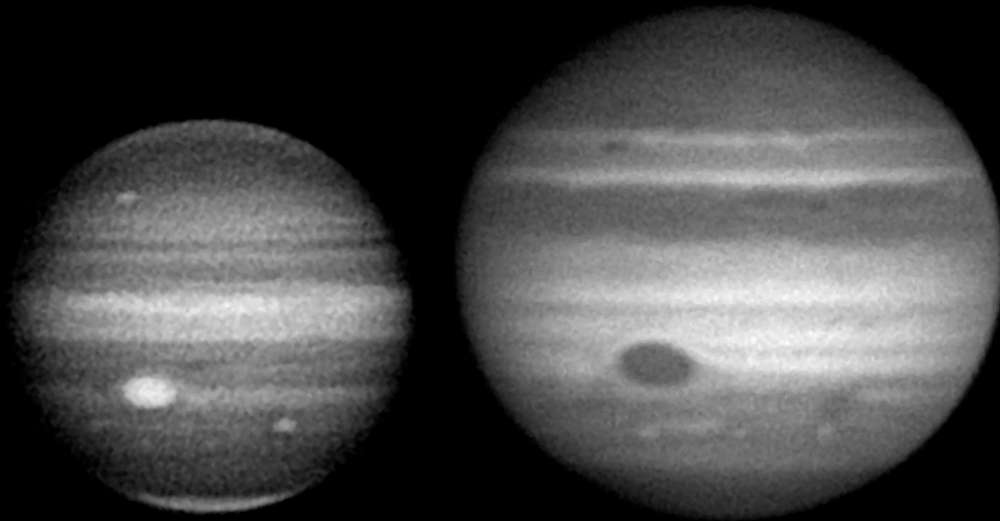


# Philippine Journal of Astronomy

The journal of the Astronomical League of the Philippines



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## Jupiter: The 3 Red Ovals

November 11, 2010 S: 7-9/10 T: 3-5/5

© Christopher Go (Cebu, Philippines)

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# PHILIPPINE JOURNAL OF ASTRONOMY

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Princeton University, USA*

### Contributors:

Edwin Aguirre  
Imelda Joson  
James Kevin Ty  
Andrew Ian Chan  
Armando Lee  
Raymund John Ang  
Christopher Go

### Cover page image:

Methane and ultraviolet images of Jupiter taken on November 11, 2010 by prolific master planetary astrophotographer Christopher Go of Cebu, Philippines.

The images were taken using an 11-inch Celestron telescope mounted on an AP900GTO mount. Methane band photo made using a Custom Scientific Methane Band filter, UV images taken using Schuler UV filter.

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# Tatakoto Total Solar Eclipse

## July 11, 2010

Edwin Aguirre  
Imelda Joson

### Introduction

The path of totality for the July 11th eclipse began at sunrise over the open waters of the South Pacific some 1,800 km northeast of New Zealand. The Moon's umbral shadow then quickly swept across Mangaia in the Cook Islands, through the remote atolls in French Polynesia and into Easter Island (Rapa Nui), before ending at sunset in southern Chile and Argentina.

We were invited by Astronomical Tours to lead a group of nearly 40 eclipse chasers to Tatakoto, a tiny isolated atoll (coral reef island surrounding a lagoon) in French Polynesia's eastern Tuamotu Archipelago about 1,200 km east of Tahiti. This is the most daring expedition we have led so far owing to the vast distances involved, mainly over the ocean. But as everyone knows, diehard eclipse chasers would go to the ends of the Earth just to spend a few moments basking in the glow of the Sun's glorious corona.

Tatakoto is an elongated ring 14 km long by 4 km wide, with less than 250 permanent residents. The island features hectares of coconut plantations, pinkish white coral-sand beaches, a blue lagoon, and a small airstrip. Its main exports include copra (dried coconut meat) and the meat from giant clams.

### Friday, July 9th

Our journey began with a 5 ½-hour non-stop flight from Boston to Los Angeles. In L.A. we boarded an Air Tahiti Nui Airbus A340-300 for the 8 ½-hour flight to Papeete, the capital of French Polynesia and the largest city on Tahiti. (The island is situated 20 km north of the eclipse track, so residents here experienced "only" a 98.7 percent partial eclipse that Sunday!)

From the Faa'a Airport, our group was transferred to the Intercontinental Hotel, where we stayed overnight

before flying to Tatakoto. We spent that evening meeting and greeting our tour members who were coming in on separate flights. Our group was truly international in scope — we had members from the U.S., Canada, England, Belgium, Germany, Spain, the Netherlands, Japan, and Hong Kong. Fortunately, everyone could speak English!

