alpha

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FEATURE IMAGE THIS ISSUE

On June 3, Chris captured the three red spots on Jupiter. Jupiter's atmosphere has been pretty active lately, with all the outbreaks going on as well as the change in color of some of its spots, such as the development of Red Spot Jr. and the Little Red Spot, both discovered from our very own Cebu. © Chris Go

CLUB NEWS

June Meeting

The Astronomical League of the Philippines (ALP) held its monthly meeting on June 8 at the Manila Planetarium at 3:00 p.m. Members who attended the meeting were James Kevin Ty, Angie Tan, Bel Pabunan, Vincent Lao, Alfonso Sy, Jomar Lacson, Melisa Bata, Dr. Armando Lee, Brian Davis and his 2 sons, Alexander and Andrew, Dante Noche and wife Rosie, Henry So, Nathaniel Custodio and Andrew Ian Chan.

The meeting started out at around 3:45 p.m. with a lecture given by Dr. Armando Lee, entitled *Program / Project Management in Astronomy*. Dr. Lee delivered a concise lecture, inserting examples along the way as he pointed out the application in different astronomical projects like telescope procurement, observatory construction, and even astronomy club yearbook. Members are expected to gain knowledge in making their projects more organized and rational. Hopefully this will make them more successful in their different endeavors.

The meeting then proceeded with ALP President James Kevin Ty's update on the current status of the ongoing ALP yearbook for the year 2008. He mentioned his experiences in soliciting sponsors and he narrated stories of how different sponsors so far have reacted to the ALP members' solicitation drive.

He gave members advice to try to be open to possible sponsors and not to limit to astro-related industries only.

ALP Ways and Means Chairperson Melisa Bata was then given the floor to give members extra solicitation kits and she reminded the members of the deadline set for the solicitation drive, i.e. July 15. She also announced the deadline for the submission of articles for the yearbook as June 30, 2008. Meeting was then adjourned and members used the remaining time to socialize and share their stories for the month. The meeting ended at 5:30 p.m. - *Armando Lee; Images by James Kevin Ty*

BREAKING NEWS

Saturnian Moonlets

Big space objects aren't the only ones who throw their weight around, where new observations from NASA's Cassini spacecraft pin responsibility for twists in Saturn's F ring on tiny moons.

Saturn's F ring is perhaps the most unusual and dynamic ring in the solar system. It has multiple structures with features changing on a variety of timescales from hours to years. The rope-like F ring is the third outermost of Saturn's rings and lies roughly 140,000 km. from the planet's center (⇨ *p. 62*).

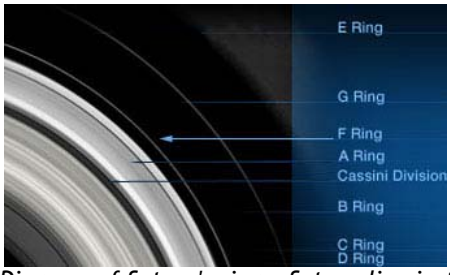
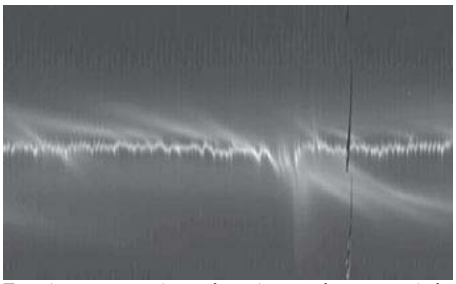


Diagram of Saturn's rings. Saturn lies just below the lower left corner. © NASA JPL

The team found two different types of features: "jets" and "fans". The jets are extensions of ring material either toward or away from the planet that look like smears through a straight chalk line. They likely arise from collisions between material in the ring's central concentration and surrounding satellites. Fans, on the other hand, are a series of furrows that converge in the ring that scientists believe result from the gravitational effects of embedded satellites.

Numerical simulations for two features indicate diameters of 14 to 70 km. for the guilty satellites, although multiple smaller satellites may offer a better solution for producing fans. Other fans also suggest smaller culprits. Two objects seen by Cassini, called S/2004 S 6 and F07090QB, fit the team's data.



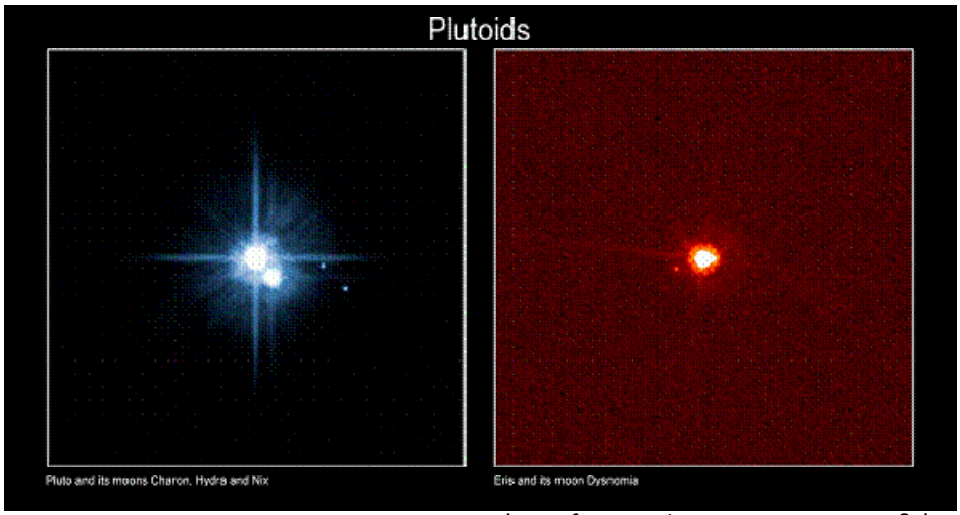
F ring mosaic showing the straight "outside" (pointing away from Saturn) and "inside" (pointing toward Saturn) jets found with Cassini. The image's lower edge faces Saturn. © C. Murray et al. / Nature

