alpha
Astronomical League of the Philippines' *HerAld*

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## FEATURE IMAGE THIS ISSUE

This month we feature an image of something that you normally don't see – it's the absence of stars – black clouds in the Milky Way. This image is of the Sagittarius Little Star Cloud, M24, a Messier "object" that isn't really an "object", and where you have two dark nebulae – clouds of gas and dust that are opaque due to no nearby stars illuminating the gas cloud. More on this from imager John Nassr on page 89. © *John Nassr*

## CLUB NEWS

### June Meeting

Last June 6, 2010, members of the Astronomical League of the Philippines (ALP) held their monthly meeting at the Manila Planetarium at 3 p.m. Members who attended were ALP President James Kevin Ty, wife Charito and son Kendrick Cole (KC); VP Jett Aguilar; PRO Armando Lee; Andrew Ian Chan; Treasurer Henry So and friend Marilene Ng; Tommy Tan; Belen Pabunan; Christopher Louie Lu; Dennis Buenviaje; Dante Cruz; Rommel Palacpac; Mark Ian Singson; Michael Cruspero; Crispin Riosa; Kevin Dagunan; Christopher Lee; Nel Lagda; Desiree del Rosario; Micky Natividad; and, new member John Ray Cabrera.

The meeting started at around 3:30 p.m. with Dr. Jett Aguilar (*below, left*) updating members on the Jupiter impact that Australian amateur astronomer Anthony Wesley got to image and view live last June 6, 2010, with our very own ALPer Christopher Go documenting it, as well as confirming the impact. They were the only 2 amateur astronomers who documented the event.

Afterwards, Dr. Armando Lee (*above*) lectured about the large scale properties of the Milky Way galaxy. He lectured on Interstellar extinction; the range in luminosity for stars in the region of the Sun; and, Stellar populations. These are topics which are seldom presented in astro club meetings. He started off by speaking about atmospheric extinction to explain its relation to the study of the whole Milky Way galaxy. The previous error in estimating the size of the Milky Way was explained in the light of interstellar light extinction in the galactic disk. Kapteyn's underestimation and Shapley's overestimation of the size of the Milky Way galaxy was discussed in relation to interstellar light extinction.

Afterwards, ALP President James Kevin Ty (*above*) gave a summary report of the May 16 Venus Occultation by the thin Crescent Moon. This event happened around 7:36 p.m. with the planet Venus disappearing on the dark limb of the Moon and reappearing again on the bright limb of the Moon around 8:16 p.m. All 3 ALP observing sites at AstroCamp Observatory; Nasugbu, Batangas; and, Candaba, Pampanga, successfully documented the ingress and egress of the event. Still and video images of the Venus Occultation were also presented to the members (⇨ *p. 82*).

Armand then reminded the members/ audience about the atmospheric extinction (earlier explained in his lecture) as he showed his video (with GPS time inserted frames) of the said event. He then discussed the upcoming June 26, 2010 Partial Lunar Eclipse. The event will start several minutes earlier when the Moon rises from the east south east horizon.

Lastly, James announced this year's ALP SportFest will be held in July and August. The 5th ALP 9-Ball tournament will be held first on July 18, 2010 at Playdium. 2008 Champion Andrew Ian Chan will be defending his title against participants James Kevin Ty, Edward Eli Tan, Henry So, Aldrin Palacio, Rommel Palacpac, Rich Pijuan and Babak Parhizkari. ALPers who want to participate should contact ALP President James Kevin Ty for further details pertaining to this event. Registration fee is P500. Trophies will be given to the top 3 participants.

The 2nd ALP Bowling tournament will also be held in Playdium in August (exact date will be announced next meeting). Among the early participants are James Kevin Ty, Andrew Ian Chan, Edgar Ang, Melisa Bata, Rommel Palacpac, John Ray Cabrera, Armando Lee, Myra Lee, Rich Pijuan, Christopher Louie Lu, and Micky Natividad. Members are encouraged to join either or both event as these activities are for our group bonding as well as have fun and relax during the rainy season. Competition is only secondary, so join the events. ALP IDs were also distributed to the members as well. The meeting ended at around 5:30 p.m. - *James Kevin Ty & Armando Lee*