We also checked and weighed all luggage bound for Tatakoto. This was required because of the strict weight limits imposed by our chartered flight (per person it was 22 pounds or 10 kilos for check-in baggage and 11 pounds or 5 kilos for carry-on). That was why in addition to lightweight clothes, we could bring only one small telescope — a Takahashi FC-60 apo refractor — and a Gitzo tripod with a Manfrotto geared head, plus our Canon EOS 7D and Digital Rebel XT DSLR cameras and a Canon Vixia HF S100 hi-def video camcorder. The rest of our belongings were left in the hotel for safekeeping.



In the hotel lobby we met our longtime friends and fellow avid eclipse chasers Fred Espenak and his wife, Pat Totten, and Glenn Schneider. Fred, a retired NASA Goddard Space Flight Center astronomer, co-authors with meteorologist Jay Anderson the NASA eclipse bulletin series, which is considered by serious eclipse chasers to be the "bible" on solar eclipses. Glenn, an astronomer at the University of Arizona's Steward Observatory, was with our group onboard Holland America's cruise ship, the Veendam, for the 1998 total solar eclipse in the Caribbean Sea. We all had a nice reunion.

### Saturday, July 10th

Early the following morning — the eve of the eclipse — we boarded our 48-seater Air Tahiti ATR 42-500

turboprop plane for the 2 ½-hour flight to Tatakoto. Along the way, we briefed our members on what to expect and what to look for during the eclipse (we had about 10 first-timers, or eclipse “virgins,” in our group). We also discussed safety precautions while on the atoll (we warned them about heat exhaustion, dehydration, coral cuts and scrapes, and insect bites; we also told them to watch out for falling coconuts, sharks prowling the surf, poisonous cone shells, etc.).

Looking out the plane’s window, we noticed a lot of scattered cumulus clouds along the eclipse path, which caused some concern among our members since totality was less than 24 hours away! Fortunately, the sky had turned to a mix of bright sunshine and broken clouds by the time our plane touched down on Tatakoto’s airstrip.

At the airport, we were greeted by the island’s mayor and town officials as well as the local families that would host our stay on the atoll. Our team was then broken up into groups of five or six and then brought by van and pickup trucks to the guest houses in Tumukuru, the island’s main settlement. Our own group included two from Japan and one from Canada.

The guest houses where we stayed for the next three days and two nights were wonderful. Since Tatakoto is one of the most remote islands in the Tuamotus (planes arrive here only once a week and ships once a month), we were expecting our accommodations to be very rustic. Some even thought we would have to camp out on the beach in tents. Before the trip, we tried to do some research about life on Tatakoto, but there was very little background information about the island on the Internet and in travel books.

It turned out Tumukuru has 24-hour electricity (240 volts, 50 cycles), and the bungalow-style house where we stayed has flush toilet, shower, running water, three nice bedrooms with mattresses, closets, and electric fans, a well-furnished living room and dining area, and a small kitchen with a refrigerator and upright freezer.

The town’s post office even has Internet access. We brought a quad-band GSM cell phone to Tatakoto and the reception on the island was even better than in Tahiti — in fact, we described the eclipse to our mom in Boston right after totality!

The meals the family prepared for us were like a feast. They were not really Polynesian dishes but more like American and European food. They consisted mainly of beef, sausages, ham, fried potatoes, and steamed rice plus Tahitian-brand bottled spring water, beer, and cola. For dessert, they served us native fruits that looked like guavas but tasted like lychee, as well as chocolate cake and ice cream. For breakfast we had omelet, firifiri (Tahitian doughnut), and coffee. We were in heaven!

Just a short distance from our guesthouse is the Tatakoto primary school. Professional astronomers from the University of Hawaii’s Institute for Astronomy (IFA) had set up a camp on the school’s soccer field to observe the eclipse, but we didn’t get a chance to meet or chat with them because we were so busy attending to our own group. The IFA folks had brought telescopes and other instruments which they kept in their air-conditioned tents.

After a sumptuous lunch prepared by our host family, a group of us went to the lagoon to scout for a suitable observing site along the lagoon’s southwestern shores. Another tour group of about 40 more eclipse chasers would be joining us at the site on eclipse morning. They would arrive from Tahiti around 6 a.m., stay a few hours for the eclipse, have lunch, and then fly back to Tahiti that same day.

With the help of Google maps, a Magellan GPS, and a compass, we found the perfect spot — a picturesque section of the beach facing the turquoise waters of the lagoon and overlooking a motu (islet) lined with palm trees. The ground at the site was made up of compacted sand, suitable for setting up tripods. The area was also very wide and flat, and had a clear, unobstructed view of the entire eastern sky.

(Unfortunately, from our vantage point we would not be able to see the approach of the Moon’s shadow too well since the western sky was blocked by tall coconut trees. That was why earlier that day we also designated the town’s wharf as an alternative site for those who wanted to watch the approach and retreat of the Moon’s shadow. It was not as photogenic as the lagoon, but it offered a clear, open view of the Pacific from west to east.)

