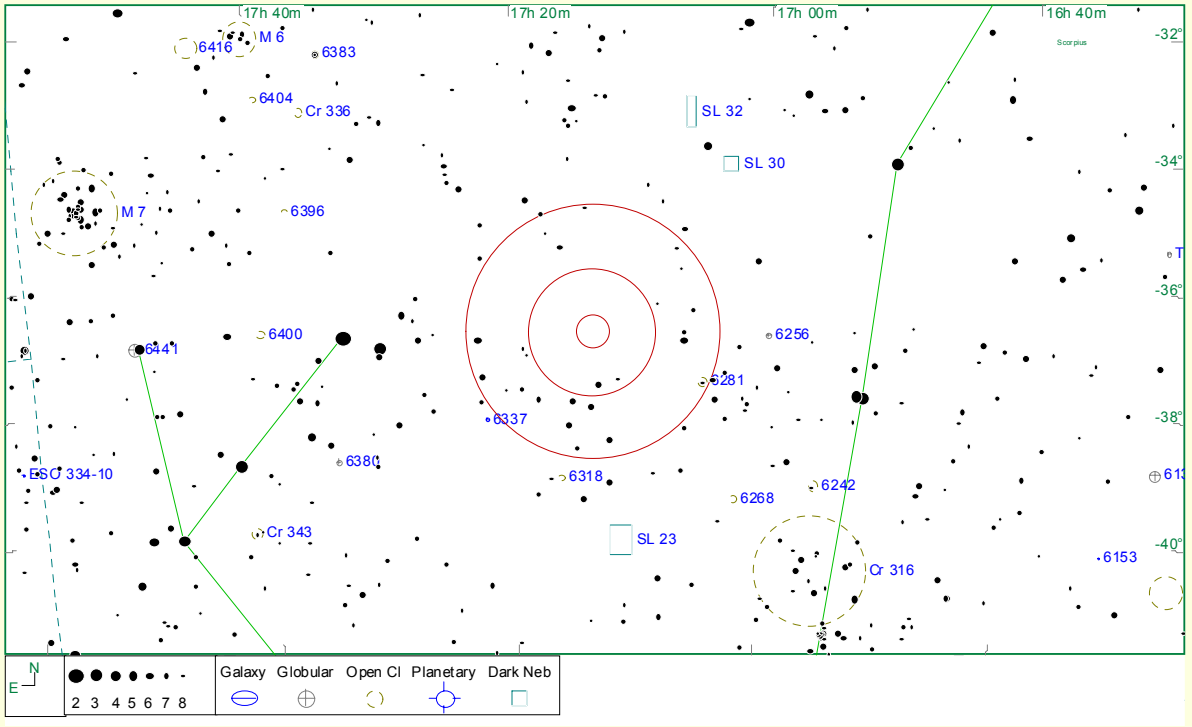
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M 7
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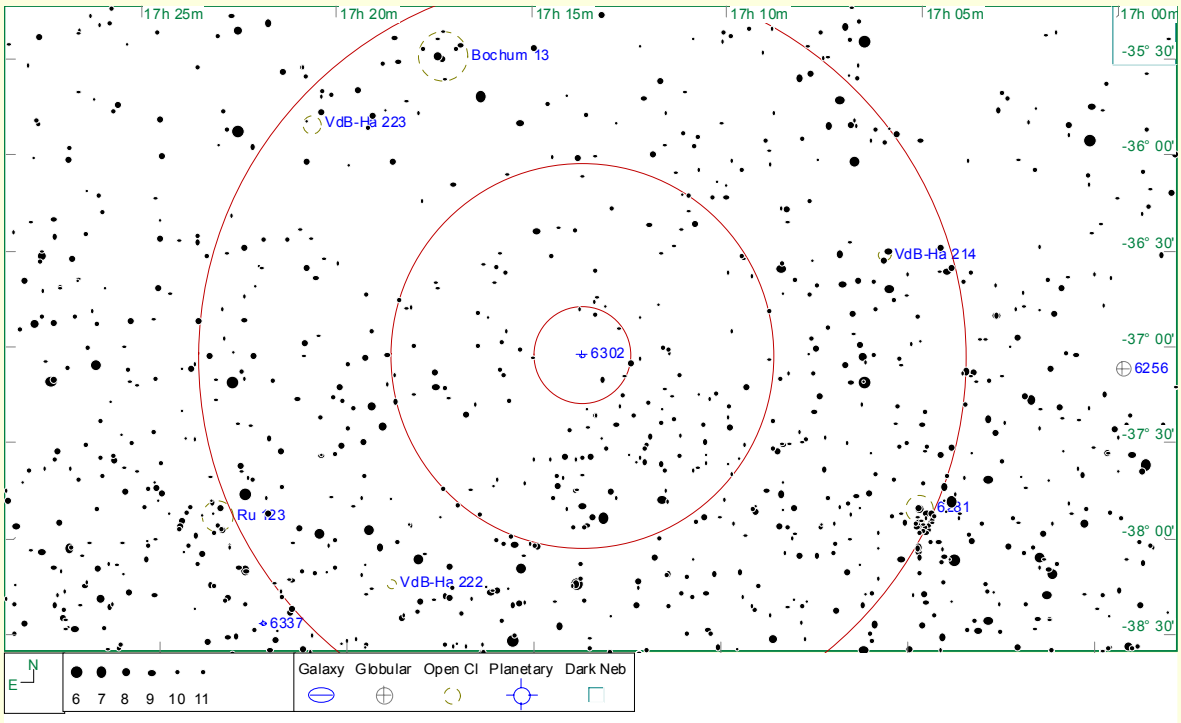
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Stolen