Earlier studies determined that the moon Prometheus plays a prominent role as well. Prometheus, which orbits just inside the F ring, directly clears channels in the ring and also off-balances embedded objects that then gravitationally affect the surrounding material. The scientists think that the processes responsible for the jets and fans parallel how planets coalesce by accreting material from a dust plane. They hope to use the F ring observations to better understand planet formation. - *Camille M. Carlisle, SkyandTelescope.com*

Plutoids

The International Astronomical Union has decided on the term plutoid as a name for dwarf planets like Pluto at a meeting of its Executive Committee in Oslo. Almost two years after the International Astronomical Union (IAU) General Assembly introduced the category of dwarf planets, the IAU, as promised, has decided on a name for transneptunian dwarf planets similar to Pluto. The name plutoid was proposed by the members of the IAU Committee on Small Body Nomenclature (CSBN), and approved by the IAU Executive Committee at its recent meeting in Oslo, Norway.

Plutoids are celestial bodies in orbit around the Sun at a distance greater than that of Neptune that have sufficient mass for their self-gravity to overcome rigid body forces so that they assume a hydrostatic equilibrium (near-spherical) shape, and that have not cleared the neighborhood around their orbit. The two known and named plutoids are Pluto and Eris. It is expected that more plutoids will be named as science progresses and new discoveries are made.



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The dwarf planet Ceres is not a plutoid as it is located in the asteroid belt between Mars and Jupiter.

Current scientific knowledge lends credence to the belief that Ceres is the only object of its kind. Therefore, a separate category of Ceres-like dwarf planets will not be proposed at this time.

The IAU has been responsible for naming planetary bodies and their satellites since the early 1900s. The IAU CSBN, who originally proposed the term plutoid, is responsible for naming small bodies (except satellites of the major planets) in the Solar System. The CSBN will be working with the IAU WGPSN to determine the names of new plutoids to ensure that no dwarf planet shares the name of another small Solar System body. The WGPSN oversees the assignment of names to surface features on bodies in the Solar System. These two committees have previously worked together to accept the names of dwarf planet Eris and its satellite Dysnomia.

In Oslo, members of the IAU also discussed the timing involved with the naming of new plutoids. Again, following the advice of the Division III Board and the two Working Groups, it was decided that, for naming purposes, any Solar System body having (a) a semimajor axis greater than that of Neptune, and (b) an absolute magnitude brighter than H = +1 magnitude will be considered to be a plutoid, and be named by the WGPSN and the CSBN.

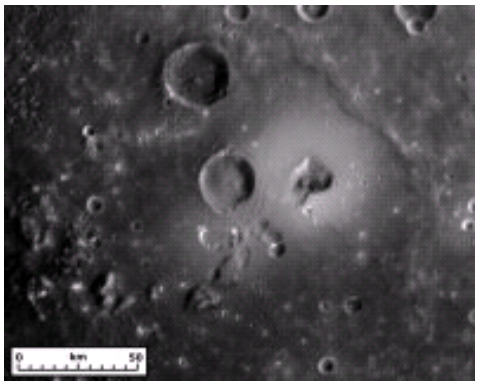
Name(s) proposed by the discovery team(s) will be given deference. If further investigations show that the object is not massive enough and does not qualify as a plutoid, it will keep its name but change category.

In French plutoid is plutoïde, in Spanish plutoide and in Japanese 冥王星様.(⇨ *p. 63*).

Mercury Unveiled

Mercury's magnetic field is "alive." Volcanic vents ring the planet's giant Caloris Basin. And Mercury has shrunk in on itself more than previously suspected. These are just a few of the new discoveries by NASA's MESSENGER spacecraft, which flew past Mercury on January 14, 2008.

By combining Mariner 10 and MESSENGER data, scientists were able to reconstruct a comprehensive geologic history of the entire Caloris basin interior. The basin was formed from an impact by an asteroid or comet during a period of heavy bombardment in the first billion years of Solar System history. As with the lunar maria, a period of volcanic activity followed, producing lava flows that filled the basin interior. This volcanism is responsible for the comparatively light, red material of the interior plains intermingled with [newer] impact crater deposits.



Above, near the rim of Caloris basin, this broad, smooth dome or shield-like feature is interpreted to be a volcano. The bright halo surrounding the kidney-shaped depression is probably an explosive volcanic eruption deposit. Courtesy of Science/AAAS

Finding volcanic vents around Caloris resolves an old debate among planetary scientists: Are smooth plains on Mercury, such as the interior of Caloris basin, caused by erupting lava or some other process? Lava has won the day.

Until Mariner 10 discovered Mercury's magnetic field in the 1970's, Earth was the only other terrestrial planet known to have a global magnetic field. Earth's magnetism is generated by the planet's churning hot, liquid-iron core via a mechanism called a magnetic dynamo. Researchers have been puzzled by Mercury's field because its iron core was supposed to have cooled long ago and stopped generating magnetism. Some researchers have thought that the field may have been a relic of the past, frozen in the outer crust.

MESSENGER data suggest otherwise: Mercury's field appears to be generated by an active dynamo in the planet's core. It is not a relic. The measurements indicate that, like Earth, Mercury's magnetic field is mostly dipolar, which means it has north and south magnetic poles. The fact that it is dipolar, and not the signature shorter-wavelength anomalies that would signify patches of magnetized crust, supports the view that we're seeing a modern dynamo.

