



Astronomy Club News

December, 2003

John Kocijanski, Editor

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John Kocijanski,	Vice President
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A makeup observation session was held on November 22nd in place of the canceled session on November 1st. Six members attended. Howie Glatter brought his newly acquired 18 inch Obsession dobsonian reflector. The large scope gave some fantastic views of many deep sky objects including the galaxies M31, M74, M33, M81, M82, NGC 891, and NGC 253. Howie's scope is pictured below. Many open clusters were also viewed including M36, M37, and M38 in Auriga. Mars and Saturn were viewed as well. Mars showed a gibbous phase. The polar cap and dark areas were seen despite its diminished size. As Saturn rose higher in the sky it was easily to see it details. Cassini's Division and some cloud bands were easily seen.



The November 29th observation session was cancelled due to cloudy skies.

The next December club observation session after the 20th is on the 27th at Walnut Mountain.

Anyone interested in submitting an astronomical observation or photograph for the newsletter, please contact John at kocis@verizon.net.

Each month the photo section of our newsletter will highlight the telescopes and equipment of club members. If you have a photo of your scope or equipment and a brief description of it that you would like to contribute please send it to John at kocis@verizon.net.

The club has selection of astronomy books, a Macintosh computer with astronomy software, and a Meade eight inch reflector for members to borrow. Please contact John at 791-5240 or kocis@verizon.net if you are interested in borrowing any of these.

Astronomy News:

Here are some articles from various NASA sources that might be of interest.

Whitney Clavin (626) 395-1877
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News Release: 2003-154 Nov. 21, 2003

Final Death Throes of Nearby Star Witnessed First-Hand

It takes only a few hundred to a thousand years for a dying Sun-like star, many billions of years old, to transform into a dazzling, glowing cloud called a planetary nebula. This relative blink in a long lifetime means that a Sun-like star's final moments - the crucial phase when its planetary nebula takes shape - have, until now, gone undetected.

In research reported in the Nov. 20 issue of Nature, astronomers led by Dr. Raghvendra Sahai of NASA's Jet Propulsion Laboratory, Pasadena, Calif., have caught one such dying star in the act. This nearby star, called V Hydrae, has been captured by the Space Telescope Imaging Spectrograph onboard NASA's Hubble Space Telescope in the last stages

of its demise, just as material has begun to shoot away from it in a high-speed jet outflow.

While previous studies have indicated the role of jet outflows in shaping planetary nebulae, the new findings represent the first time these jets have been directly detected.

“The discovery of a newly launched jet outflow is likely to have a significant impact on our understanding of this short-lived stage of stellar evolution and will open a window onto the ultimate fate of our Sun,” said Sahai.

Other institutions contributing to this paper include: University of California, Los Angeles; Princeton University, Princeton, New Jersey; Harvard-Smithsonian Center for Astrophysics, Cambridge, Massachusetts; and Valdosta State University, Valdosta, Georgia.

Low-mass stars like the Sun typically survive around ten billion years before their hydrogen fuel begins to run out and they start to die. Over the next ten to hundred thousand years, the stars slowly eject nearly half of their mass in expanding, spherical winds. Then - in a poorly understood phase lasting just 100 to 1,000 years - the stars evolve into a stunning array of geometrically shaped glowing clouds called planetary nebulae.

Just how these extraordinary “star-clouds” are shaped has remained unclear, though Sahai, in several previous papers, put forth a new hypothesis. Based on results from a recent Hubble Space Telescope imaging survey of young planetary nebulae, he proposed that two-sided, or bipolar, high-speed jet-like outflows are the primary means of shaping these objects. The latest study will allow Sahai and his colleagues to test this hypothesis with direct data for the first time.

“Now, in the case of V Hydrae, we can observe the evolution of the jet outflow in real-time,” said Sahai, who together with his colleagues will study the star with the Hubble Space

Telescope for three more years.

The new findings also suggest what may be driving the jet outflows. Past models of dying stars predict that accretion discs - swirling rings of matter encircling stars - may trigger jet outflows. The V Hydrae data support the presence of an accretion disc surrounding, not V Hydrae itself, but a companion object around the star. This companion is likely to be another star or even a giant planet too dim to be detected. The authors have also found evidence for an outlying large dense disc in V Hydrae, which could enable the formation of the accretion disc around the companion.

