Catskills Astronomy Club News

7/1/04

Club News:

The observation session scheduled for June 12th was held. Thirteen people attended. Despite deteriorating sky conditions through the evening some decent views were seen early. One early highlight was Comet NEAT. It was seen under the Big Dipper. It showed a bright nucleus that was surrounded by a cloudy coma. It did not show much of a tail though. The globular cluster M13, planetary nebula M27, and galaxy M51 were also observed before the sky clouded over.

Our second observation session for the month was held on June 17th. Three people attended. The sky conditions were very clear but a brisk wind caused some problems early on. As the evening progressed the wind died down. A number of galaxies in the Virgo Cluster were observed including some in Markarian's Chain. In particular M84, M86, NGC 4387, and NGC 4388 were a great sight. M84, M86, and NGC 4388 form an almost equilateral triangle with NGC 4387 in the middle of the triangle. Many globular clusters in Ophiuchus, Hercules, and Scorpius were observed as well.

A local Cub Scout troop has contacted the club and would like to join us in August for one of our observation sessions. A few years ago a group of scouts joined us for an observation session and all who participated had a great time.

The observation sessions for July are on the 10th and 17th.

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

The club has selection of astronomy books, Stardate audio CDs, 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.

Image Advisory: 2004-165 June 28, 2004

Seeing Double: Spitzer Captures Our Galaxy's Twin

What would our Milky Way galaxy look like if we could travel outside it and snap a picture? It might look a lot like a new image by NASA's Spitzer Space Telescope of a spiral galaxy called NGC 7331 - a virtual twin of our Milky Way.

The picture, which can be viewed at http://photojournal.jpl.nasa.gov/catalog/PIA06322, shows our twin as never before. Its swirling arms spin outward from a central bulge of light, which is outlined by a ring of actively forming stars.

"Being inside our galaxy makes it difficult to see what's going on in the center," said Dr. J.D. Smith, a member of the team that observed NGC 7331, and an astronomer at the University of Arizona, Tucson. "By looking at a very similar galaxy, we gain a bird's eye-view of what the entire Milky Way might look like."

Such an outside perspective will teach astronomers how our own galaxy, as well as others like it, might have formed and evolved.

The latest observations are the first in a large-scale effort to observe 75 nearby galaxies with Spitzer's highly sensitive infrared eyes. Called Spitzer Infrared Nearby Galaxies Survey, the program will combine Spitzer data with that from other ground- and space-based telescopes operating at wavelengths ranging from ultraviolet to radio to create a comprehensive map of the selected galaxies.

The program's first target, NGC 7331, was chosen in part for its striking similarities to the Milky Way. While these so-called twin galaxies do not share the same parents, they have many features in common, including number of stars, mass, spiral arm pattern and star-formation rate of a few stars per year. Whether the Milky Way has an inner star-forming ring like that of NGC 7331 is not known. NGC 7331 is located about 50 million light-years away in the constellation Pegasus.

The new Spitzer image demonstrates the power of the telescope's infrared eyes to dissect galaxies into their various parts. Taken by the telescope's infrared array camera, the false-colored picture readily distinguishes NGC 7331's arms (brownish red), central bulge (blue) and star-forming ring (yellow). The composition of materials making up these regions was also revealed by the Spitzer observations: the central bulge consists primarily of older stars; the ring possesses a large amount of gas and dusty organic molecules called polycyclic aromatic hydrocarbons, which typically glow when illuminated by newborn stars; and the arms contain these same dust grains to a lesser degree. Polycyclic aromatic hydrocarbons are also found on Earth, on burnt toast and in car exhaust among other places.

Data from Spitzer's infrared spectrograph instrument were also used to show that the center of NGC 7331 harbors either an unusually high concentration of massive stars, or a moderately active black hole about the same size as the one lurking at the core of our galaxy.