It was getting close to sunset by the time we reached Tumukuru, and we headed straight to the wharf where we watched the Sun slowly dip into the Pacific. At the last moments before the Sun’s limb disappeared below the horizon, we glimpsed a brilliant “green flash” for about a second or so, and then it was gone. It was a good omen!

### *Sunday, July 11th — Eclipse Day!*

The following morning — E-Day — we woke up early and were already on the beach by 4 a.m.

The beach was still dark and deserted, but we were anxious to see what the sky conditions were. They didn’t look promising at all — thick, dark clouds blanketed the horizon all the way to the zenith. We even had to cover our telescope and camera backpack with plastic bags since light rain started to fall over our site at dawn.

We debated whether to move our group to our

backup site on the eastern end of the atoll, which was a 45-minute drive on dirt roads. First contact was scheduled to occur at 7:27 a.m. local time, so we didn't have much time left.

Adding to our stress level that morning was the fact that the battery of the minivan that brought us to the lagoon had suddenly died. We needed all the vehicles we could get if we had to relocate our group to the other site. So we pushed the van across the sand to try to kick-start it. It wasn't an easy job! Fortunately, with the help from some passersby, we were able to get the van going again.

According to the locals, this year's weather on the atoll was unusual — it was mostly cool and cloudy. In previous years, it was mainly hot, sunny, and humid. Tatakoto's weather, they said, is also much localized — it could be raining on one end of the atoll and sunny on the other.

We noticed the weather pattern on the island was like a giant conveyor belt — bands of clouds and rain showers pass through with gaps of sunshine and blue skies in between. So we finally decided to stay put and take our chance.

Shortly after the Sun rose at 5:45 a.m., wind from the east began to blow, and the low-lying clouds started to dissipate. We could finally glimpse blue skies through the clearing. We felt so relieved!

The second tour group landed at the airport shortly after 6 a.m. and immediately joined us at the site. From the air, they could see what the cloud pattern looked like around the atoll. They also had the latest weather satellite data that morning. They basically confirmed our suspicion that a huge cloud break would be moving in over our site by the time of totality!

By this time our own group also arrived at the site. We now had more than 100 people on the beach, including Tatakoto's mayor and his family and some local residents and vendors. Everyone scrambled to find their own private spots and hurriedly set up their telescopes and video cameras. Many opted to just sit back, relax, and enjoy the show visually through eclipse sunglasses, filtered binoculars, and hydrogen-alpha telescopes.

First contact occurred with the Sun 21 degrees high. The Sun continued to play hide and seek with the clouds throughout the partial phase of the eclipse. We saw through our camera's viewfinder the two sunspots of AR

1087 and the tiny spot of AR 1088 being occulted one by one by the Moon's rugged limb.

In the meantime, we unpacked the

American and Philippine flags we had brought especially for the occasion, tied them to the branches of a nearby tree, and let the colors wave majestically in the gentle breeze. They were our lucky charms. The

Philippine flag has been with us for the past eight eclipse expeditions, starting with the total solar eclipse in 1988 in General Santos City, South Cotabato.

About 30 seconds before second contact, the rapidly dwindling crescent Sun entered a huge break in the cloud cover.

We knew right away that, except for some very thin passing cirrus, we would definitely see totality. Everyone was ecstatic!

Totality was set to begin at 8:46 a.m. local time, with the Sun hanging 36° above the northeastern horizon. As the Moon's 241-km-wide shadow swept over the site at more than 3,100 km per hour, a prolonged, slow-motion diamond ring marked the last vestige of the Sun. And then the corona suddenly flashed into view. People cheered and shouted in joy; many remained silent, furiously shooting the eclipse with their cameras and camcorders.

The corona was surprisingly full of structure even though the Sun was just coming out of a very deep minimum, displaying at least four long streamers that extended asymmetrically in opposite directions and tapered off into the deep, velvety blue sky. And hair-like brushes delicately traced magnetic-field lines above the Sun's polar regions.

Numerous prominences — those brilliant red flame-like eruptions projecting from the edge of the Sun's disk like a necklace of rubies — were visible to the naked eye. An especially large loop prominence could be seen at the 11 o'clock position during third contact.



Adding to the mesmerizing visual drama unfolding above was the planet Venus gleaming through a break in the clouds a short distance from the darkened sun. And on the ground, the eclipse's 360° sunset painted the entire horizon in a vivid, yellow-orange glow.

to take their very first look through a telescope. (There were no suitable targets at the school so we simply aimed the scope at a distant coconut tree.) They were all very excited and happy.



The island is blessed with some of the clearest, darkest and most pristine skies we've ever seen, and the telescope would be a superb tool for the children to explore the beauty of the night sky.