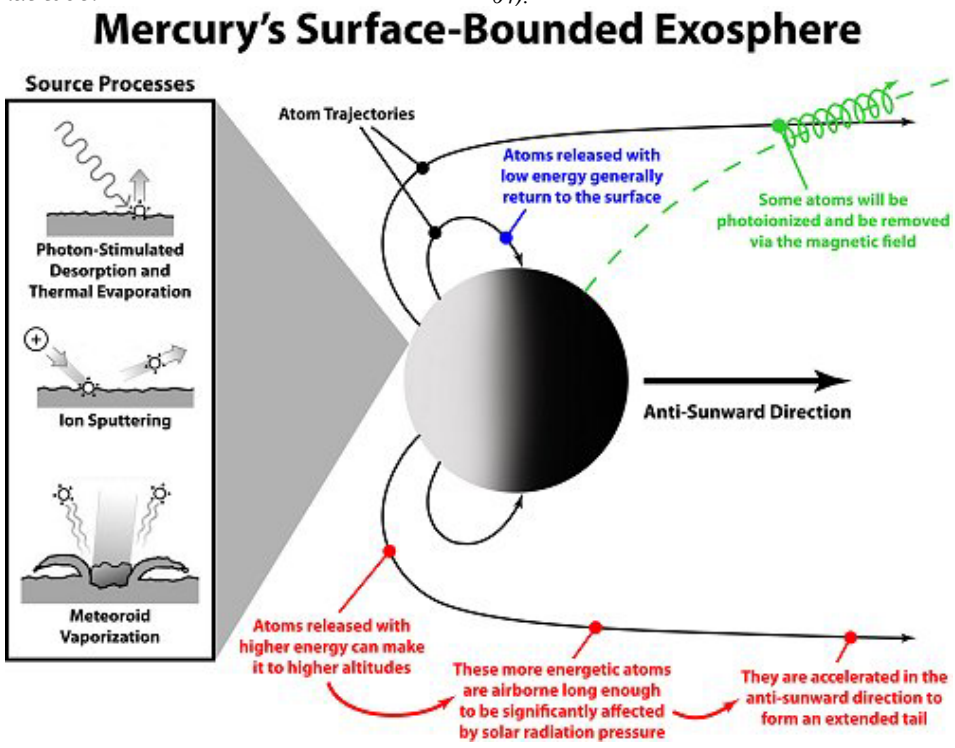
The flyby also made the first-ever observations of charged particles in Mercury's unique exosphere. The exosphere is an ultrathin atmosphere where the molecules are so far apart they are more likely to collide with the surface than with each other. Material in the exosphere comes mainly from the surface of Mercury itself, knocked aloft by solar radiation, solar wind bombardment and meteoroid vaporization.

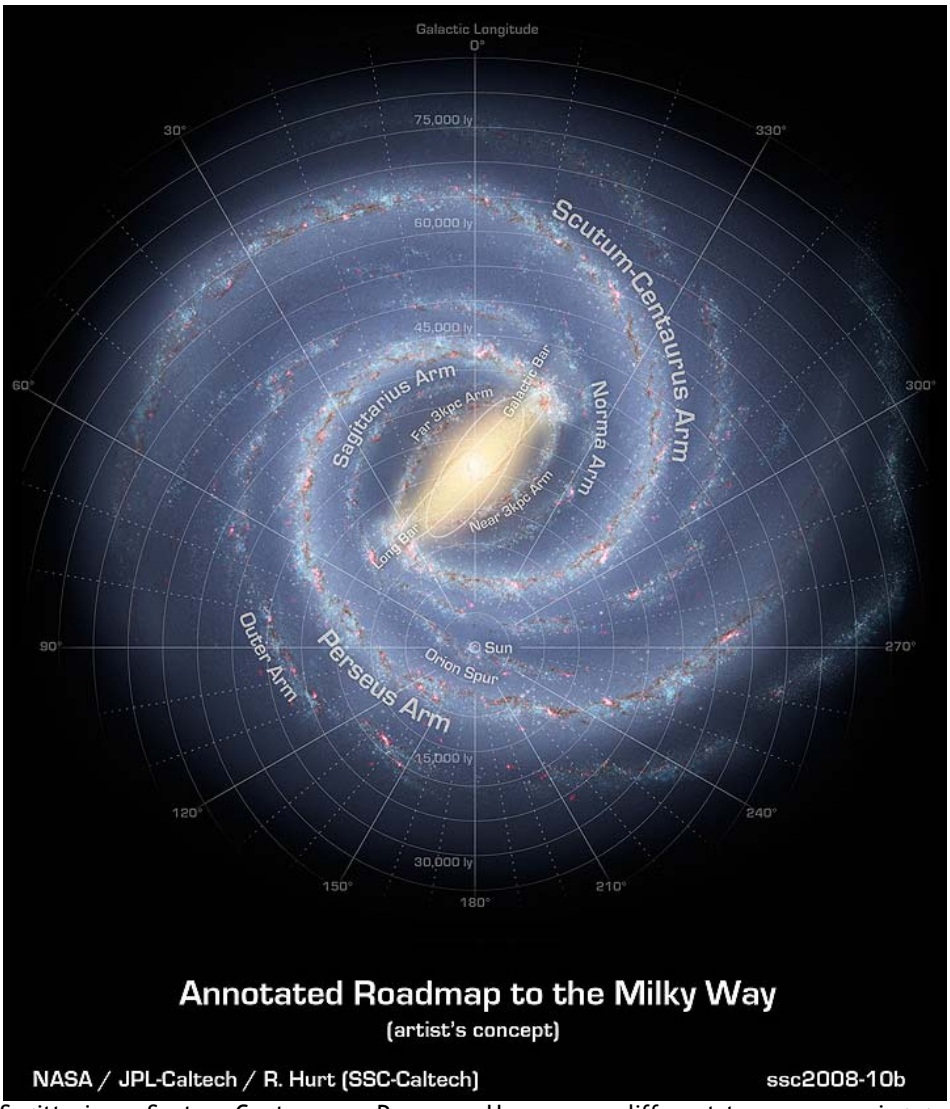
MESSENGER was able to observe Mercury's exosphere in three areas — the dayside, the day/night line, or terminator, and its 40,000 km-long sodium tail. Atoms of hydrogen, helium, sodium, potassium, and calcium have been seen in the exosphere, and many other elements almost certainly exist there. These atoms are accelerated away from Mercury by solar-radiation pressure and form a long tail of atoms flowing away from the Sun. But their abundances differ depending on whether it's day or night, effects from the magnetic field and solar wind, and possibly the latitude.