These findings will appear in two papers in the September issue of a special supplement to the Astrophysical Journal. Dr. Michael W. Regan of the Space Telescope Institute, Baltimore, Md., is lead author of a paper detailing observations from the infrared array camera, and Smith is lead author of a paper on the infrared spectrograph results. The Spitzer Infrared Nearby Galaxies Survey project is conducted by a team of about 25 scientists from 12 institutions, and is led by principal investigator Dr. Robert C. Kennicutt of the University of Arizona, Tucson.

Launched August 25, 2003, the Spitzer Space Telescope is the fourth of NASA's Great Observatories, a program that also includes the Hubble Space Telescope, Chandra X-ray Observatory and Compton Gamma Ray Observatory.

JPL manages the Spitzer Space Telescope mission for NASA's Office of Space Science, Washington, D.C. Science operations are conducted at the Spitzer Science Center at the California Institute of Technology in Pasadena. JPL is a division of Caltech. Spitzer's infrared spectrograph was built by Cornell University, Ithaca, N.Y., and Ball Aerospace Corporation, Boulder, Colo. The instrument's development was led by Dr. Jim Houck of Cornell. Spitzer's infrared array camera was built by NASA Goddard Space Flight Center, Greenbelt, Md. The camera's development was led by Dr. Giovanni Fazio of Smithsonian Astrophysical Observatory, Cambridge, Mass.

Additional information about the Spitzer Space Telescope is available at http://www.spitzer.caltech.edu .

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News Release: 2004-164 June 28, 2004

Scientists Find That Saturn's Rotation Period Is A Puzzle

On approach to Saturn, data obtained by the Cassini spacecraft are already posing a puzzling question: How long is the day on Saturn?

Cassini took readings of the day-length indicator regarded as most reliable, the rhythm of natural radio signals from the planet. The results give 10 hours, 45 minutes, 45 seconds (plus or minus 36 seconds) as the length of time it takes Saturn to complete each rotation. Here's the puzzle: That is about 6 minutes, or one percent, longer than the radio rotational period measured by the Voyager 1 and Voyager 2 spacecraft, which flew by Saturn in 1980 and 1981.

Cassini scientists are not questioning Voyager's careful measurements. And they definitely do not think the whole planet of Saturn is actually rotating that much slower than it did two decades ago. Instead, they are looking for an explanation based on some variability in how the rotation deep inside Saturn drives the radio pulse.

The radio sounds of Saturn's rotation, which are also the first sounds from Saturn studied by Cassini, are like a heartbeat and can be heard by visiting http://www.jpl.nasa.gov/videos/cassini/0604/ and http://www-pw.physics.uiowa.edu/space-audio

"The rotational modulation of radio emissions from distant astronomical objects has long been used to provide very accurate measurements of their rotation period," said Dr. Don Gurnett, principal investigator for the Cassini Radio and Plasma Wave Science instrument, University of Iowa, Iowa City. "The technique is particularly useful for the giant gas planets, such as Jupiter and Saturn, which have no surfaces and are covered by clouds that make direct visual measurements impossible."

The first hint of something strange about that type of measurement at Saturn was in 1997, when a researcher from Observatoire de Paris reported that Saturn's radio rotation period differed substantially from Voyager.

Dr. Michael D. Desch, Cassini Radio Plasma Wave Science team member, and scientist at NASA's Goddard Space Flight Center in Greenbelt, Md., has analyzed Saturn radio data collected by Cassini from April 29, 2003, to June 10, 2004. "We all agree that the radio rotation period of Saturn is longer today than it was in during the Voyager flyby in 1980," he said.

Gurnett said, "Although Saturn's radio rotation period has clearly shifted substantially since the Voyager measurements, I don't think any of us could conceive of any process that would cause the rotation of the entire planet to actually slow down. So it appears that there is some kind of slippage between the deep interior of the planet and the magnetic field, which controls the charged particles responsible for the radio emission." He suggests the solution may be tied to the fact that Saturn's rotational axis is nearly identical to its magnetic axis. Jupiter, with a more substantial difference between its magnetic axis and its rotational axis, shows no comparable irregularities in its radio rotation period.