After dinner that evening, we all went back to the school where the people of Tatakoto had prepared a special cultural show for us. Over the next two hours, we were treated to authentic, traditional Polynesian music, songs, and dances. These were not professional artists performing, but ordinary folks who wanted to showcase their talents and their culture. It was a

Four and a half minutes after totality started, the Sun's reappearance on the opposite side of the Moon was heralded by another spectacular diamond ring. The total eclipse was over, and daylight returned very swiftly as if a giant celestial dimmer switch had been turned off. The Polynesian gods had answered our prayers and blessed us with a clear view of totality!

wonderful presentation. At the end of the show, the dancers invited several of our members to join them. Everyone had a great time.

The eclipse took place in central Gemini, just 45 arc minutes east of the 3rd-magnitude star Delta Geminorum. Upon reviewing our images of the corona, we found out we actually recorded this star embedded in one of the coronal streamers.

Since the sky was crystal clear that final night on Tatakoto, we hosted a stargazing session for our members at the town's wharf. At latitude 17 degrees 21 minutes south, the island offered a spectacular view of the Milky Way. With practically no light pollution or smog, the night sky was studded with countless stars from horizon to horizon. Scorpius blazed directly overhead, and to the unaided eye, the dense star clouds of Sagittarius appeared like balls of cotton crisscrossed by dark lanes. People armed with binoculars had a fun time scanning Carina, Crux, Centaurus, and the other far-southern constellations.

After the two groups finished packing their equipment, the mayor of Tatakoto hosted a feast at his home to celebrate the day's success.

By the time our star party ended after midnight, we could see the Small Magellanic Cloud rising in the southeast. We wanted to keep on taking photos of the Milky Way, but we still had to pack our things for our early morning flight back to Tahiti.

Later that afternoon, we went to the island's primary school and presented the mayor, the school's headmaster and the children of Tatakoto with a telescope we had brought with us. (Three months prior to the trip, we were able to convince Celestron to donate a brand-new AstroMaster 90AZ refractor for the school.) The telescope came with an altazimuth mount on a steel tripod, a small finder, two eyepieces, a star diagonal, The Sky planetarium program, and manuals.

*Monday, July 12th*

We assembled the telescope for them and showed them how to use it. The kids then eagerly waited in line

After breakfast, we said our final goodbyes to our wonderful host family and exchanged gifts with them. Our group was given beautiful necklaces made of seashells as well as crowns made of straw. In return, we

presented the family a couple of fishing rods and a small tent that we had originally brought for our group.

The people of Tatakoto were so warm and friendly, and their generosity and hospitality made us really feel at home. Although only a handful are fluent in English (they speak mainly French, Tahitian, and their own native dialect), which made communicating quite a challenge, we were able to get by using a lot of pointing and hand gestures. It was quite a learning experience for all!

En route to the airport, we passed by the post office to pick up postcards with eclipse stamps that were issued and postmarked in Tatakoto on July 11th. We bought five of them as souvenirs for a total of 1,000 French Polynesian francs (about US\$12).



At the airport, there were more emotional farewells as the other members of our group joined their hosts for some final group photos. Although our stay on the island was very brief, we really bonded with our respective families.

The eclipse was the most exciting thing that had ever happened to Tatakoto. Unlike French Polynesia's well-known islands — Tahiti, Moorea, and Bora Bora — Tatakoto is a relatively unknown atoll far from the usual tourist destinations. But it's a hidden gem waiting to be discovered by the more adventurous travelers and explorers. We promised our hosts that, given a chance, we would visit Tatakoto again and spend more time exploring the island and learning more about its fascinating history, culture, and people.

After an uneventful 2 ½-hour flight, we landed at Faa'a Airport in Papeete. Our group was then transferred to the city's pier for the ferry ride to the island

of Moorea, less than 30 km away to the west. The waters between Tahiti and Moorea were a bit choppy, and some of the ferry passengers became seasick. After disembarking in Moorea, we were taken by bus to the Intercontinental Hotel, our home for the next two nights.

At the hotel we saw some members from Sky & Telescope's Easter Island tour, including our good friend Dava Sobel, who was a guest lecturer on the S&T tour. Dava is an international best-selling author whose works include the highly acclaimed books *Longitude* and *Galileo's Daughter*. She was on our tour in Rome during the 2004 transit of Venus so it was a happy reunion for us. She had breakfast with us the following morning and we caught up on the latest news. Her current project involves writing a play about the life of Copernicus.

We later learned that observers on Easter Island (Rapa Nui) also saw the eclipse high above the giant moai statues. The IFA astronomers at the Tatakoto primary school were equally successful. Some lucky eclipse chasers on one part of Mangaia in the Cook Islands also saw the eclipse, but others did not (the clouds were that low and local).