Another significant scientific surprise involves Mercury's magnetosphere - the bubble of magnetism surrounding the planet. Mercury's magnetosphere is full of many kinds of charged particles, both atomic and molecular. What is in some sense a 'Mercury plasma nebula' is far richer in complexity and makeup than the Io plasma torus in the Jupiter system. The composition of the nebula doesn't match that of the solar wind, leading researchers to conclude that this material came from the planet's surface. This observation means that this flyby got the first-ever look at surface composition. Two more flybys are scheduled for Oct. 2008 and Sept. 2009. MESSENGER will actually go into orbit around Mercury in 2011. – *Science@NASA*

New Milky Way Map

New findings make a case that the Milky Way has a grand, simple structure of just two major spiral arms, along with two minor ones, rather than four equal ones as theorized in the past. A team led by Robert Benjamin of the University of Wisconsin used the recently completed Spitzer Space Telescope mid-infrared survey of the Milky Way, which spans 130° of the galactic plane centered on the galaxy's center in Sagittarius. Mid-infrared light penetrates dust especially well. Previous studies led astronomers to conclude the galaxy has a pronounced central bar and four major spiral arms, named for constellations where early researchers identified parts of them: (⇨ *p. 64).*





Sagittarius, Scutum-Centaurus, Perseus, and Norma. Using software developed by Benjamin that counts stars and sorts them by their type and likely distances, the team mapped stellar distributions and noticed an increase in the number of stars where the Scutum-Centaurus Arm is thought to be. This agreed well with earlier studies.

But when the team analyzed the areas of the Sagittarius and Norma arms, they saw no such big increase in stars. These two arms contain gas and clusters of young stars, while the Scutum-Centaurus arm consists of both young and old star populations.

What's more, the Scutum-Cen Arm connects nicely with one end of the galaxy's central bar, as does the Perseus arm with the other. In this picture, Sagittarius and Norma become mere "minor arms." Many other barred spiral galaxies have this structure, dominated by two spiral arms originating from the bar's ends.

However, a different team — mapping gas with data from the Far Infrared Absolute Spectrometer (FIRAS) aboard the Cosmic Background Explorer (COBE) satellite — claims that the Milky Way indeed has four large arms and that they are not identical in form, at least within 30° of the galactic center. The conflict between these studies arises because the FIRAS data maps interstellar gas density (using ionized carbon and nitrogen atoms as tracers), whereas the Spitzer study maps both gas and stars. The actual difference between the four-arm and two-arm models may only be what each team defines as a full-fledged spiral arm. Speaking of the Spitzer results: the survey is the largest, highest-resolution mid-infrared portrait of our galaxy ever done, consisting of more than 800,000 individual frames.

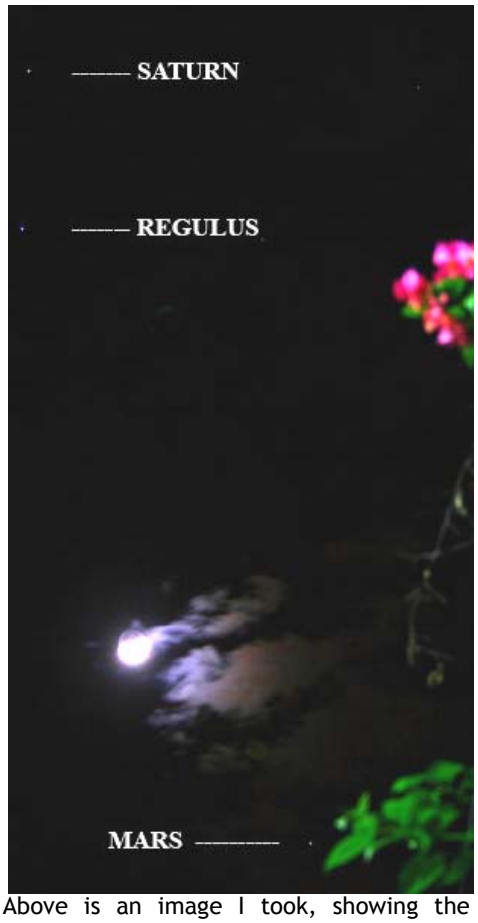
Meanwhile, other astronomers announced finding another piece of Milky Way symmetry. Some 50 years ago an inner "Expanding 3-kiloparsec Arm" was identified only 3 kiloparsecs (10,000 light-years) on our side of the galactic center. Now Tom Dame and Patrick Thaddeus (Harvard-Smithsonian Center for Astrophysics) find evidence for its far-side counterpart. The new "Far 3-kpc Arm" seems to be a twin of the near one.

And in other recent Milky Way mapping news, radio astronomers have measured parallaxes (distances) and velocities of young, maser-emitting stars scattered around the galaxy. These stars turn out to be on surprisingly elliptical galactic orbits, perhaps due to effects of today's spiral arms on star-forming gas clouds. - *Sean Walker, SkyandTelescope.com*

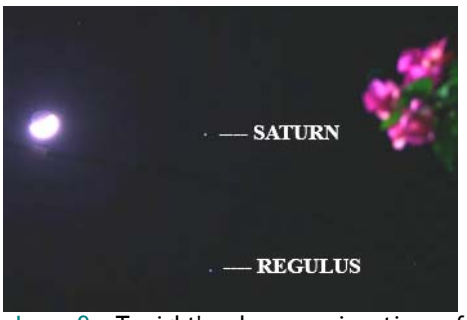
Observing Log

Conjunctions

June 8. After reading from www.spaceweather.com that there will be a nice conjunction of the crescent Moon together with planet Saturn and bright star Regulus on June 8 (June 9 Phil Time), I had the chance to image them one day in advance so that I can compare their positions in the sky.