"This finding is very significant. It demonstrates that the idea of a rigidly rotating magnetic field is wrong," said Dr. Alex Dessler, a senior research scientist at the University of Arizona, Tucson. In that way, the magnetic fields of gas giant planets may resemble that of the Sun. The Sun's magnetic field does not rotate uniformly. Instead, its rotation period varies with latitude. "Saturn's magnetic field has more in common with the Sun than the Earth. The measurement can be interpreted as showing that the part of Saturn's magnetic field that controls the radio emissions has moved to a higher latitude during the last two decades," said Dressler.

"I think we will be able to unravel the puzzle, but it's going to take some time," said Gurnett. "With Cassini in orbit around Saturn for four years or more, we will be in an excellent position to monitor long-term variations in the radio period, as well as investigate the rotational period using other techniques."

Cassini, carrying 12 scientific instruments, is just two days from its planetary rendezvous with Saturn. On June 30 it will become the first spacecraft to orbit Saturn, when it begins a four-year study of the planet, its rings and its 31 known moons. The spacecraft recently flew past Saturn's cratered moon Phoebe, where it captured spectacular images as well as data on its mass and composition.

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://www.nasa.gov/cassini .

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News Release: 2004-161 June 25, 2004

Mars Rover Surprises Continue; Spirit, Too, Finds Hematite

On challenging slopes that NASA's Mars rovers began exploring this month, both Spirit and Opportunity have found new surprises for the folks back home.

Spirit rolled up to a knobby rock just past where the "Columbia Hills" start to rise from the surrounding plain. It touched the rock with a mineral-identifying instrument at the tip of its robotic arm and detected hematite. Hematite identified from orbit was NASA's key reason for choosing Opportunity's landing site halfway around Mars from these hills within Gusev Crater.

Opportunity, continuing its descent into "Endurance Crater," has found unexpected similarities between lower layers of rock it is examining for the first time and an overlying layer at "Eagle Crater" where, months ago, the rover discovered evidence that water once soaked the area.

"It's gratifying how well these machines keep performing, considering they've now nearly doubled their original three-month missions on Mars," said Chris Voorhees, rover mechanical systems engineer at NASA's Jet Propulsion Laboratory, Pasadena, Calif. By the end of next week, Spirit will have worked on Mars for half a year. It has driven more than three times the design requirement of one kilometer (0.6 mile). The only symptom of wear or aging on either rover so far is increased friction in one wheel on Spirit. The rover team at JPL is beginning to consider good sites for the solar-powered robots to spend the period of martian winter when reduced daily sunshine cuts power supply to a minimum. In the nearer term, though, team members are eager to follow through on the new scientific findings.

Spirit's hematite finding is in a rock dubbed "Pot of Gold," about the size of a softball. "This rock has a shape as if somebody took a potato and stuck toothpicks in it, then put jelly beans on the ends of the toothpicks," said Dr. Steve Squyres of Cornell University, Ithaca, N.Y., principal investigator for the rovers' science instruments. "How it got this crazy shape is anyone's guess. I haven't even heard a good theory yet."

Dr. Doug Ming, a rover science-team member from NASA's Johnson Space Center, Houston, said, "There's apparently some type of weathering, a removal of material, but we're still trying to determine whether it's by chemical or mechanical processes."

Further study of Pot of Gold could also help scientists assess what the hematite in it tells about past environmental conditions. "Hematite can form in a few different ways. Most of them require water, but it can also result from a dry, thermal oxidation process," Ming said. "It was hematite identified from orbit that made Meridiani Planum a compelling place to send Opportunity. There, we've learned that the hematite is indeed part of a water story. At Gusev we're just at the starting stage."