Observers on the Hao and Anaa atolls in French Polynesia's Tuamotu Archipelago, as well as passengers aboard the cruise ships Paul Gauguin and the Aranui 3, were also rewarded with views of totality. Eclipse watchers in El Calafate in Patagonia, Argentina, saw totality (and the Moon's umbral cone), with the setting Sun only a degree or so above the Andes

Mountains.

Unfortunately, others were not so lucky. A group of about 40 travelers, including well-known Canadian astrophotographer and writer Alan Dyer, were at the airport on Hikueru Atoll in the Tuamotus when a cloud moved in at second contact and completely obscured totality.

Fred Espenak and Glenn Schneider didn't have to worry about the weather. They led a group of about 40 people aboard a specially chartered Airbus A-319 jet that intercepted the Moon's shadow some 2,500 km east of Tahiti. Passengers cruised above the clouds at an altitude of about 39,000 feet (12 km), and they were able to extend the duration of totality to 9 minutes 23 seconds!

We have already observed eclipses both on land and at sea, and an airborne eclipse chase is what we want to try out in the near future.



*Tuesday, July 13th*

Moorea truly is a tropical paradise. It's a favorite destination for honeymooners. This beautiful island features rugged volcanic peaks and sheer cliffs covered with lush vegetation. It's stunningly photogenic no matter where you look.

The Intercontinental Hotel itself is magnificent, with white-sand beaches, emerald-green lagoons teeming with coral reefs and colorful fishes, and private bungalows sitting over the water. People spent the days relaxing and having fun while sunbathing, swimming with dolphins, snorkeling, scuba diving with sharks and manta rays, jet skiing, kayaking, or driving around the island on 4 x 4s or dune buggies.

However, paradise does come with a hefty price tag. Moorea, like Tahiti and Bora Bora, is a very expensive destination. Everything has to be flown in or shipped to French Polynesia, and the French Government levies heavy taxes on all goods and services on the islands. We can't imagine how the locals manage to survive.

You should be prepared to spend serious money while on the islands. The currency here, French Polynesian francs, runs about 70 to 90 per U.S. dollar, depending on where you exchange your money. A liter of bottled water can cost you about \$5 at the hotel bar; a can of Coke \$10 at the airport. In addition to tourism, Tahiti's main industries are the production of vanilla and black pearls.

In the afternoon, we had a few hours of free time so our tour members and new friends, Paul and Ruth Young from California, offered to take us in their rental car to Opunohu Bay so we can do some surf fishing. It's a beautiful bay with warm, crystal-clear waters, gentle waves, and a scenic view of Mount Rotui. Another perfect day in paradise!

*Wednesday, July 14th*

In the afternoon, our group returned to Tahiti by ferry for a final overnight stay at the Intercontinental before flying back home.

*Thursday, July 15th*

Since our Air Tahiti Nui flight was not scheduled to depart until 10 p.m. that night, we still had a full day to explore Tahiti and do some last-minute shopping for gifts and souvenirs.



A very nice couple from our group, David and Phyllis Brewer from California, had a rental car and they offered to drive us anywhere on the island. We chose to go to historic Point Venus on Tahiti's northernmost coast.

This was the site where Captain James Cook observed the transit of Venus in 1769. A white concrete monument enclosed in a red fence now marks the spot, which is just a short distance from the Point Venus lighthouse constructed in 1867. Unfortunately, someone stole the plaque on the transit monument either in the late 70s or early 80s and it had not been replaced since then.

While we stood next to the monument, we tried to imagine the hardship and ordeal that Capt. Cook had to endure while sailing from England to Tahiti, and what Tahiti must have looked like at the time.

After more than 240 years, the transit of Venus will again touch the shores of Point Venus. On June 6, 2012, the planet's ingress across the solar disk can be viewed shortly after local noon but unfortunately, its egress will not be visible. The Sun would have set that day with the transit still in progress.

Also present at Point Venus is a huge boulder adorned with plaques commemorating the British ship HMS Bounty and her crew. In 1789 a group of renegades led by Fletcher Christian mounted a mutiny against the ship's captain, William Bligh. The mutineers settled in Tahiti and in Pitcairn Island, where some of their descendants still live today. The main author of the 1932 novel "Mutiny on the Bounty" — James Norman Hall — also lived in Tahiti, where he died in 1951 and is buried there. His house has now been converted into a museum.

It was a very nice (but windy) day when we visited Point Venus. Later that afternoon, we went to a local shopping center to buy some gifts and souvenirs before heading back to the hotel. That evening, we were transferred to Faa'a Airport for the long flight home.

*Friday, July 16th*

After a delayed departure in L.A. due to severe thunderstorms on the East Coast, our plane finally touched down in Boston late in the evening, but we didn't get home till past midnight on Saturday morning. It was an exhausting but very satisfying trip. We can't wait for the next total solar eclipse — on November 14, 2012, in Queensland, Australia!