Above is an image I took, showing the Moon below Saturn and Regulus and planet Mars below the overexposed Moon. The image was taken using a Canon 300D DSLR with EF-S 18-55 mm lens set at 55 mm (equivalent to 85 mm in 35 mm format) at f/5.6 *(⇨ p. 65).*



June 9. Tonight's close conjunction of Moon, Saturn and Regulus was a sight to behold. The magnificent trio formed a triangle that was a good photo-opportunity for astro-imagers like me. Image above taken using the same setup as the night before. - *James Kevin Ty*

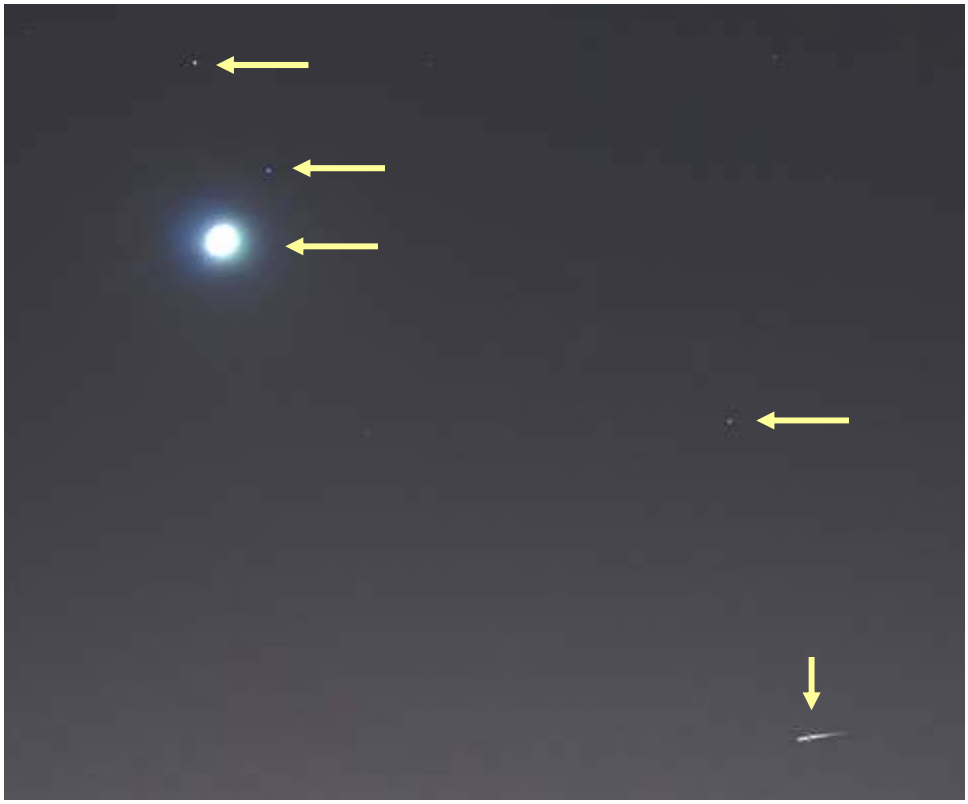
June 8 (June 9 in the Philippines). Tonight, June 8, the weather outside was hot and muggy, but at 11:03 p.m., there was a nice sight in the western sky - the Moon was with the pair of Regulus and Saturn, and as a nice bonus, Iridium 45 flared to mag. -6, 11 degrees above the horizon (*streak at bottom right on image at right*), plus we had Mars (above the Iridium flare).

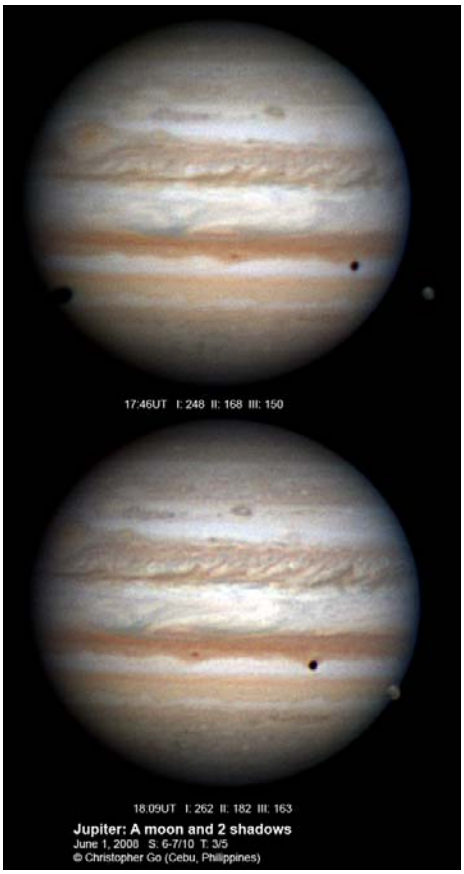
If you think about it, it was a nice progression of distances - the Iridium satellite was just above Earth's atmosphere, then the Moon was some distance away, then Mars was a little farther, with Saturn further still, all the way to Regulus. A hop, skip, jump, and dash to see all these objects.

As an additional benefit, the International Space Station (ISS) passed by earlier (*above*), at around 9:30 p.m., during twilight, so the sky was still blue, but the ISS was shining nearly as bright as Venus. - *Jun Lao, Mason, Ohio*

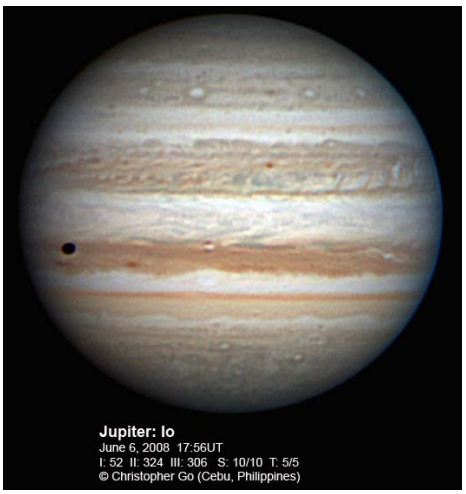
Jupiter

June 1. Transparency was not good this morning because of thin clouds. Seeing was just average. It is very nice to see the shadows of Ganymede and Europa at the same time. Note how huge the shadow of Ganymede is compared to that of Europa. Note also some details on the disk of Ganymede.