After examining Pot of Gold with the microscopic imager and two spectrometers on Spirit's arm, the rover backed away from the rock to re-approach at a better angle for using its rock abrasion tool to expose the rock's interior. In the rough and slippery terrain, that maneuver took several days. The Other nearby rocks may also be inspected before Spirit resumes longer drives exploring the Columbia Hills area. Also, engineers are planning an attempt to redistribute lubricant in Spirit's balky right front wheel before the rover leaves its current vicinity.

Team members presented both rovers' status at a press conference at JPL today. Opportunity has driven far enough into the stadium-sized Endurance Crater to put it within arm's reach of three layers of rock beneath a sulfate-rich layer. That area is similar to what Opportunity first examined in the shallower "Eagle Crater," where it landed in January. "We're trying to systematically characterize the stratigraphy of the crater as we drive down, analyzing each unit chemically and

mineralogically with all the instruments available," said Nicholas Tosca, a science-team affiliate from the State University of New York, Stony Brook. The first two newly accessed layers resemble the upper layer in having sulfate salts and spherical concretions; both are signs of formation of the rocks under wet conditions.

Squyres said, "I had thought we might see just basalt below the top salty layer, but instead it's salty as far as we've been able to see so far. Every time we see more sulfates as we work down this stack, it adds to the amount of water that was necessary to make this happen."

JPL, a division of the California Institute of Technology in Pasadena, manages the Mars Exploration Rover project for NASA's Office of Space Science, Washington, D.C. Images and additional information about the project are available from JPL at http://marsrovers.jpl.nasa.gov and from Cornell University, at http://athena.cornell.edu .

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NEWS RELEASE: 2004-158 June 23, 2004

Cassini Opens A Cosmic Time Capsule

Like a woolly mammoth trapped in Arctic ice, Saturn's small moon Phoebe may be a frozen artifact of a bygone era, some four billion years ago. The finding is suggested by new data from the Cassini spacecraft.

Cassini scientists reviewed data from the spacecraft's June 11, 2004, flyby of the diminutive moon. They concluded Phoebe is likely a primordial mixture of ice, rock and carbon-containing compounds similar in many ways to material seen in Pluto and Neptune's moon Triton. Scientists believe bodies like Phoebe were plentiful in the outer reaches of the solar system about four and a half billion years ago.

These icy planetesimals (small bodies) formed the building blocks of the outer solar system and some were incorporated into the giant planets Jupiter, Saturn, Uranus and Neptune. During this process, gravitational interactions ejected much of this material to distant orbits, joining a native population of similar bodies to form the Kuiper Belt.

"Phoebe apparently stayed behind, trapped in orbit about the young Saturn, waiting eons for its secrets to be revealed during its rendezvous with the Cassini spacecraft," said Dr. Torrence Johnson, Cassini imaging team member at NASA's Jet Propulsion Laboratory, Pasadena, Calif.

"All our evidence leads us to conclude, Phoebe's surface is made of water ice, water-bearing minerals, carbon dioxide, possible clays and primitive organic chemicals in patches at different locations on the surface," said Dr. Roger N. Clark, team member for the visual and infrared mapping spectrometer, U.S. Geological Survey in Denver. "We also see spectral signatures of materials we have not yet identified." Cassini's observations gave scientists the first detailed look at one of these primitive icy planetesimals.

Phoebe's mass was determined from precise tracking of the spacecraft and optical navigation, combined with an accurate volume estimate from images. The measurements yield a density of about 1.6 grams per cubic centimeter (100 pounds per cubic foot), much lighter than most rocks, but heavier than pure ice at approximately 0.93 grams per cubic centimeter (58 pounds per cubic foot). This suggests a composition of ice and rock similar to Pluto and Triton.

Spectral measurements, light intensity as a function of color or wavelength, confirmed the presence of water ice previously detected by Earth-based telescopes. The measurements provided evidence for hydrated minerals on Phoebe's surface, and detected carbon dioxide and solid hydrocarbons similar to those found in primitive meteorites.