# International Observe the Moon Night at AstroCamp

James Kevin Ty



September 18, 2010. Members of the Astronomical League of the Philippines celebrated the first *International Observe the Moon Night* (InOMN) at AstroCamp Observatory in SM Mall of Asia San Miguel by the Bay by providing free public viewing of the Moon through low, medium and high power magnification from five thirty in the afternoon until ten in the evening. The InOMN was initiated this year to get public awareness not only to observe the beauty of our nearest celestial neighbor, but also, to promote lunar mission by various international space agencies like Lunar Reconnaissance Orbiter Education and Public Outreach, NASA Lunar Science Institute (NLSI), Lunar Atmosphere and Dust Environment Explorer, Lunar Quest Office at NASA Marshall Space Flight Center, The Lunar and Planetary Institute (LPI), Astronomers Without Borders, The Astronomical Society of the Pacific & the NASA Night Sky Network, Gemini Observatory, and the International Year of Astronomy.

Members present were ALP President James Kevin Ty, wife Charito Ty and son Kendrick Cole (KC) Ty, Myra Lee and son Jason Lee, Andrew Ian Chan, Christopher Louie Lu, John Ray Cabrera, Babak Parhizkari and friend Amir Mohamadi, Kevin Dagunan, Crispin Riosa, Christopher Lee, Mark Ian Singson, Kristine Angeli Valdez and friend Nikka Santos, and Michelle Lampa. Mr. Bernie Esporlas and staff of Cutting Edge were also present to help provide manpower and scope equipment.

The event started at around 5:30 p.m. with ALP members setting up their telescopes beside

AstroCamp's main scope, a Celestron C11 Schmidt-Cassegrain reflector on Atlas EQ-6 mount. James brought a Meade ETX-90AT Maksutov-Cassegrain; Babak Parhizkari with his Sky-Watcher Mak 102 on Takahashi Sky Patrol 2 mount; Andrew Ian Chan with his Sky-Watcher 80ED refractor on Vixen GP mount. AstroCamp also provided several telescopes, such as a Celestron C90 Maksutov-Cassegrain, William Optics 66SD refractor and a 10" Discovery Newtonian reflector. Cutting Edge, through Star Paper Corp., the official Celestron dealer here in the Philippines, brought a NexStar 4i Schmidt-Cassegrain.

More than 400 people joined the activity. Some of them were surprised that even a small scope can show abundant details on the lunar surface, which they thought can only be viewed through a very large telescope. ALP members explained to the crowd what they were looking at, as well as expound on the history and significance of the Moon in the evolutionary formation of life. Another plus factor was a surprised media coverage by QTV5's *The Beat*, where ALP President James Kevin Ty got interviewed. *Survivor Philippines* participant Jervy Patani Dano was also present with the QTV crew and was able to observe the Moon through various telescopes.

At the conclusion of the event, ALP members and guests posed for the traditional group shot to mark the success of the 1st *International Observe the Moon Night* event at AstroCamp Observatory. The league would like to thank Ma'am Jen Liza of Cutting Edge for their support and free dinner packs.





# Comet Hunting 103/P Hartley 2

James Kevin Ty  
Andrew Ian Chan



October 16-17, 2010. A heavy downpour late afternoon led to a spectacularly transparent sky, ALP members James Kevin Ty and Andrew Ian Chan went to PAGASA Observatory in the University of the Philippines Diliman after an unsuccessful try last October 15 to recover *Comet Hartley 2* under sub-urban sky condition. They quickly pounced on this rare opportunity, especially since Typhoon Megi will surely close all chances of good observation beginning tomorrow night.

Condition was far better compared to the day before.

Transparency was quite good and amid passing clouds, they could see lots of stars through cloud breaks. They decided to set up their imaging equipment to try to image the passing comet. James brought along a portable setup - Canon 500D DSLR with Canon EF 100-400mm f/4.5-5.6 IS Lens on Kenko Sky Memo-R mount, while Andrew had with him his Canon 500D DSLR on Sky-Watcher 80ED refractor mounted on a Vixen GP with Sky Sensor 2000 system.



Comet 103/P Hartley 2 - 10/10/16 22:53:48 (14:53:48 UT) Image taken by James Kevin Ty using Canon 500D DSLR with Canon EF 100-400mm f/4.5-5.6 IS L lens set at 400mm f/5.6. 120 seconds exposure at ISO 400.

Due to certain factors (e.g. moon, city glow, and others) affecting their ability to detect faint objects, the comet was neither visible to the naked eye nor through binoculars. So once again, they were forced to rely solely on the powerful sensors of their cameras, accompanied by a green laser pointer and, armed with the calculated prediction of the comet's location (the same technique they employed to hunt for Comet McNaught) to successfully recover Hartley 2.