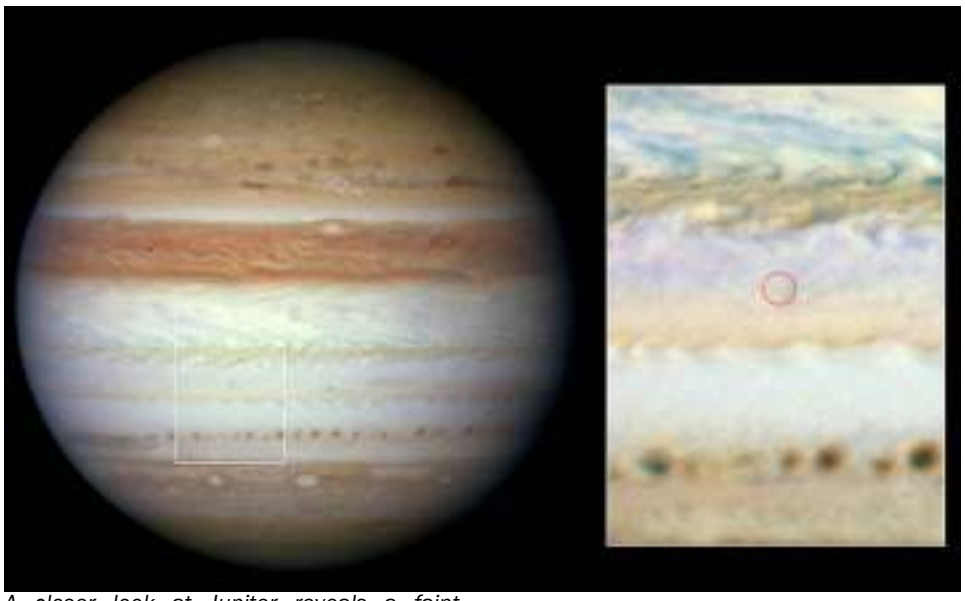
## *BREAKING* NEWS

### Jupiter Impact

Detailed observations made by NASA's Hubble Space Telescope have found an answer to the flash of light seen June 3 on Jupiter. It came from a giant meteor burning up high above Jupiter's cloud tops. The space visitor did not plunge deep enough into the atmosphere to explode and leave behind any telltale cloud of debris as seen in previous Jupiter collisions.

Astronomers around the world knew that something must have hit the giant planet to unleash a flash of energy bright enough to be seen 644 million kilometers away, but they didn't know how deeply it penetrated into the atmosphere. There have been ongoing searches for the "black-eye" pattern of a deep direct hit.

The sharp vision and ultraviolet sensitivity of Hubble's Wide Field Camera 3 were brought to bear on seeking out any trace evidence of the aftermath of the cosmic collision.



*A closer look at Jupiter reveals a faint imprint where the giant meteor touched its surface three days before. NASA/ESA/MH Wong/HB Hammel/Goddard Space Flight Center*

Images taken June 7, just over 3 days after the flash was sighted, show no sign of debris above Jupiter's cloud tops. This means that the object didn't descend beneath the clouds and explode as a fireball. "If it did, dark sooty blast debris would have been ejected and would have rained down onto the cloud tops, and the impact site would have appeared dark in the ultraviolet and visible images due to debris from an explosion," said Heidi Hammel of the Space Science Institute in Boulder, Colorado. "We see no feature that has those distinguishing characteristics in the known vicinity of the impact, suggesting there was no major explosion and fireball."

Dark smudges marred Jupiter's atmosphere when a series of comet fragments hit Jupiter in July 1994. A similar phenomenon occurred in July 2009 when a suspected asteroid slammed into Jupiter. The latest intruder is estimated to be only a fraction of the size of these previous impactors. "We suspected for this 2010 impact there might be no big explosion driving a giant plume and, hence, no resulting debris field to be imaged," said Hammel. "There was just the meteor, and Hubble confirmed this."

Australian amateur astronomer Anthony Wesley saw the flash at 4:31 p.m. EDT June 3. He was watching a live video feed of Jupiter from his telescope. In the Philippines, amateur astronomer Christopher Go confirmed that he had simultaneously recorded the transitory event on video (*still image on page 88*). The two-second-long flash of light in the videos of Jupiter was created by the same physics that causes a meteor (or "shooting star") on Earth.

A shock wave generated by ram pressure as the meteor speeds into the planet's atmosphere heats the impacting body to a high temperature, and as the hot object streaks through the atmosphere, it leaves behind a glowing trail of superheated atmospheric gases and vaporized meteor material that rapidly cools and fades in just a few seconds.

"Though astronomers are largely uncertain about the rate of large meteoroid impacts on the planets, the best guess for Jupiter is that the smallest detectable events may happen as frequently as every few weeks," said Mike Wong of the University of California at Berkeley. "The meteor flashes are so brief, they are easily missed, even in video recordings, or perhaps misidentified as detector noise or cosmic ray hits on imaging devices."

"It's difficult to even know what the current impact rates are throughout the solar system," said Amy Simon-Miller of NASA's Goddard Space Flight Center in Greenbelt, Maryland. "That's partly why we are so excited by the latest impact. It illustrates a new capability that can be exploited with increased monitoring of Jupiter and the other planets."

As a bonus, the Hubble observations also allowed scientists to get a close-up look at changes in Jupiter's atmosphere following the disappearance of the dark Southern Equatorial Belt several months ago.

In the Hubble view, a slightly higher altitude layer of white ammonia ice crystal clouds appears to obscure the deeper, darker belt clouds. "Weather forecast for Jupiter's South Equatorial Belt — cloudy with a chance of ammonia," Hammel said *(⇨ p. 83).*

The team predicts that these ammonia clouds should clear out in a few months, as it has done in the past. The clearing of the ammonia cloud layer should begin with a number of dark spots like that seen by Hubble along the boundary of the south tropical zone.

"The Hubble images tell us these spots are holes resulting from localized downdrafts taking place," Simon-Miller said. "We often see these types of holes when a change is about to occur."

"The Southern Equatorial Belt last faded in the early 1970s. We haven't been able to study this at this level of detail before," said Simon-Miller. "The changes of the last few years are adding to an extraordinary database on dramatic cloud changes on Jupiter." – *Space Telescope Science Institute*

## Pale Blue Crescent

Two Japanese spacecraft, one headed to Venus and another limping home from an asteroid, have beamed home snapshots of Earth that reveal our planet in different hues amid a sea of stars. The latest photos of Earth come from Japan's brand new Venus Climate Orbiter Akatsuki and the Hayabusa asteroid probe.

Akatsuki launched May 20 alongside a novel solar sail vehicle and other smaller payloads to begin a six-month trek toward the second planet from the sun. Hayabusa is returning to Earth from the asteroid Itokawa, which it visited in late 2005 and is due to land in Australia in June.