"One intriguing result is the discovery of possible chemical similarities between the materials on Phoebe and those seen on comets," said Dr. Robert H. Brown, team leader for the visible and infrared mapping spectrometer, University of Arizona, Tucson. Evidence that Phoebe might be chemically kin to comets strengthens the case that it is similar to Kuiper Belt Objects.

Measurements taken by the composite infrared spectrometer were used to generate temperature maps. The maps show the surface of Phoebe is very cold, only about 110 degrees above absolute zero (minus 163 degrees Celsius, or minus 261 degrees Fahrenheit). Even colder nighttime temperatures suggest a fluffy, porous surface layer.

"One of the first results from this map is the surface of Phoebe has been badly chewed up, probably by meteorite impacts," said Dr. John Pearl, a Cassini co-investigator for the composite infrared spectrometer, at NASA's Goddard Space Flight Center, Greenbelt, Md. "We are discovering Phoebe is a very complex object, with large variations in topography."

Cassini also made radar observations of Phoebe's enigmatic surface, making it the first spacecraft radar observations of an outer-planet moon. The results are consistent with the dirty, rocky, icy surface suggested by other observations.

"We have conducted our first analysis of an outer solar system resident akin to Kuiper Belt Objects," said Dr. Dennis Matson, project scientist of the Cassini-Huygens mission at JPL. "In two short weeks, we have added more to what we know about Phoebe than we had learned about it since it was discovered 100 years ago. We did this by having multiple instruments conducting investigations all at one time during our flyby."

The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. JPL manages the mission for NASA's Office of Space Science, Washington. For the latest images and more information about the mission on the Internet, visit http://www.nasa.gov and http://saturn.jpl.nasa.gov .
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NEWS RELEASE: 2004-154 June 17, 2004

NASA Spacecraft Reveals Surprising Anatomy Of A Comet

Findings from a historic encounter between NASA's Stardust spacecraft and a comet have revealed a much stranger world than previously believed. The comet's rigid surface, dotted with towering pinnacles, plunging craters, steep cliffs, and dozens of jets spewing violently, has surprised scientists.

"We thought Comet Wild 2 would be like a dirty, black, fluffy snowball," said Stardust Principal Investigator Dr. Donald Brownlee of the University of Washington, Seattle. "Instead, it was mind-boggling to see the diverse landscape in the first pictures from Stardust, including spires, pits and craters, which must be supported by a cohesive surface."

Stardust gathered the images on Jan. 2, 2004, when it flew 236 kilometers (about 147 miles) from Wild 2. The flyby yielded the most detailed, high-resolution comet images ever.

"We know Wild 2 has features sculpted by many processes. It may turn out to be typical of other comets, but it is unlike any other type of solar system body," Brownlee said. He is lead author of one of four Stardust papers appearing in the Fri., June 18, issue of Science. "We're fortunate that nature gave us such a rich object to study."

Stardust images show pinnacles 100 meters tall (328 feet), and craters more than 150 meters deep (492 feet). Some craters have a round central pit surrounded by ragged, ejected material, while others have a flat floor and straight sides. The diameter of one large crater, called Left Foot, is one fifth of the surface of the comet. Left Foot is one kilometer (.62 miles) across, while the entire comet is only five kilometers (3.1 miles) across.

"Another big surprise was the abundance and behavior of jets of particles shooting up from the comet's surface. We expected a couple of jets, but saw more than two dozen in the brief flyby," said Dr. Benton Clark, chief scientist of space exploration systems, Lockheed Martin Space Systems, Denver.
The team predicted the jets would shoot up for a short distance, and then be dispersed into a halo around Wild 2. Instead, some super-speedy jets remained intact, like blasts of water from a powerful garden hose. This phenomenon created quite a wild ride for Stardust during the encounter.

"Stardust was absolutely pummeled. It flew through three huge jets that bombarded the spacecraft with about a million particles per second," said Thomas Duxbury, Stardust project manager at NASA's Jet Propulsion Laboratory, Pasadena, Calif. Twelve particles, some larger than a bullet, penetrated the top layer of the spacecraft's protective shield.