The 3 red spots are setting in this image. Note the South Temperate Belt (STB) white oval with a dark ring at the Central Meridian (CM). The South Tropical Zone-1 (STrZ-1) oval seems to be fading. The South Equatorial Belt (SEB) outbreak is really huge.



June 2. It was a little scary this morning. Jupiter was just 20 degrees above a big storm cloud - there was thunder and lightning. Fortunately, seeing was very good and transparency perfect. These are some of my best images this season. Note the activity on the SEB. There are a lot of small red and white spots on the SEB, while the SEBn has some parts of the SEB outbreak.

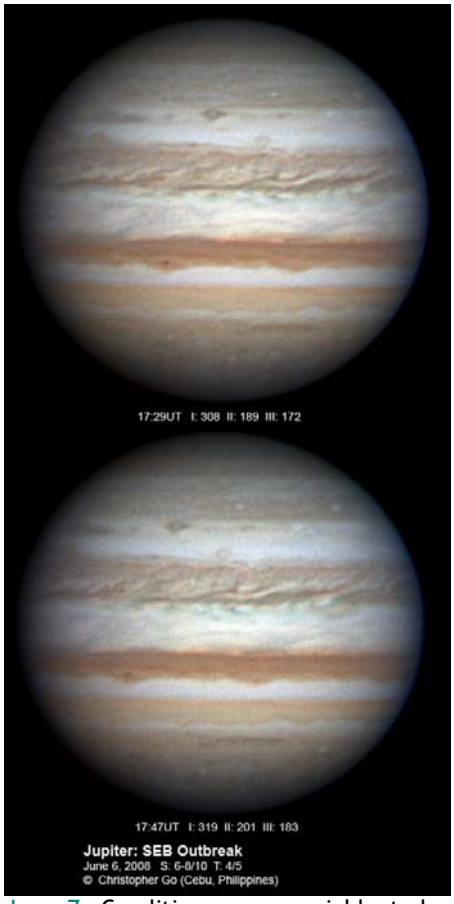
Io can be seen at the North Equatorial Belt (NEBn). Io's shadow is on the left. Note the white oval Z on the NEBn, and the bluish feature at the center of this oval. The NEB outbreak can be seen rising on the right. Note the detail on the northern hemisphere. There are a lot of tiny white spots and other interesting features *(⇨ p. 66).*

June 3. The sky was clear this morning. Sadly, seeing was just average - only 7 to 8, probably because of the northerly wind. Seeing is never great when the Great Red Spot (GRS) is around. Sigh. The 3 major red spots of Jupiter are clearly visible - in fact, even a hint of the North North Temperate Belt Little Red Spot (NNTB LRS) is visible setting on the left. All 3 spots are getting very close to each other *(see cover)*.

Note the bright batch at the Equatorial Zone (EZs) just before the GRS. Is this the South Equatorial Depression (SED)? The festoon activity at the EZ has returned. Note the major festoons appearing at the northern edge. The NNTZ seems to be fading a little bit. It is not as bright white as before.

June 4. Another thrilling morning! The sky started clear but thunderclouds appeared. Seeing was perfect but transparency was poor (*above*). Five minutes after my last image, it rained HARD! The SEB is very busy because of the outbreak. Note the greenish feature at the area where the SEB outbreak meets the SED. The EZ is really very busy.

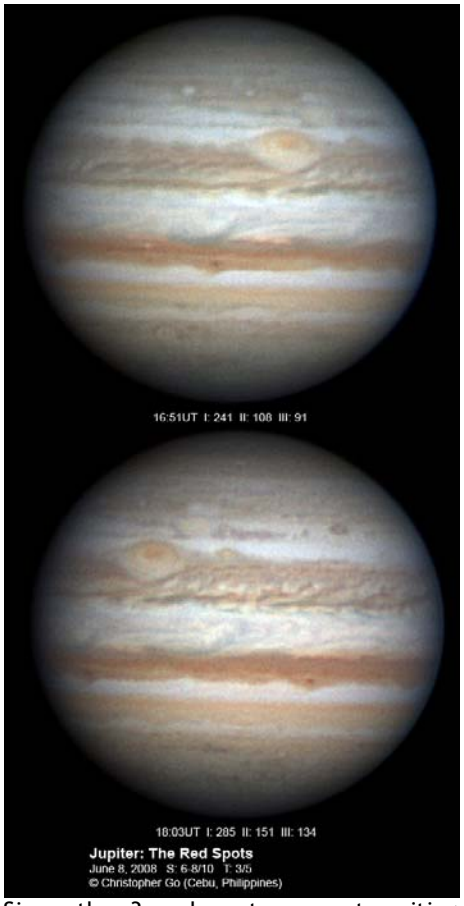
June 6. It was mostly cloudy today. I had to image between clouds (*center top*). Seeing wasn't great either, just average. Note the complex SEB disturbance leading up to the GRS on the left. Note the yellow green feature on the SEBn - this is where the SED meets the SEB outbreak. The STrZ Oval 1 looks like it's fading. The SEBn/EZ border looks complex in this image. The dark ring around the white oval looks very interesting. This feature has been prominent during the past few weeks. Note the long Folded Filamentary Region (FFR) above this feature. The NEB looks very quiet here.



June 7. Conditions were variable today. It started with a lot of clouds and low transparency, but conditions improved as Jupiter rose higher in the sky.

This image (*above*) features the complex SEB Outbreak and the bright NEB outbreak. 4 white spots are lined up at the South South Temperate Belt (SSTB). The SEB outbreak is very interesting. Most of the outbreak material is in the SEBn, while there are dark red spots and white spots at the mid-SEB.