Further support in favor of a companion-driven jet outflow comes from the scientists' observation that the jet fires in bursts: because the companion orbits the star in a periodic fashion, the accretion disc around it is expected to produce regular spurts of material rather than a steady stream. The Space Telescope Imaging Spectrograph is managed by NASA's Goddard Space Flight Center in Greenbelt, Maryland. The Hubble Space Telescope is a project of international cooperation between NASA and the European Space Agency. The California Institute of Technology, Pasadena manages JPL for NASA.

-end-

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News Release: 2003-151 November 13, 2003

Delta-like Fan on Mars Suggest Ancient Rivers were Persistent



Newly seen details in a fan-shaped apron of debris on Mars may help settle a decades-long debate about whether the planet had long-lasting rivers instead of just brief, intense floods.

Pictures from NASA's Mars Global Surveyor orbiter show eroded ancient deposits of transported sediment long since hardened into interweaving, curved ridges of layered rock. Scientists interpret some of the curves as traces of ancient meanders made in a sedimentary fan as flowing water changed its course over time.

"Meanders are key, unequivocal evidence that some valleys on early Mars held persistent flows of water over considerable periods of time," said Dr. Michael Malin of Malin Space Science Systems, San Diego, which supplied and operates the spacecraft's Mars Orbiter Camera.

"The shape of the fan and the pattern of inverted channels in it suggest it may have been a real delta, a deposit made where a river enters a body of water," he said. "If so, it would be the strongest indicator yet Mars once had lakes."

Malin and Dr. Ken Edgett, also of Malin Space Science Systems, have published pictures and analysis of the landform in today's online edition of Science Express. The im-

ages with captions are available online from the Mars Orbiter Camera team, at http://www.msss.com/mars_images/moc/2003/11/13/ and from NASA's Jet Propulsion Laboratory, Pasadena, Calif., at <http://photojournal.jpl.nasa.gov/catalog/PIA04869> .

The fan covers an area about 13 kilometers (8 miles) long and 11 kilometers (7 miles) wide in an unnamed southern hemisphere crater downslope from a large network of channels that apparently drained into it billions of years ago.

“This latest discovery by the intrepid Mars Global Surveyor is our first definitive evidence of persistent surface water,” commented Dr. Jim Garvin, NASA's Lead Scientist for Mars Exploration, NASA Headquarters, Washington, D.C. “It reaffirms we are on the right pathway for searching the record of martian landscapes and eventually rocks for the record of habitats. Such localities may serve as key landing sites for future missions, such as the Mars Science Laboratory in 2009,” continued Garvin. “These astounding findings suggest that “following the water” with Mars Global Surveyor, Mars Odyssey, and soon with the Mars Exploration Rovers, is a powerful approach that will ultimately allow us to understand the history of habitats on the red planet.”

No liquid water has been detected on Mars, although one of the previous major discoveries from Mars Global Surveyor pictures suggests that some gullies have been cut in geologically recent times by the flow of ephemeral liquid water. Another NASA orbiter, Mars Odyssey, has discovered extensive deposits of near-surface ice at high latitudes. Mars' atmosphere is now so thin that, over most of the planet, any liquid water at the surface would rapidly evaporate or freeze, so evidence of persistent surface water in the past is also evidence for a more clement past climate.

Malin and Edgett estimate that the volume of material in the delta-like fan is about one-fourth the volume of what was

removed by the cutting of the upstream channels. Their analysis draws on information from Mars Global Surveyor's laser altimeter and from cameras on Mars Odyssey and NASA's Viking Orbiter, as well as images from the Mars Orbiter Camera.

"Because the debris in this fan is now cemented, it shows that some sedimentary rocks on Mars were deposited by water," Edgett said. "This has been suspected, but never so clearly demonstrated before."

The camera on Mars Global Surveyor has returned more than 155,000 pictures since the spacecraft began orbiting Mars on Sept. 12, 1997. Still, its high-resolution images cover only about three percent of the planet's surface. Information about Mars Global Surveyor is available on the Internet at <http://mars.jpl.nasa.gov/mgs>.

JPL, a division of the California Institute of Technology, Pasadena, manages Mars Global Surveyor for NASA's Office of Space Science in Washington. JPL's industrial partner is Lockheed Martin Space Systems, Denver, which developed and operates the spacecraft. Malin Space Science Systems and the California Institute of Technology built the Mars Orbiter Camera. Malin Space Science Systems operates the camera from facilities in San Diego.