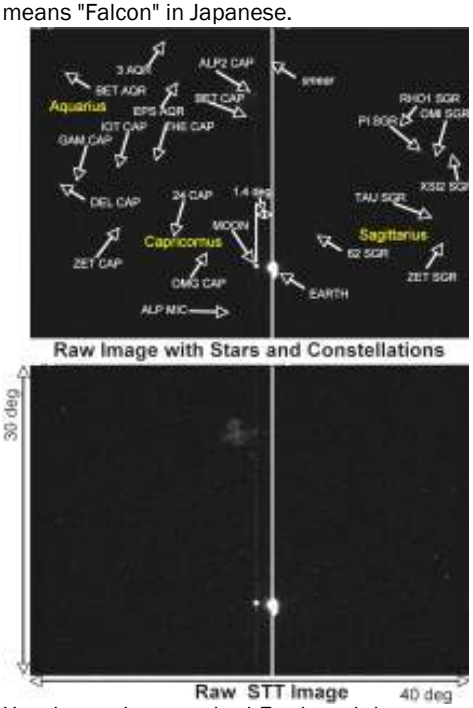
The photos of Earth from space by Akatsuki reveal a stunning crescent as the planet appeared to the probe's ultraviolet and infrared cameras.

In ultraviolet, the Earth appears as a dazzling blue sliver, while the same crescent has a vibrant orange hue in infrared. Akatsuki ("Dawn" in Japanese) was flying about 250,000 km. from Earth when it imaged the planet. Akatsuki also used its long-wave infrared camera to take a snapshot of the entire Earth, though the planet may be unrecognizable to the uninitiated.

Earth's trademark blue oceans and white clouds are rendered only in black and white. Japan's Akatsuki mission is expected to observe Venus in unprecedented detail to study its ever-present clouds and hidden surface. The spacecraft is expected to reach Venus in December and spend two years studying the planet.

The IKAROS solar sail vehicle also launched with the Akatsuki probe and will make a pit stop at Venus before heading off to the far side of the sun. Both spacecraft are doing well, JAXA officials said.

The other view of Earth is an ultra-long shot that came earlier this month from Japan's beleaguered asteroid probe Hayabusa, which means "Falcon" in Japanese.




Hayabusa photographed Earth and the moon, from a distance of nearly 13.5 million km. on May 12. "The Earth was seen so brightly that the image contained [a] strong smear in it, but the image clearly separates the Moon from the Earth," officials with the Japan Aerospace Exploration Agency (JAXA) said in a statement.

Hayabusa used the CCD sensor on its star tracker device to take the portrait of Earth and the moon as they hovered between the constellations Sagittarius and Capricornus. In the photo, the moon is clearly seen as a separate bright object to the left of Earth, which is so bright it overwhelmed Hayabusa's sensor. Many stars, which Hayabusa's star tracker also picked up, are visible and can be identified in the image.

Hayabusa launched in 2003 to visit the asteroid Itokawa and snatch samples of the space rock so they could be returned to Earth. But the 430-kg. spacecraft has suffered a series of setbacks. Telemetry has shown it did not fire the projectile device intended to kick up material from Itokawa's surface after it landed. Mission scientists hope that some material managed to enter Hayabusa's sample container despite the glitch.

A fuel leak, power outage and communications dropout beset the probe during its seven-year voyage. Its ion engines have also suffered multiple failures, though JAXA engineers managed to revive some systems and send the probe on a long detour through space in order to return it to Earth. Hayabusa is currently on track to land in the Australian outback sometime in June, about three years later than its original scheduled return. – *Space.com*

# Reports

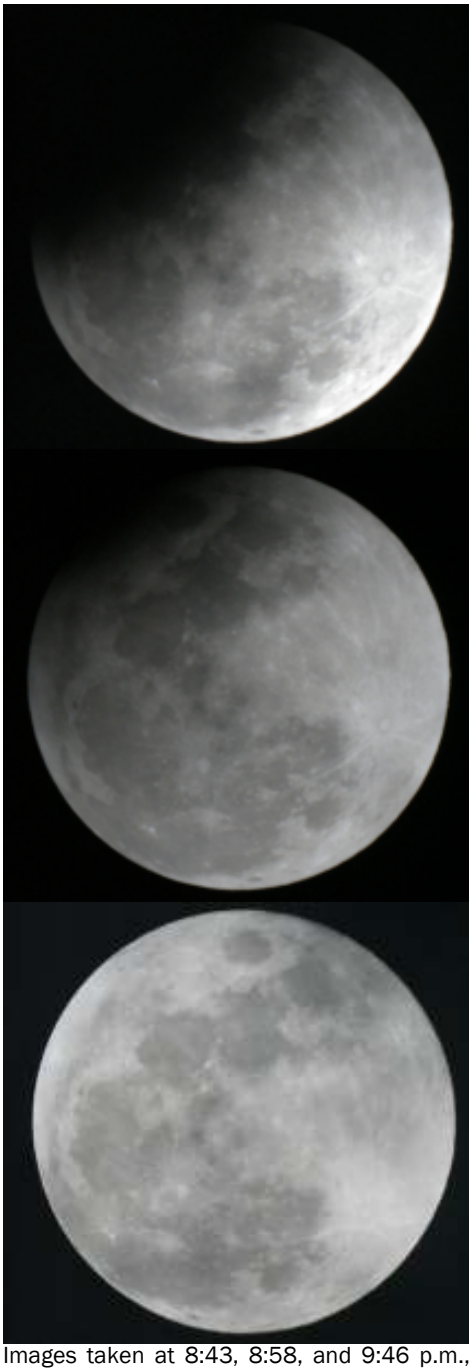
## Partial Lunar Eclipse

A partial lunar eclipse was partly visible in the Philippines last June 26, 2010, amid poor weather condition across most of the country. Nevertheless, ALPers across the country were able to document the event past maximum eclipse.