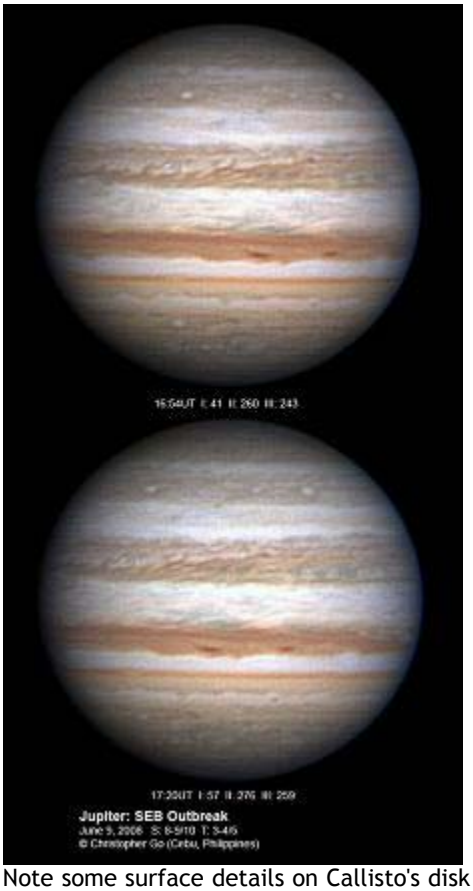
June 8. The sky was clear when I woke up. After taking a few images, clouds rolled in.



Since the 3 red spots were transiting (*above*), I waited for the clouds to pass. It took almost an hour for the clouds to pass. Seeing was very variable from poor to good. The NNTB LRS is visible in the 1st image. The white spot that was close to it has disappeared. It has probably merged with the LRS.

The GRS, Oval BA (Red Spot Jr.) and the STrZ Red Oval (RO) are vey close now. Note that while BA is pale orange, it seems to have expanded. The phenomenon seems to occur when it has a conjunction with the GRS. The SEB following the GRS is very busy, while the NEB is quiet. The NEBs is darker than the NEBn. The NTB is not very formed in this region. Note the small white spot forming at the NEBs after the CM of the 1st image.

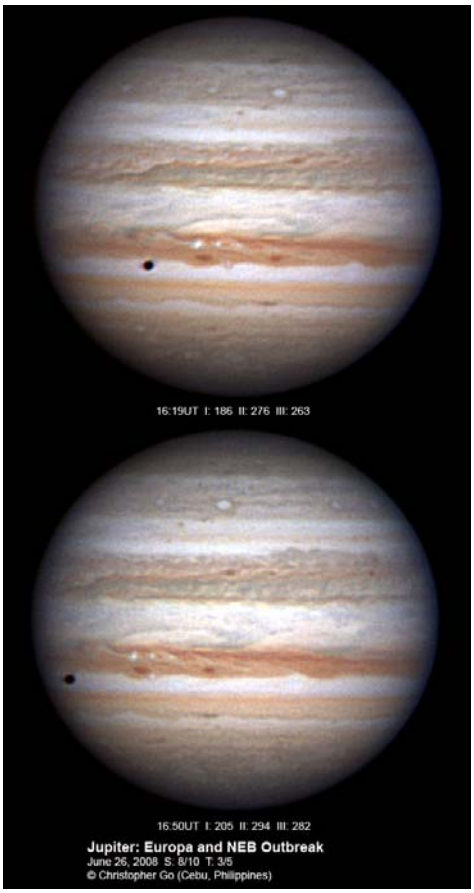
June 9. Conditions were perfect this morning. The SEB Outbreak is really very complex. The bluish STB remnant can be seen in this image. Note the elongated dark oval on the NEBn. This is the product of the merged ovals. White Oval Z can be seen rising on the right. Note that the NNTZ is slowly turning dark. It is no longer bright white as before *(⇨ p. 67).*



Note some surface details on Callisto's disk (*above*). Callisto is really a very dark moon - the area around it is very busy.

June 23. I'm back from my trip, but Typhoon Fengshen came. It was devastating, especially when a ferry overturned 320 kms. north of my area. My buddy Tomio's C14 was also a casualty. It fell off its mount and the corrector and tube broke. This is really painful because of the excellent IR, UV and CH4 images that Tomio contributes. The SEB is very busy (center top). Note the STrZ Oval. The STB blue remnant is prominent. Note also the white spot at the NTB. The NEB outbreak can be seen rising on the right. Note the dark red spot at the NEBn north of the outbreak. Note the huge white spot at the NNTB.

June 26. Seeing was very good this evening but transparency was bad because of clouds. The SEB has a lot of complex activity. Note the dark spots at the mid-SEB just before the CM. The NEB has a lot of white spot activity. Is the rift redeveloping? Europa is just north of the NEB and is following its shadow. Note the dark oval at the NEBn. Note also the large white ovals at the NEBn (*right*). The white bar of the NNTZ is fading - note the dark formation on its southern edge. The southern polar area is notably dark. - *Chris Go, Cebu*



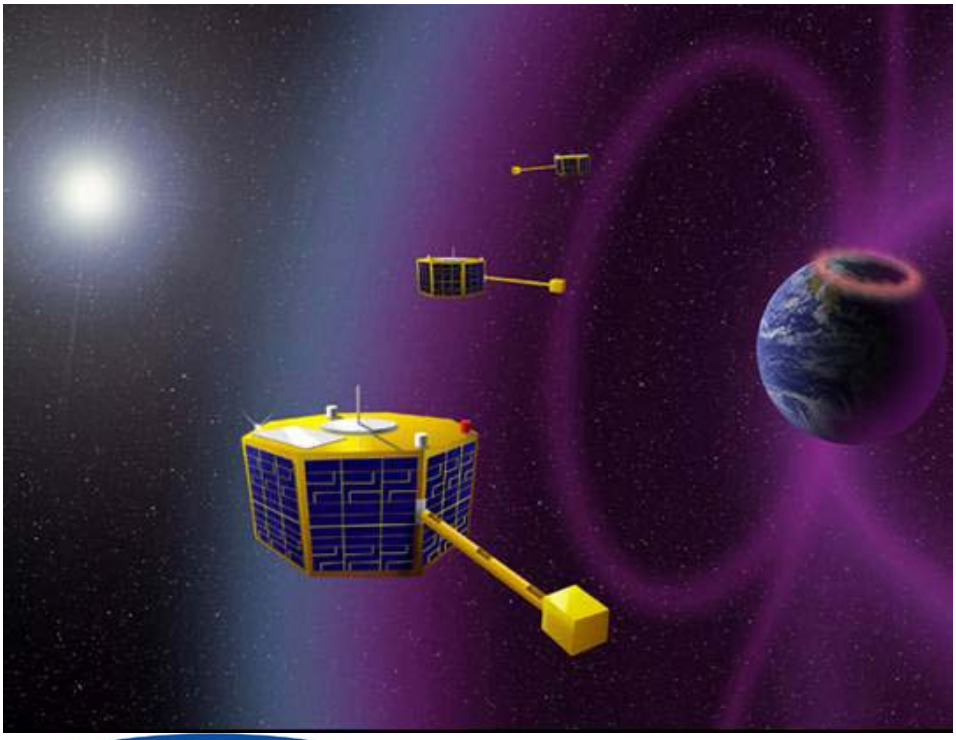
June 8. I wanted to see what a 5-inch refractor could do on a night of mediocre seeing. Above is the result with the AP127 f/40 DBK21 S4 T4. - *John Nass, Baguio*