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News Release: 2003-145 November 5, 2003

Voyager Spacecraft Approaches Solar System's Final Frontier

NASA's venerable Voyager 1 spacecraft, built and operated by NASA's Jet Propulsion Laboratory, Pasadena, Calif., is about to make history again. It is the first spacecraft to enter the solar system's final frontier, a vast expanse where wind from the Sun blows hot against thin gas between the stars: interstellar space.

However, before it reaches this region, Voyager 1 must pass through the termination shock, a violent zone that is the source of beams of high-energy particles. Voyager's journey through this turbulent zone will give scientists the first direct measurements of our solar system's unexplored final frontier, the heliosheath. Scientists are debating whether this passage has already begun. Two papers about this research are being published in Nature today.

The first paper, by Dr. Stamatios Krimigis of the Johns Hopkins University Applied Physics Laboratory, Laurel, Md., and his team, supports the claim Voyager 1 passed beyond the termination shock. The second paper, by Dr. Frank McDonald of the University of Maryland, College Park, and his team, disputes the claim. A third paper, published October 30 in Geophysical Research Letters by Dr. Leonard Burlaga of Goddard Space Flight Center, Greenbelt, Md., and collaborators, states Voyager 1 did not pass beyond the termination shock.

"Voyager 1 has seen striking signs of the region deep in space where a giant shock wave forms, as the wind from the Sun abruptly slows and presses outward against the interstellar wind. The observations surprised and puzzled us, so there is much to be discovered as it begins exploring this new region at the outer edge of the solar system," said Dr. Edward Stone, Voyager project scientist at the California Institute of Technology in Pasadena.

Launched on September 5, 1977, Voyager 1 explored the giant planets Jupiter and Saturn before being tossed out

toward deep space by Saturn's gravity. It is approaching, and may have temporarily entered, the region beyond termination shock. At more than 13 billion kilometers (approximately eight billion miles) from the Sun, Voyager 1 is the most distant object from Earth built by humanity.

The termination shock is where the solar wind, a thin stream of electrically charged gas blown constantly from the Sun, is slowed by pressure from gas between the stars. At the termination shock, the solar wind slows abruptly from its average speed of about 700,000 to 1,500,000 miles per hour.

Estimating the location of the termination shock is hard, because we don't know the precise conditions in interstellar space. We do know speed and pressure of the solar wind changes, which cause the termination shock to expand, contract and ripple.

From about August 1, 2002 to February 5, 2003, scientists noticed unusual readings from the two energetic particle instruments on Voyager 1, indicating it had entered a region of the solar system unlike any previously encountered. This led some to claim Voyager 1 may have entered a transitory feature of the termination shock.

The controversy would be resolved if Voyager could measure the speed of the solar wind, because the solar wind slows abruptly at the termination shock. However, the instrument that measured solar wind speed no longer functions on the spacecraft. Scientists must use data from instruments that are still working to infer if Voyager pierced the termination shock.

"We have used an indirect technique to show the solar wind slowed down from about 700,000 miles per hour to much less than 100,000 mph. We used this same technique when the instrument measuring the solar wind speed was still working. The agreement between the two measurements

was better than 20 percent in most cases,” Krimigis said.

“The analysis of the Voyager 1 magnetic field observations in late 2002 indicate that it did not enter a new region of the distant heliosphere by having crossed the termination shock. Rather, the magnetic field data had the characteristics to be expected based upon many years of previous observations, although the intensity of energetic particles observed is unusually high,” Burlaga said.

Voyagers 1 and 2 were built by JPL, which continues to operate both spacecraft 26 years after their launch. The spacecraft are controlled and their data returned through NASA’s Deep Space Network, a global spacecraft tracking system also operated by JPL. The Voyager Project Manager is Ed Massey of JPL. For their original missions to Jupiter and Saturn, the Voyagers were destined to explore regions of space where solar panels would not be feasible, so each was equipped with three radioisotope thermoelectric generators to produce electrical power for the spacecraft systems and instruments. Still operating in remote, cold and dark conditions 26 years later, the Voyagers owe their longevity to these Department of Energy-provided generators, which produce electricity from the heat generated by the natural decay of plutonium dioxide.

More information about the Voyagers is available at: <http://voyager.jpl.nasa.gov/> .