## AstroCamp Observatory Service, SMBY, SM MOA

Last June 26, 2010, the ALP team stationed at Astrocamp Observatory set up their telescopes at 6 p.m. inside the grounds of Astocamp Observatory in SMBY Park, SM Mall of Asia Complex in Pasay City. They were Kevin Dagunan, Crispin Riosa, Mark Singson, Michael Cruspero and Dr Armando Lee. With them were the MS Astronomy students of Rizal Technological University (RTU) namely; Jimdel Macapagal and Pee Jay Lim. Also present were Victor Espartero of Astrocamp Observatory and a guest friend of PeeJay - Jovan Aboga-a. The group was already at the site at around 6 p.m. but since the eastern sky was heavily clouded out, they first observed the planets Venus, Mars and Saturn as they waited for the Moon to show up behind the clouds.

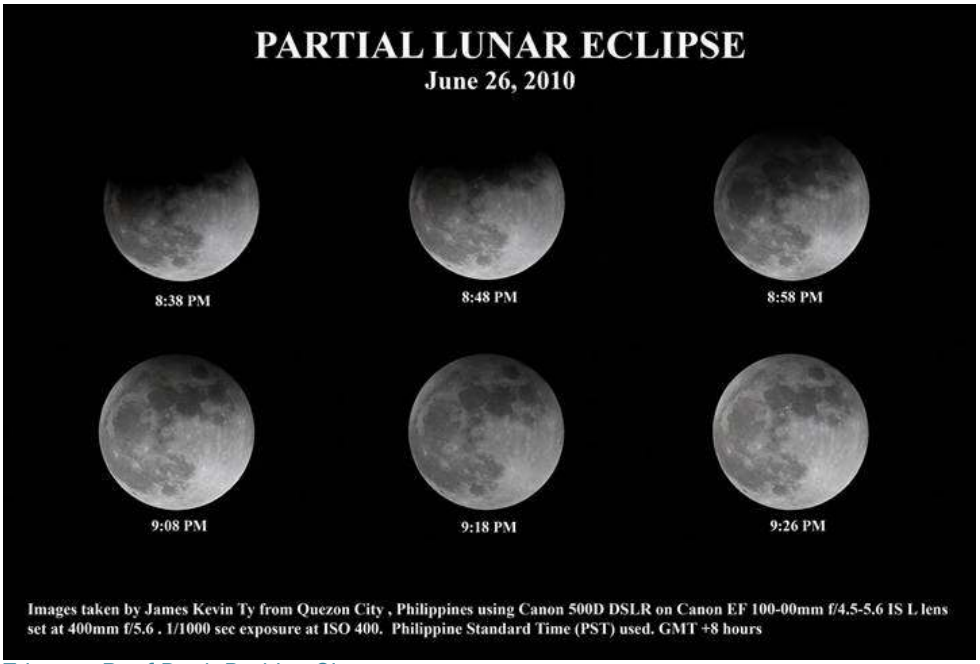
Dr Lee and Michael Cruspero set up the Apex 127 Maksutov on an ASGT mount and used a Canon EOS 350D at prime focus. Dr Lee also set up his Celestron C90 on a photo tripod and instructed Jimdel Macapagal on how to take prime focus images with his Canon EOS450D. Kevin Dagunan helped out Jimdel in setting up his camera and adjusting the tripod in a way to avoid the glare from the big bright lamp post in SMBY Park. The team was all set and ready by the time the Moon already entered the maximum phase of the partial eclipse, which was at 7:38 p.m. local time. Unfortunately, the time for the maximum coverage of the partial eclipse came and the clouds remained at the eastern sky *(⇨ p. 84).*



Images taken at 8:43, 8:58, and 9:46 p.m., respectively by Dr. Armand Lee and Michael Cruspero using Canon EOS350D at prime focus with 127mm f/12.7 Maksutov telescope.

It was not only until 13 minutes after the maximum did the group glimpse the Moon though breaks in the clouds, as rain fell on the site. Umbrellas were deployed as the group tried to shoot with their telescopes and cameras. Then, after a few minutes, the Moon disappeared behind clouds again. This happened several times, but the group did not lose hope and stayed fixed in their stations as they patiently waited for the breaks in the clouds.

They were able to catch several images of the partial lunar eclipse from 7:53 p.m. to 9:00 p.m., but gave up before the egress of the penumbral phase because of thick clouds. They noticed and observed that some 15 mins. after the end of the egress of the penumbral phase, the sky turned clear with very minimal clouds! Just right after the eclipse the sky turned good! Such was the experience this event brought to the members of ALP and RTU MS Astronomy. Patience is indeed a virtue indispensable in astronomy but still THE SKY (condition) IS THE LIMIT! - *Armando Lee*




## Trinoma Roof Deck Parking Site

Last June 26, there was a partial lunar eclipse that was visible in the country. James Kevin Ty went to Trinoma Mall in Quezon City at around 4:00 p.m. and parked the car at the roof deck of Mindanao Parking Area. Fellow ALPer Andrew Ian Chan had scouted the area already before and told me that the ESE position at the roof deck has a clear area to observe and image the eclipse. Unfortunately, Andrew could not join because he had a prior commitment to attend his best friend's debut. James was supposed to have Zed Contractor join, but he had to beg off because he was worried that the weather will not cooperate that evening.