After double-checking the comet's position with James's StarMap Pro software in Iphone 3G, they aimed their scope and lens to the predicted position. They finally got to recover the elusive comet!

There was slight haze during the session, thus, they were not able to obtain longer exposures to get a better image of the comet. The comet was a bit dim through 1 to 2 minute exposure as they had to contend with fighting the Moonlight glow. Nevertheless, after two days of mosquito bites, they finally got to image the comet!

In addition, Andrew was able to photograph the *Pleiades Star Cluster* and the *Great Orion Nebula* for the first time with his new setup!

At around 2:30 in the morning, with clouds starting to roll in, they had a group shot taken before packing up with a happy heart, being able to recover Comet 103/P Hartley 2!

*Comet Hartley 2 was discovered by Malcolm Hartley in 1986 in Siding Spring, Australia.*



Comet 103/P Hartley 2 - 10/10/16 23:22-23:36 (15:22-15:36 UT) Image taken by James Kevin Ty using Canon 500D DSLR on Canon EF 100-400mm f/4.5-5.6 IS L lens set at 400mm f/5.6. Composite 14 minutes exposure (7 x 2 minutes) at ISO 400.



# Gems in the Sky: The Geminids 2010

*James Kevin Ty*

*Armando Lee*

*(Images by Babak Parhizkari & James Kevin Ty)*



December 13-14, 2010. Members of the Astronomical League of the Philippines held their Geminid meteor shower observation at AstroCamp Observatory in SM Mall of Asia San Miguel by the Bay. Members who attended were ALP President James Kevin Ty, public relations officer Armando Lee, Andrew Ian Chan and friend Iah Serna, Christopher Lee and Sandra Torita Lee, Michael Cruspero and friend Mathew Esteban, Christopher Louie Lu, Babak Parhizkari, Amir Mohammadi and newest ALP member Prabhaker Yasa. ALP and Astrocamp Observatory also participated in the worldwide *Meteors Without Borders* activity initiated by *Astronomers Without Borders*. Also supporting the ALP activity that evening was Cutting Edge/Celestron who provided the members with free dinner packs.

The sky was cloudy early evening 'till past midnight before the clouds started to break up a bit to show some stars and constellations. By that time, the observers were all looking up on the clear portion of the sky and hoped to see some Geminids zip through the open skies. Astrophotographers from the ALP then started to capture photos but it was still a bit cloudy so they decided to image lightning clouds instead.

Around 2:00 a.m., Geminid meteors started to be frequent and Armand was able to record 48 Geminids plus 1 sporadic meteor that early morning. If not for the clouds, the number of Geminids recorded would have easily doubled or tripled perhaps. Aside from Geminids and lightning, ALP members were also able to view artificial satellites before sunrise. Andrew Ian Chan was able to capture around 9 Geminids and 4 artificial satellites while Babak got 2 Geminids.

A crepuscular ray signals the end of the Geminid session and the observers were all satisfied with the results and are looking forward to observing the January Quadrantid meteor shower.



*A bright Geminid captured by ALP member Babak Parhizkari.  
Credit: Babak Parhizkari*

ALP members who brought their cameras, tripods, tracking platform were: James setup with his dual Canon 500D and 400D DSLR cameras setup on Kenko Sky Memo mount; Babak with his Canon Astro 50D and 5D Mark 2 DSLR on Takahashi Sky Patrol 2 mount; Prabhaker with his new Skywatcher 4.25" refractor on modified EQ-3 mount with Autostar system; Andrew brought along his Canon 500D DSLR on sturdy tripod as well as Chris Lu with Canon 450D DSLR.



*Lightning bold during the Geminids. Credit: James Kevin Ty*

# An Eclipsed MOON

**James Kevin Ty**  
**Armando Lee**

(Images by James Kevin Ty, Armando Lee, John Nassr and  
Nathaniel Custodio)



December 21, 2010. A total lunar eclipse was only visible in the U.S. In the Philippines, observers were only able to see around 35% partiality phase remaining after the moon rose from the NE horizon at 5:32 p.m. This eclipse also fell on the same date as the northern winter solstice this year, which is a rare occurrence. According to Geoff Chester of the US Naval Observatory, who inspected a list of eclipses going back 2,000 years:

*"Since Year 1, I can only find one previous instance of an eclipse matching the same calendar date as the solstice, and that is Dec. 21, 1638," says Chester. "Fortunately we won't have to wait 372 years for the next one...that will be on Dec. 21, 2094."*

For this event, James Kevin Ty was stationed in Laoag City, Ilocos Norte as he had a business work trip. He brought with him his portable Canon 500D DSLR coupled with Canon EF 100-400mm f/4.5-f/5.6 IS L lens to image the eclipse.