For images and animation on the Internet, visit:

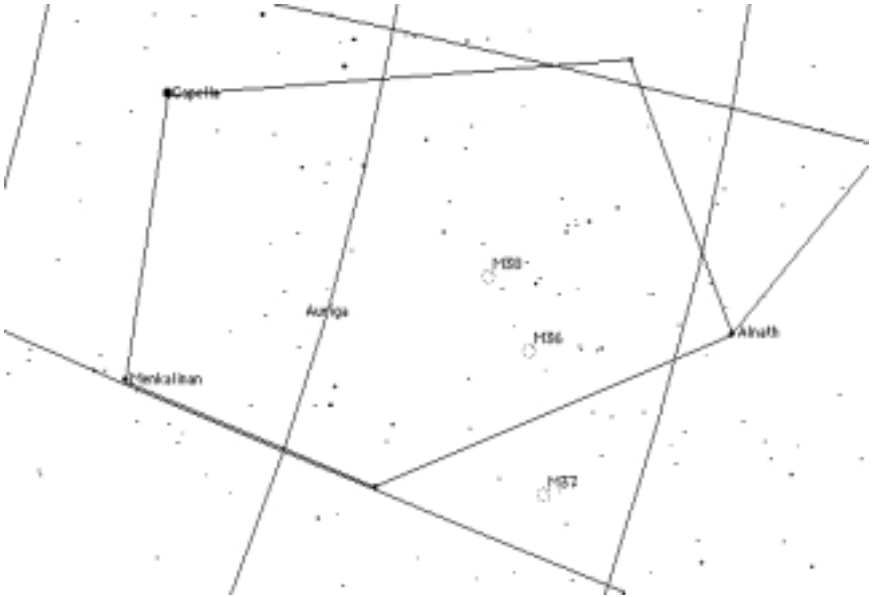
<http://www.gsfc.nasa.gov/topstory/2003/1105voyager.html> .

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Mid Evening Observing Highlights for December

Saturn can be found in the eastern sky in Gemini. Mars is moving into the western sky. Orion and Gemini are rising in the east. Auriga and Taurus are higher in the eastern sky. Auriga contains the open clusters

M36, M37, and M38. The open cluster M34 can be found in the north-eastern sky between Andromeda and Perseus. The Double Cluster is high in the northern sky between Cassiopeia and Perseus. The bright star Aldebaran can be found in Taurus. The Andromeda Galaxy is almost directly overhead. The Great Square is moving into the western sky. The Milky Way stretches from the east to west. Cygnus is setting in the western sky. Full moon is on December 8th and new moon is on December 23rd. The Geminid meteor shower will peak on the morning of the 14th. The picture below shows Auriga and the location of the open clusters in it.



Observations and Photographs

If you are interested in submitting an observation or photograph please contact John at kocis@verizon.net

The image below is of the lunar eclipse that occurred last month. It was taken by John Kocijanski with an Olympus D-550 digital camera through a Meade Super Plossl eyepiece on an Orion XT 4.5 dobsonian reflector.



BARLOW BOB'S CORNER

Barlow Bob is a member of the Rockland Astronomy Club.

John,

Rolando Chavez took these pictures using a Tele Vue 2.5 X Powermate not a 2.5 X Barlow.

Barlow Bob

— Forwarded by Robert A. Godfrey/NY/DOMESTIC/BNY on 11/17/03 07:31 AM —

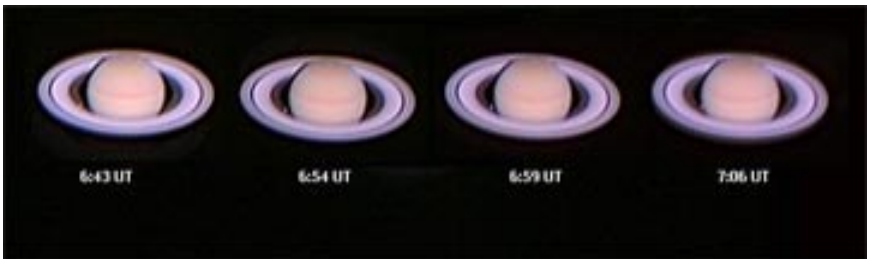
rolochavez@comcast.net

11/15/03 10:45 PM

To: bart12345@mindspring.com (Vince Garland), rgodfrey@bankofny.com (Barlow Bob)

cc:

Subject: Saturn Occultation Captured



Hello my friends! Here's another image for the fan club! LOL

Seeing conditions did not allow high power imaging but I was still able to capture good images! Thanks to Bob's 2.5X Tele Vue Barlow I was able to use a good compromise magnification for these images.