For this eclipse, James opted to bring along a Canon EF 100-400mm f/4.5-5.6 IS L lens to image the Moon. He brought a portable setup Sky Memo mount as well as a sturdy tripod to use, whichever was practical. The Sky Memo was so portable that it could fit into the camera backpack easily compared to the workhorse Vixen GP-DX mount which was bulky and heavy as well.

While waiting for the eclipse to start at around 6:24 p.m., he was able to meet new ALP member Jenine Rochelle Yee, who used the opportunity to fill up her application to join us officially, as well as get to meet and get info on buying a telescope for a beginner. He was also able to meet up with fellow ALPer Lea Visaya at the roof deck at around 6:30 p.m. to give her ALP ID as well as use the opportunity to observe the eclipse together.

Unfortunately, the weather was so cloudy in the east southeast horizon that they missed observing the eclipse at moonrise.

At around 7:15 p.m., rain started to fall and both of them had to use James' car trunk door as a rain shield. With the weather getting worse, Lea opted to go down to the lower floor and try to observe the eclipse there. James opted to stay put and waited till around 8:25 p.m. before he saw a faint Moon glow from the thick rain clouds! He quickly brought out his Sky Memo and tripod and camera lens to the side of the concrete roof and started to image the eclipsed Moon through thick clouds (*eclipse sequence shown above*). Lady luck then started to smile on him as the Moon started to show despite the rain, and he was able to start imaging the eclipse despite continued rains *(⇨ p. 85)*

The Moon image was a little soft at the start and got better and better at around 8:35 p.m. when the rain stopped, and James brought out his mount and set it beside his car. He was able to image the latter part of the eclipse from 8:30 p.m. till 9:26 p.m. before clouds started to roll in again. As he was imaging the eclipse, he was also able to show the partial eclipse in between exposures to a batch of Trinoma security guards who were at the roof deck, getting their orientation from their security head. They were delighted, as well as surprised to know that there was an eclipse going on and commented to James that the eclipse view was beautiful and they were amazed at the setup he had that evening. Very portable indeed! James packed up at around 9:30 p.m. and went home very happy and glad that he was able to observe the eclipse and still not come out empty handed. - *James Kevin Ty*

## Partial Lunar Eclipse Gallery

Image taken at 8:42 p.m. PST using Canon 400D on Canon EF 70-300mm lens set at 300mm f/8. 1/1000 second exposure at ISO 800. – *Nathaniel Custodio*

Image taken with a C8 SCT and Canon XS/1000D at prime focus at around 8:40 p.m. PST. – *Hernando Bautista*

What follows is a sequence of images taken by Ted Gonzaga, from Iloilo. Images taken using Canon EOS 550D DSLR with Vixen R130 reflector at prime focus.

– *Ted Gonzaga*

*(⇨ p. 86)*

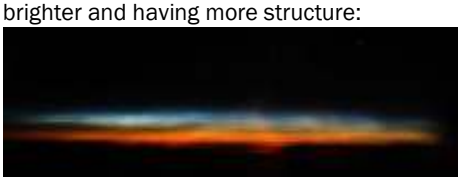

Sequence of images taken using Canon A540 Point and Shoot Digicam on Orion Starblast 4.5" f/4 reflector. – *Vincent Lao*

Below is a sequence of images of the partial solar eclipse taken with a Canon PowerShot SD400 digicam, coupled afocally to a Meade ETX-90 and 32mm Plossl eyepiece. - *Raymund John Ang*

## Noctilucent Clouds

June 22. Was on a plane to Belgium for meetings, and I was on the lookout for noctilucent clouds. These are electric blue high-altitude clouds composed of ice crystals (like cirrus clouds) that reflect the light of the Sun even if the Sun was waaay down in altitude.

I didn't see them after sunset as we left Canada, but I woke up during the flight to see blue clouds above a pitch black horizon and sky. The noctilucent clouds were also visible before sunrise! I figured it out when I recognized the stars above the clouds to be Capella and the stars of Perseus, so this was the early morning pre-dawn sky over the North Atlantic Ocean. As dawn approached, I saw more detail on the clouds. The sequence below shows how they looked when I first saw them, and as we went eastward and saw the brightening light of dawn, how the clouds started becoming brighter and having more structure:



The images I took were hard to do, as I had to position my camera on the window, put up a blanket to deflect stray light from inside the plane, have a steady hand, and press the shutter for a 5-second handheld exposure. There's some movement/trails in Capella, but the clouds still turned up nice.

Seeing that Capella was there, I was struggling to see if I could pick out Comet McNaught R1 with the naked eye. Alas, I didn't have binoculars with me to see the comet, which should continue to be brightening and dropping in elevation. - *Jun Lao, Mason, Ohio*

## Comet McNaught R1

June 8. I got up early at 3:30 a.m. yesterday to visually observe and image Comet McNaught R1 which was brightening as it approached the warmth of the sun. Its tail reportedly now extended over 5 degrees and its coma was visible at magnitude 5 under dark skies.