The violent jets may form when the Sun shines on icy areas near or just below the comet's surface. The solid ice becomes a gas without going through a liquid phase. Escaping into the vacuum of space, the jets blast out at hundreds of kilometers per hour.

The Stardust team theorizes sublimation and object hits may have created the comet's distinct features. Some features may have formed billions of years ago, when life began on Earth, Brownlee said. Particles collected by Stardust during the Wild 2 encounter may help unscramble the secrets of how the solar system formed.

Stardust was launched in 1999. It is zooming back to Earth with thousands of captured particles tucked inside a capsule. The capsule will make a soft landing in the Utah desert in January 2006. The samples will be analyzed at the planetary material curatorial facility at NASA's Johnson Space Center, Houston.

Comets have been objects of fascination through the ages. Many scientists believe they delivered carbon and water, life's building blocks, to Earth. Yet their destructive potential is illustrated by the widely held theory that a comet or asteroid wiped out the dinosaurs.

To view Stardust images on the Internet, visit:

http://stardust.jpl.nasa.gov or http://photojournal.jpl.nasa.gov/

Stardust, part of NASA's Discovery Program of low-cost, highly focused science missions, was built by Lockheed Martin Space Systems and is managed by JPL for NASA. JPL is a division of the California Institute of Technology in Pasadena.

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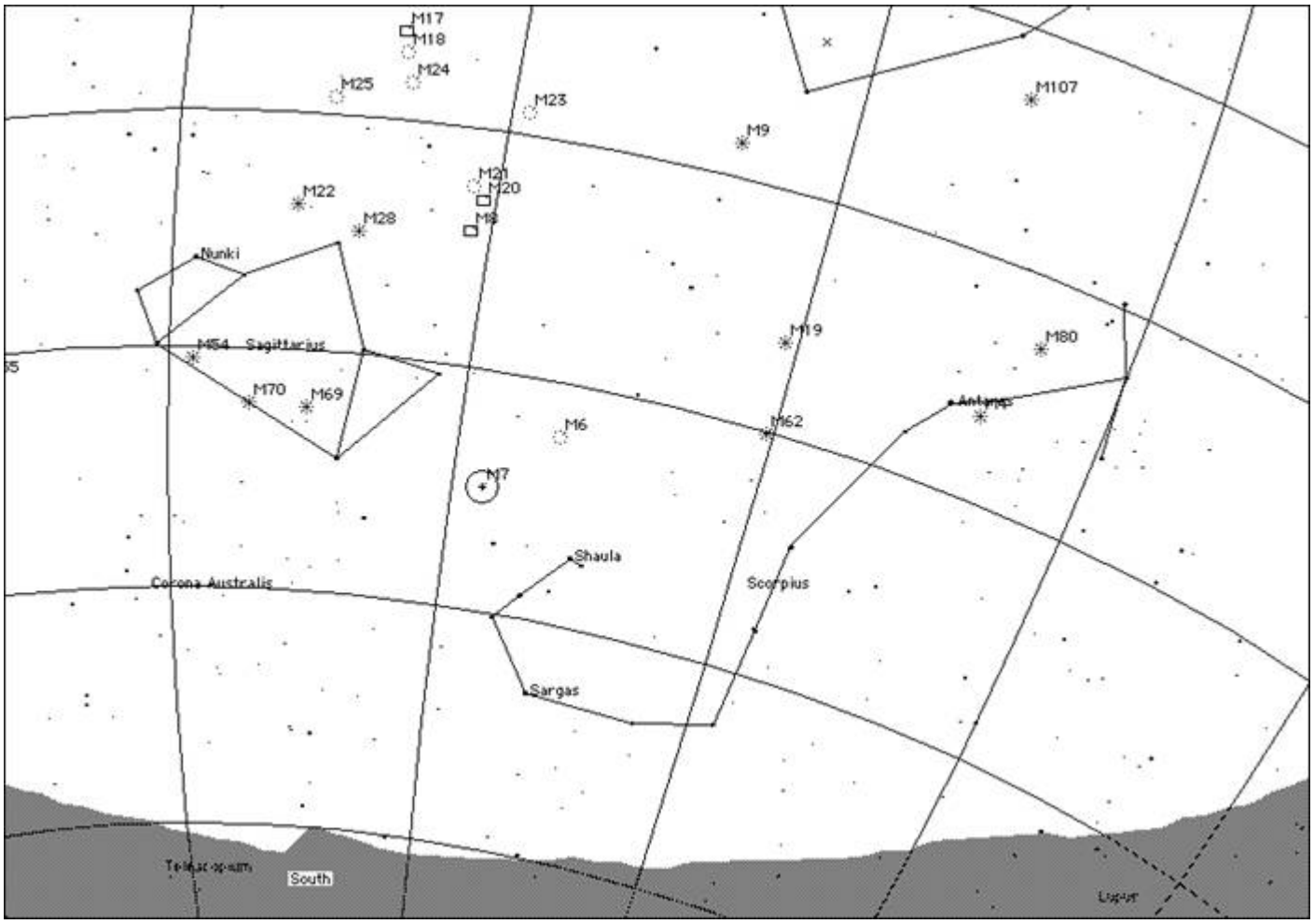
Middle Evening Observing Highlights for July