Take care!

Rolo

NASA Space Place

Stardust

by Patrick L. Barry and Dr. Tony Phillips

Philosophers have long sought to "see a world in a grain of sand," as William Blake famously put it. Now scientists are attempting to see the solar system in a grain of dust-comet dust, that is.

If successful, NASA's Stardust probe will be the first ever to carry matter from a comet back to Earth for examination by scientists. It would also be the first time that any material has been deliberately returned to Earth from beyond the orbit of the Moon.

And one wouldn't merely wax poetic to say that in those tiny grains of comet dust, one could find clues to the origin of our world and perhaps to the beginning of life itself.

Comets are like frozen time capsules from the time when our solar system formed. Drifting in the cold outer solar system for billions of years, these asteroid-sized "dirty snowballs" have undergone little change relative to the more dynamic planets. Looking at comets is a bit like studying the bowl of leftover batter to understand how a wedding cake came to be.

Indeed, evidence suggests that comets may have played a role in the emergence of life on our planet. The steady bombardment of the young Earth by icy comets over millions of years could have brought the water that made our brown planet blue. And comets contain complex carbon compounds that might be the building blocks for life.

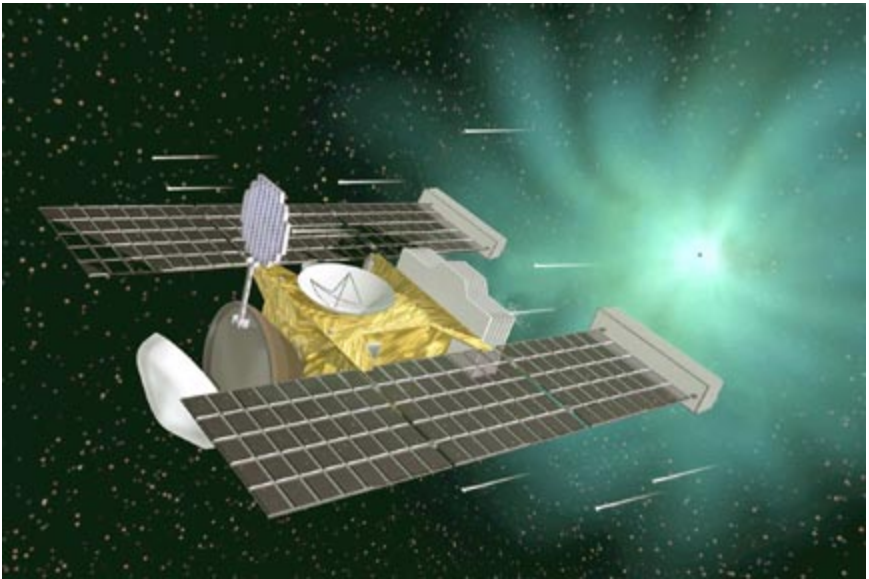
Launched in 1999, Stardust will rendezvous with comet Wild 2 (pronounced "Vilt" after its Swiss discoverer) on January 2, 2004. As it

passes through the cloud of gas and dust escaping from the comet, Stardust will use a material called aerogel to capture grains from the comet as they zip by at 13,000 mph. Aerogel is a foam-like solid so tenuous that it's hardly even there: 99 percent of its volume is just air. The ethereal lightness of aerogel minimizes damage to the grains as they're caught.

Wild 2 orbited the sun beyond Jupiter until 1974, when it was nudged by Jupiter's gravity into a Sun-approaching orbit-within reach of probes from Earth. Since then the comet has passed by the Sun only five times, so its ice and dust ought to be relatively unaltered by solar radiation. Some of this pristine "stuff" will be onboard Stardust when it returns to Earth in 2006, little dusty clues to life's big mysteries.

To learn more about Stardust, see the mission website at stardust.jpl.nasa.gov. Kids can play a fun trivia game about comets at spaceplace.nasa.gov/stardust .

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.



Caption:
NASA's Stardust mission will capture dust from comet Wild 2 and bring them back to Earth for study.

The dues are due

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