The sky was spectacularly clear and steady here in Baguio yesterday morning but the last quarter moon was still very bright and just a few degrees from the comet, which from my observatory hid behind a tall tree and was unable to be imaged!! I nevertheless caught an unobstructed view of it through binoculars and could just barely make out a faint tail. It was easy to spot beside Almach in Andromeda. – *John Nassr, Baguio*

Last June 13, ALPers James Kevin Ty and Andrew Ian Chan proceeded to Caliraya, Laguna to try to recover Comet McNaught C/2009 R1 as that weekend was the best chance for them to see it before it got too close to the glare of the Sun. Despite very bad weather in Manila as well as earlier news of drizzle in the afternoon at Caliraya, they left Manila at around 8:30 p.m. and arrived at the site at around 11:30 p.m.

The weather was hazy but most of the zenith objects were clear. The Milky Way region in the Scorpius/Sagittarius region was clearly visible as it stretched to the constellation of Cygnus. Unfortunately, Polaris was covered by clouds, thus they were not able to do any serious astrophotography. James used that opportunity to use a binocular to observe the DSOs found in the Scorpius/Sagittarius region while Andrew used his camera on sturdy tripod to image the Milky Way with short and wide field imaging.

James brought along his new portable system, which included a Canon 500D DSLR on Canon EF 100-400mm f/4.5-5.6 IS L lens mounted on Kenko Sky Memo tracking mount. This was quite light and portable, compared to the usual imaging workhorse that he used over the years. Andrew, on the other hand, brought along his 80mm ED Skywatcher refractor on Vixen GP mount with Sky Sensor 2000-PC system.

While waiting for Polaris to appear, both of them took time off to get some rest and woke up at around 3:30 a.m. and saw Polaris faintly coming out of the clouds. They didn't waste any time and quickly set up their equipment. They scanned the ENE area for the stars Mirfak and Algol, as the comet was calculated to be between the 2 fairly bright stars of Perseus. With slight haze near the horizon that hampered their search for the comet, they were able to recover the comet roughly around 3:26 a.m. when the 2 helped each other out pointing to the possible location of the comet with the aid of a green laser that James brought.

As James checked the image of the field that they think the comet was situated, they were delighted to see its small greenish glow with a short faint 1.5 degree tail pointing upwards away from the east horizon. Unfortunately for them, the sky started to get brighter and brighter until they could not image anymore because the succeeding images were all washed out. Nevertheless, they were quite satisfied with the session. – *James Kevin Ty*

## Moon

Clavius – *Vincent Lao*

June 16. First test image of the crescent Moon using a Canon 500D DSLR with Canon EF 100-400mm f/4.5-5.6 IS L lens set at 400mm f.5.6.

*(⇨ p. 88).*

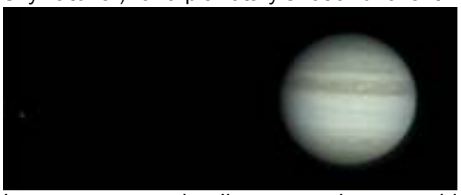
After I returned home from work, the sky was a bit clear with the crescent Moon in the western horizon, so I brought out the Canon EF 100-400mm f/4.5-5.6 IS L lens and tested it.

Image was not bad and no chromatic aberration can be seen in the image. I used the autofocus system and turned off the Image Stabilization (IS) and focus was ok. Exposure was 1/250 sec at ISO 400.

I used only a photo tripod to mount the Canon 500D together with the said lens and the result was satisfactory. I hope to be able to retest my portable system next time on the deep sky objects. – *James Kevin Ty*

## Jupiter

June 24. This morning, I managed to use my newly acquired 102mm Synta Mak (branded Skywatcher) for a planetary shot and love it!



I can get more detail compared to my old Starblast 4.5 even though it is a bit smaller in aperture. My Starblast 4.5 is really not suitable for planets, but I still love it for deep sky.

June 26. I managed to wake up early this morning again to image Jupiter. Seeing was not as good as yesterday and there was a thin haze, making the target a bit dimmer. Taken with a Powershot A540 on a 102mm Skywatcher Starmax.

The Great Red Spot can be seen at the right edge of the disk, trying to hide from me. – *Vincent Lao*

June 3. Today was supposed to be a routine imaging run. Seeing was perfect. And this was on the boring side of Jupiter. On my second image sequence using the blue filter, I luckily imaged an impact on Jupiter.

I did not see this when it happened but Antony Wesley saw this in Australia. Anthony sent an alert on this suspected impact and I was able to confirm this with my video.

The impact occurred at exactly 20:31.5 UT (04:31.5 local time). The impact lasted for around 1 sec.

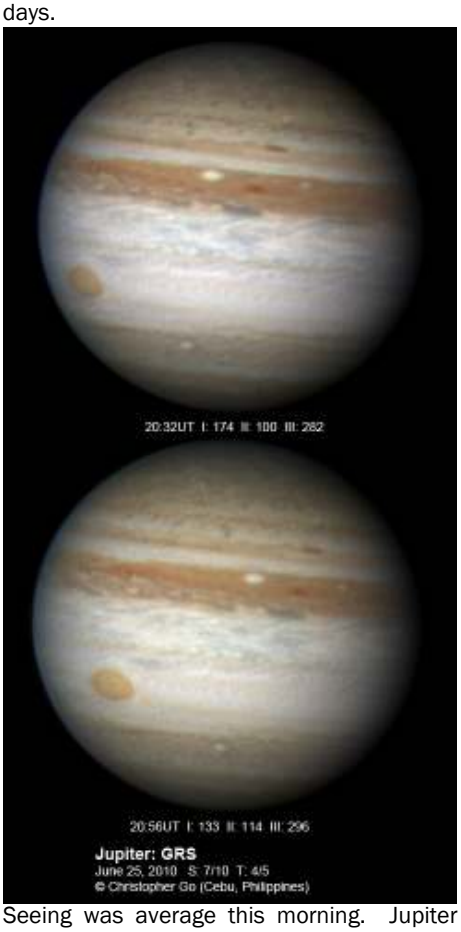

This impact hit the now faded South Equatorial Belt (SEB)! This is good timing as it will make it easier to find a dark remnant. In my image, I have superimposed the impact frame to the color image. I would like to congratulate my friend Anthony Wesley for having such a sharp eye on this historic find!