Sky Calendar

July is normally a time when the rainy season holds full sway over the country, and the days when it is not raining may still be cloudy and humid.

The Sky

DAY	*HR*	*EVENT*
JULY 2008		
01	12:05	Mars 0.7° N of Regulus
02	01:45	Mercury Greatest Elongation - 22° W
03	10:18	NEW MOON
03	22:20	Venus 1° S of Moon
04	17:55	Earth at Aphelion
05	03:44	Moon 0.9° S of Beehive star cluster
09	15:41	Jupiter at Opposition
10	12:34	FIRST QUARTER
11	14:23	Mars 0.8° S of Saturn
14	19:05	Moon 0.8° S of Antares
18	15:58	FULL MOON
19	02:50	Venus 0.3° S of Beehive star cluster
26	02:41	LAST QUARTER
27	22:59	Moon 0.5° N of Pleiades
28	10:08	Delta Aquarids Meteor Shower Peak
30	04:04	Mercury at Superior Conjunction
30	06:46	Mercury 0.1° N of Beehive star cluster



Above, The Space Technology 5 micro-satellites proved the feasibility of using a constellation of small spacecraft with miniature magnetometers to study Earth's magnetosphere.

Space Buoys
By Dr. Tony Phillips

Congratulations! You're an oceanographer and you've just received a big grant to investigate the Pacific Ocean. Your task: Map the mighty Pacific's wind and waves, monitor its deep currents, and keep track of continent-sized temperature oscillations that shape weather around the world. Funds are available and you may start immediately.

Oh, there's just one problem: You've got to do this work using no more than one ocean buoy.

"That would be impossible," says Dr. Guan Le of the Goddard Space Flight Center. "The Pacific's too big to understand by studying just one location."

Yet, for Le and her space scientist colleagues, this was exactly what they have been expected to accomplish in their own studies of Earth's magnetosphere. The magnetosphere is an "ocean" of magnetism and plasma surrounding our planet. Its shores are defined by the outer bounds of Earth's magnetic field and it contains a bewildering mix of matter-energy waves, electrical currents and plasma oscillations spread across a volume billions of times greater than the Pacific Ocean itself.

"For many years we've struggled to understand the magnetosphere using mostly single spacecraft," says Le. "To really make progress, we need many spacecraft spread through the magnetosphere, working together to understand the whole."

Enter Space Technology 5.

In March 2006 NASA launched a trio of experimental satellites to see what three "buoys" could accomplish. Because they weighed only 55 lbs. apiece and measured not much larger than a birthday cake, the three ST5 "micro-satellites" fit onboard a single Pegasus rocket.

Above Earth's atmosphere, the three were flung like Frisbees from the rocket's body into the magnetosphere by a revolutionary micro-satellite launcher. Space Technology 5 is a mission of NASA's New Millennium Program, which tests innovative technologies for use on future space missions. The 90-day flight of ST5 validated several devices crucial to space buoys: miniature magnetometers, high-efficiency solar arrays, and some strange-looking but effective micro-antennas designed from principles of Darwinian evolution. Also, ST5 showed that three satellites could maneuver together as a "constellation," spreading out to measure complex fields and currents.

ST5 was able to measure the motion and thickness of current sheets in the magnetosphere. This could not have been done with a single spacecraft, no matter how capable. The ST5 mission is finished but the technology it tested will key future studies of the magnetosphere. Thanks to ST5, hopes Le, lonely buoys will soon be a thing of the past.

Learn more about ST5's miniaturized technologies at nmp.nasa.gov/st5. Kids (and grownups) can get a better understanding of the artificial evolutionary process used to design ST5's antennas at spaceplace.nasa.gov/en/kids/st5/ emoticon.

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ALP SOCIALS

The ALP is coming up with a social get-together to meet with fellow members. This will take place at PAGASA Observatory, Quezon City on July 20, 2008 late afternoon till we drop (with rain date of August 3, 2008). It's time to showcase your telescopes and your binoculars, from the latest to the oldest equipments. Show us what you have! If weather permits we get to do some stargazing as well.

Young ALPers get the chance to rub elbows and mingle with the young once. Get comments, hear the ooohhhhs and the ahhhhhs…. it's a night of fun! Take part in our first-ever astronomers' SWAP MEET. Your eyepieces, mounts, scopes, binoculars, laser pointers, cameras, starmaps, gadgets and gizmos, back issues of astronomical magazines, 2nd hand books, Star Wars toys or any astro-related goodies. If you have any items sitting around your house that you don't need anymore, go ahead and put them up! REMEMBER, ONE MAN'S GARBAGE IS ANOTHER MAN'S TREASURE.

Mark your calendar: JULY 20, 2008 - You don't want to be left out on our 1st group pictures for our ALP YEARBOOK. - *Angie Tan*