The brighter stars in the sky are Antares, Arcturus, Spica, Vega, Deneb, and Altair. Antares is in the southern sky in the constellation Scorpius. It has an orange. The globular cluster M4 can be found just to the west of it. Spica is in the western part of the sky in the constellation Virgo. Arcturus is in the western sky in the constellation Bootes but it is higher in the sky than Spica. Arcturus has a “ginger ale” tint. Vega, Deneb, and Altair are in the eastern sky. They form the asterism known as the Summer Triangle. Vega is in the constellation Lyra. Deneb is in the constellation Cygnus (the Northern Cross). Altair is in the constellation Aquilla. The Keystone of the constellation Hercules is almost directly overhead (in the zenith). In the middle of the western side of the Keystone the globular cluster M13 can be seen. In the southeastern sky the constellation Sagittarius can be seen. It has a “teapot” shape. The Lagoon Nebula (M8) can be found to the northwest of the “teapot”. The globular cluster M22 can be found just to the east of the top of the teapot. The center of our galaxy is located near Sagittarius. The plane of our galaxy (the Milky Way) stretches from the south to the north across the sky.

Full moon will occur twice this month, once on July 2nd and again on July 31st. A second full moon during a month is called a Blue Moon. New moon is on July 17th. The chart below shows the middle evening southern sky.



Observations and Photographs

This picture of the Venus Transit of June 8th through the clouds that morning was taken by John Kocijanski in Central Valley, NY. It was taken afocally with an Olympus D-550 digital zoom camera through a 32mm Meade Super Plossl on a Stellarvue AT1010.

BARLOW BOB'S CORNER

Barlow Bob is a member of the Rockland Astronomy Club.

The Astronomical Society of New Haven proudly presents the fourteenth annual Connecticut Star Party. Set under the clear dark skies of Marlborough Connecticut CSP-14 boasts a modern and spacious new location. CSP-14 will be chock full of wonderful friendly people, guest speakers, swap tables, vendors, games and of course STARGAZING! Come join us in beautiful Marlborough CT for our annual event and share in the wonders of our unverse!

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NASA Space Place

Space Weather
By Patrick Barry and Tony Phillips

Radiation storms, 250 mile-per-second winds, charged particles raining down from magnetic tempests overhead . it sounds like the extreme weather of some alien world. But this bizarre weather happens right here at Earth.