June 4. Seeing was excellent this evening. The Great Red Spot (GRS) and Oval BA are prominent in these images. Oval BA's ring is very visible. The white spot following BA has been pushed south. There seems to be a reddish feature north of this white spot. The South Temperate Belt (STB) remnant following BA is very prominent.


The GRS looks very lonely at the SEB. The bluish feature of the Equatorial Zone (EZ) seems to have pushed into the SEB. The North Equatorial Belt (NEB) is very busy and dark. Note the outbreak. The North North Temperate Zone Little Red Spot (NNTZ LRS) can be seen rising on the upper left. The GRS, Oval BA and the NNTZ LRS are all bright in Methane band and dark in UV *(⇨ p. 89).*

June 25. I have been out of action for weeks because my filter wheel broke down. Thanks to Andy Homeyer for fixing it. My filter had to go back to New Mexico then back here in Cebu.

My cousin Grace brought it back home. When the filter wheel arrived, my right foot got sprained so I was out for a few more days.




Seeing was average this morning. Jupiter was more than 70 deg when I took this image. The GRS is rising on the right. The SEB is still faded but note the orange band on the SEBn. The SEBs is a bit busy and looks like part of the EZ. The NEB is very busy with lots of ovals.

June 26. My left leg was still in pain when I woke up at around 3 a.m. today, but I had to wake up because Oval BA was up. Seeing was only average. The GRS and Oval BA are setting on these images (*middle images*). The area following BA is very disturbed. Note the bright area in Methane following BA.

The SEB is very quiet, but note the bright tiny flares on the SEBs. These were well resolved on the HST image earlier this month. The NEB is still very dark and busy. The NNTZ LRS is prominent on the northern hemisphere. It is very bright in Methane Band. - *Chris Go, Cebu*


## Saturn

June 26. While I waited for the moon to come out of the clouds, I took some planetary shots. – *Vincent Lao*

## Sagittarius Star Cloud

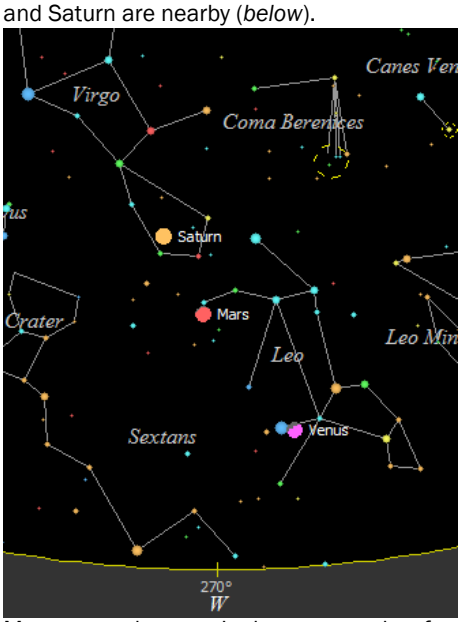
The sky unexpectedly cleared last night to reveal the star clouds of the Milky Way glowing magnificently in the firmament. I was eventually drawn to the extremely rich and complex regions in Sagittarius where the open star cluster M24 aka "Little Star Cloud" is nicely juxtaposed to two of Lynd's dark nebulae, LDN328 and LDN323. Coordinates: 18h 19' -18° 25'

The image on the cover was imaged June 15, 2010 using a Borg 77ED f/5.5 and Atik 16HR camera with an exposure of 65 minutes unguided, and a Baader LRGB filter: 16, 16, 16, 17 x 1minute. – *John Nassr, Baguio*

# The Sky

July is normally in the thick of monsoon season, when the days and nights can be wet and cloudy as the Intertropical Convergence Zone (ITCZ) sweeps over the country or typhoons and tropical depressions whip up rain clouds and thunderstorms to dump rain over the country.

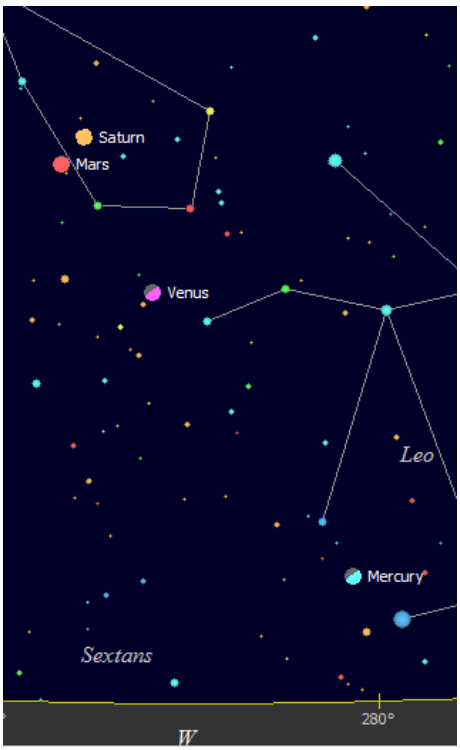
Still, if the skies are clear, then there's a wonderful display of planets in the sky after sunset. Venus is the most easily visible, as it gleams yellowish white and, with the exception of the Moon, is easily the first thing you see as the sky darkens. On July 9, Venus sidles close to Regulus, while Mars and Saturn are nearby (*below*).