AAS member Al Arduengo, who is in the process of moving his family to Dallas, had his truck broken into Sunday night. They didn't break out a window but somehow popped a door lock. They were probably after his satellite radio, which they got out of the dash. Unfortunately they also took a shiny Orion aluminum eyepiece case which contained every optical aide that he had. The case included:

1. 19mm Televue Panoptic
2. 40mm Celestron
3. 31mm Celestron Ultima
4. Celestron Ultima Barlow
5. 12.5mm Meade
6. Meade 1 1/4" diagonal

All eyepieces are 1 1/4". He had his Meade 10" LX200 in there also but they didn't touch it (probably too big & heavy). Al doesn't have e-mail right now but you can contact him at 214-498-1686 in case you see something like this in an area pawn shop.

Upcoming Events

CENTRAL TEXAS STAR PARTY: August 13th and 14th. A free star party for amateur astronomers held at the Eagle Eye Observatory, Canyon of the Eagles Lodge and Nature Park, Lake Buchanan, Texas. Hosted by the Austin Astronomical Society. The event features a talk by Russell Croman, astrophotographer. Other activities include observing challenges, door prizes, and skies filled with the Summer Milky Way. For more information visit the Austin Astronomical Society web site at http://austinastro.org/ctsp.html.

OKIE-TEX STAR PARTY: The 21st annual Okie-Tex Star Party will be held October 9-17 at Camp Billy Joe, Kenton, Oklahoma. Sponsored by the Oklahoma City Astronomy Club, activities include speakers Brian Lula and Dick Parker, vendors, door prizes and dark sky observing. For more information contact Larry Beatty, ldbeatty@aol.com or to register, go to http://www.okie-tex.com.

Member Recognition

©Becky Ramotowski

Becky Ramotowski had two images of a double Sun halo published on June 1st on SpaceWeather.com .

Ed Grafton was credited for his reporting of a July 29th, 2003, Martian dust cloud near Nilokeras in an article by Donald C. Parker, *The 2003 Apparition of Mars*, that appeared in the August 2004 issue of *Sky & Telescope*.

Scott Ewart, the JSCAS ambassador to Philadelphia, had his letter to the Sky & Telescope editors published in the August 2004 issue. Scott was commenting about the magazine's new format that eliminated the Jupiter moon and red spot event lists that were so useful. There was no response by the editors to his comments.

Johnson Space Center Astronomical Society

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July Meeting Agenda

July 9th. Center for Advanced Space Studies/Lunar Planetary Institute, 3600 Bay Area Blvd. (at Middlebrook Drive).

7:30	Meeting start and welcome
7:40	Presentation—
8:30	Break
8:45	Calendar review, presentations, and awards
8:50	Star Party Announcements, Lisa Lester
9:10	Deep Sky Observing, Chris Randall
9:30	Astronomical Oddities, Hernan Contreras
9:40	Charlies Challenge, Charles Hudson
9:50	Door Prizes

Starscan Submission Procedures

Original articles of astronomical interest will be accepted up to 6 P.M. July 25th.

The most convenient way to submit articles or a Calendar of Events is by electronic mail, however computer diskettes or CDs will also be accepted. All articles should include author's name and phone number. Also include any picture credits. The recommended format is Microsoft Word. Text files will also be accepted.

Submitter bears all responsibility for the publishing of any e-mail addresses in the article on the World Wide Web.

Editor's electronic address is: lesteke@swbell.net. Be sure to include the word Starscan in the subject line for proper routing of your message.

Starscan Staff

Editor
Ken Lester

Assistant Editors
Sheila Steele
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Cover Image by
Omega Centauri - NGC 5139
Randy Brewer©

According to Randy "The BIG globular!!! This was only 11 degrees above the horizon when I shot it. I normally never shoot anything under about 35 degrees due to associated problems (bad seeing, color distortion, etc.)" Taken on May 22, 2004 from TSP 2004 in Ft. Davis with the FCT-150 @ F/5. RGB = (20:20:20) minutes.