Scientists call it "space weather." It occurs mostly within the gradual boundary between our atmosphere and interplanetary space, where the blast of particles and radiation streaming from the Sun plows into the protective bubble of Earth's magnetic field. But space weather can also descend to Earth's surface. Because the Earth's magnetic field envelops all of us, vibrations in this springy field caused by space weather reverberate in the room around you and within your body as much as at the edge of space far overhead.

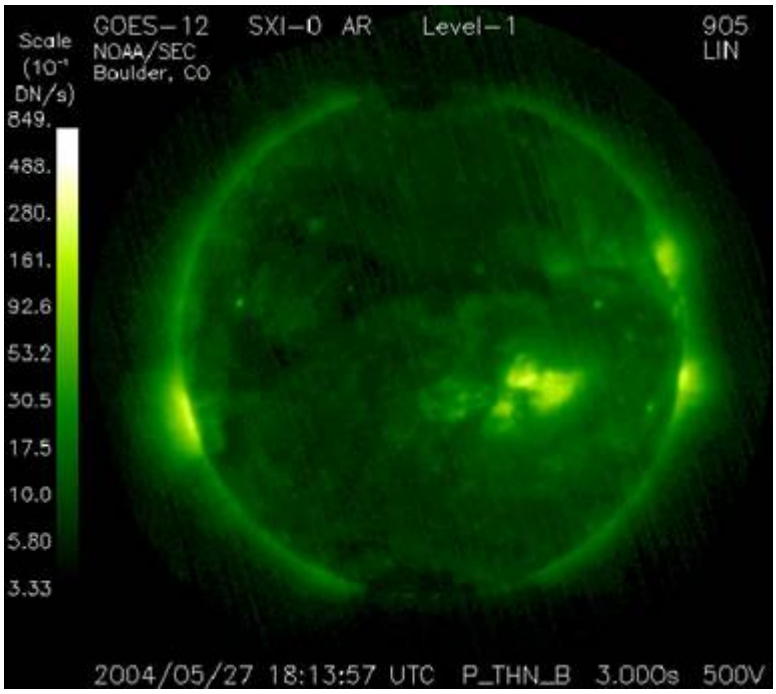
In fact, one way to see these "geomagnetic storms" is to suspend a magnetized needle from a thin thread inside of a bottle. When solar storms buffet Earth's magnetic field, you'll see the needle move and swing. If you live at higher latitudes, you can see a more spectacular effect: the *aurora borealis* and the *aurora australis*. These colorful light shows happen when charged particles trapped in the outer bands of Earth's magnetic field get "shaken loose" and rain down on Earth's atmosphere.

And because a vibrating magnetic field will induce an electric current in a conductor, geomagnetic storms can have a less enjoyable effect: widespread power blackouts. Such a blackout happened in 1989 in Quebec, Canada, during a particularly strong geomagnetic storm. These storms can also induce currents in the metallic bodies of orbiting satellites, knocking the satellite out temporarily, and sometimes permanently.

Partly because of these adverse effects, scientists keep close tabs on the space weather forecast. The best way to do this is to watch the Sun. The NASA/ESA SOHO satellite and NOAA's fleet of GOES satellites keep a constant watch on the Sun's activity. If a "coronal hole"--where high-speed solar wind streams out from the Sun's surface--comes into view, it could mean that a strong gust of solar wind is on its way, along with the geomagnetic storms it will trigger. And an explosive ejection of hot plasma toward the Earth--called a "coronal mass ejection"--could mean danger for astronauts in orbit. The advancing front of ejected matter, moving much faster than the solar wind, will accelerate particles in its path to near the speed of light, spawning a radiation storm that can threaten astronauts' health.

Look for coming articles for more about space weather and about NOAA's efforts to forecast these celestial storms. Meanwhile, read today's space weather forecast at http://www.sec.noaa.gov/. Kids can learn about the geostationary and orbits of the GOES satellites at http://spaceplace.nasa.gov/en/kids/goes/goes_poes_orbits.shtml .

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