Mercury can be seen in the western sky after sunset during the latter half of July. Mercury can be a little elusive, so keep your eye out to spot it.

Mars is now a pale red dot gleaming in the sky, struggling to get ahead of the solar glare. It will be closing in on bright, yellow Saturn *(⇨ p. 90).*


The crescent Moon will be joining the congregation of planets during the middle of the month. The chart above shows the group in the western sky on July 16, at 7:30 p.m. The night before, the Moon will be dangling below and between Venus and Mars.




Toward the end of the month, see Saturn, Mars, and Venus all close together in the sky. The chart above shows the western sky at 7:30 p.m. Catch elusive Mercury near Regulus quickly, as it sets very soon after.

To complement the partial lunar eclipse, there'll be a total solar eclipse, but alas, the path of this one is all across the southern Pacific Ocean. None of the Philippines will even see part of the penumbral phases.

## Sky Calendar

| DAY | HR | EVENT |
|---|---|---|
| *July 2010* | | |
| 04 | 22:35 | LAST QUARTER |
| 06 | 21:23 | Earth at Aphelion |
| 08 | 17:02 | Moon 0.9° S of Pleiades |
| 10 | 10:55 | Venus 1.1° N of Regulus |
| 12 | 03:33 | Total Solar Eclipse (not visible) |
| 12 | 03:40 | NEW MOON |
| 13 | 22:02 | Mercury 0.2° N of Beehive / Praesepe star cluster |
| 18 | 18:09 | FIRST QUARTER |
| 22 | 03:27 | Moon 1.6 deg N of Antares |
| 26 | 09:35 | FULL MOON |
| 28 | 07:17 | Mercury 0.3° S of Regulus |
| 28 | 10:10 | Delta Aquarids Meteor Shower Peak |
| *August 2010* | | |
| 02 | 03:37 | Moon 1.9° S of Saturn |
| 03 | 12:58 | LAST QUARTER |
| 04 | 23:10 | Moon 1.1° S of Pleiades |
| 07 | 09:02 | Mercury at Greatest Elongation 27° E |
| 10 | 11:08 | NEW MOON |
| 12 | 07:47 | Mercury 2.2° N of Moon |
| 12 | 13:39 | Perseid Meteor Shower Peak |
| 17 | 02:13 | FIRST QUARTER |
| 18 | 07:11 | Moon 2.0° N of Antares |
| 20 | 11:31 | Venus Greatest Elongation 46° E |
| 24 | 05:18 | Venus 2.5° S of Mars |
| 25 | 01:04 | FULL MOON |


## Black Holes No Joke

by Dr. Tony Phillips

Kip Thorne: *Why was the black hole hungry?*
Stephen Hawking: *It had a light breakfast!*
Black hole humor—you gotta love it. Unless you're an astronomer, that is. Black holes are among the most mysterious and influential objects in the cosmos, yet astronomers cannot see into them, frustrating their attempts to make progress in fields ranging from extreme gravity to cosmic evolution. How do you observe an object that eats light for breakfast?

"Black holes are creatures of gravity," says physicist Marco Cavaglia of the University of Mississippi. "So we have to use gravitational waves to explore them." Enter LIGO—the NSF-funded Laser Interferometer Gravitational-wave Observatory. According to Einstein's Theory of General Relativity, black holes and other massive objects can emit gravitational waves—ripples in the fabric of space-time that travel through the cosmos. LIGO was founded in the 1990s with stations in Washington state and Louisiana to detect these waves as they pass by Earth.

"The principle is simple," says Cavaglia, a member of the LIGO team. "Each LIGO detector is an L-shaped ultra-high vacuum system with arms four kilometers long. We use lasers to precisely measure changes in the length of the arms, which stretch or contract when a gravitational wave passes by." Just one problem: Gravitational waves are so weak, they change the length of each detector by just 0.001 times the width of a proton! "It is a difficult measurement," allows Cavaglia. Seismic activity, thunderstorms, ocean waves, even a truck driving by the observatory can overwhelm the effect of a genuine gravitational wave. Figuring out how to isolate LIGO from so much terrestrial noise has been a major undertaking, but after years of work the LIGO team has done it. Since 2006, LIGO has been ready to detect gravitational waves coming from spinning black holes, supernovas, and colliding neutron stars anywhere within about 30 million light years of Earth. So far the results are ... nil. Researchers working at dozens of collaborating institutions have yet to report a definite detection.

Does this mean Einstein was wrong? Cavaglia doesn't think so. "Einstein was probably right, as usual," he says. "We just need more sensitivity. Right now LIGO can only detect events in our little corner of the Universe. To succeed, LIGO needs to expand its range." So, later this year LIGO will be shut down so researchers can begin work on Advanced LIGO—a next generation detector 10 times more sensitive than its predecessor. "We'll be monitoring a volume of space a thousand times greater than before," says Cavaglia. "This will transform LIGO into a real observational tool." When Advanced LIGO is completed in 2014 or so, the inner workings of black holes could finally be revealed. The punchline may yet make astronomers smile. Find out more about LIGO at http://www.ligo.caltech.edu/.

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