Another site was headed by Armando Lee, together with wife Mia and son Jason Lee at Heritage Park in Taguig City. He also brought a portable setup - Canon 350D DSLR on Celestron C90 Maksutov-Cassegrain.

Below are observation accounts from ALP members stationed at different areas of the country:

*Observation Site A - Laoag City, Ilocos Norte*  
*James Kevin Ty*

The afternoon sky was a bit cloudy and hazy, but luckily, the sky in Laoag City, Ilocos Norte cleared in the Northeast horizon for James to image the Partial phase of the rare winter solstice total lunar eclipse that was visible in the U.S. In the Philippines, however, observers could only view the partial phase which was estimated to be around 35% partiality remaining at Moonrise around 5:32 p.m. But since there was a mountain in the Northeastern part, he was only able to get a view of the moonrise at around 5:38 p.m. - a wonderful sight!



Partial Lunar Eclipse - 10/12/21 17:45:10 (09:45:10 UT) Image taken by James Kevin Ty in Laoag City, Ilocos Norte, Philippines using Canon EOS 500D DSLR on Canon EF 100-400mm f/4.5-5.6 IS L lens set at f/5.6, 1/125 sec exposure at ISO 800.

James imaged the entire partial phase which lasted until around 6:05 p.m. He continued to image into the penumbral phase until around 6:15 p.m. before calling it a night. James still deem himself lucky to be able to image it almost completely compared to his other colleagues who reported seeing some parts of the partial eclipse under very hazy and cloudy condition.

James would like to thank his godfather, Mr. Antonio Co of Laoag Bazar, for letting him use his roofdeck to image the beautiful eclipse. Thanks also to Mr. George Avila for giving him an alternate observation site for this event.

*Observation Site B - Heritage Park, Taguig City*  
*Armando Lee*

Dr. Armando Lee, with wife Myra and son Jason, originally planned to observe from Venice Piazza but opted to move to nearby Heritage Park hill to get the best unobstructed view after realizing that the view from Venice Piazza was hindered by high voltage power lines. With a C90 telescope and an EOS350d DSLR camera, they waited even past the moonrise time of 5:32 p.m. They were blessed with the sight of the moon just

clearing the clouds above the Sierra Madre Mountain range.



It was around 5:43 p.m. when they glimpsed the bright orange limb of the moon with the umbral shadow still covering less than half of the moon's disk. It took several minutes more before the whole disk cleared the clouds and an image was captured at 5:46 p.m. It was a surreal scene finding the orange colored moon with a dark "bite". It was a treat for Dr. Lee's family, looking at the eclipsed moon as it rose above the Sierra Madre Mountain Range. At six in the afternoon, the moon was already covered by thick haze that made the moon's image so soft and too dark for imaging. They packed up at around 6:15 p.m. and descended the hill with a feeling of accomplishment and content, happy that their family shared a unique treat for Winter Solstice.

*Observation Site C - Taguig City*  
*Nathaniel Custodio*

Here is Nathaniel's shot of the lunar eclipse from Taguig City. This is overlooking the city of Pasig. He had to overexpose the moon to bring out the city skyline for perspective. He used a Canon 400D with Canon EF 70-300 zoom lens at F5.6.



*Observation Site D - Baguio City*  
*John Nassr*

John Nassr and his son, John Michael, positioned themselves on a mountain side, overlooking the north-east to capture the partially eclipsed moon just as it rose over a misty Cordillera Mountain range. Image was captured using a Nikon D40 DSLR with Nikkor AF 75-300mm set at 200mm.





# Stargazing in Urban Lights

*Raymund John Ang*

Astronomy is a popular hobby among science enthusiasts, along with bird watching and microscopy. With a small telescope or a pair of binoculars, one would be able to observe a number of celestial sights and appreciate the wonders of the cosmos. Using moderate sized telescopes and digital imagers, amateur astronomers are now able to take stunning pictures of heavenly bodies, surpassing the quality of photos taken decades earlier. Astronomical societies have also been organized to promote the science and enjoyment of

Astronomy, as well as camaraderie among sky observers. Notable organizations in the Philippines are the Astronomical League of the Philippines, Philippine Astronomical Society, and university-based astronomy clubs, such as the University of the Philippines, Rizal Technological University, Philippine Normal University, and the Pamantasan ng Lungsod ng Maynila (University of the City of Manila)

astronomical societies.

A number of urban stargazing sites have been identified as popular areas for observing sessions. The Philippine Atmospheric, Geophysical, and Astronomical Services Administration or PAGASA Observatory located at the University of the Philippines in Diliman houses the country's largest telescope with a 45-cm or 18-inch aperture. Using this instrument, one could clearly appreciate planetary details and faint fuzzy objects, such as nebulae and galaxies. But aside from using the giant telescope, amateur astronomers also camp atop the roof deck to watch meteor showers, planetary conjunctions, comet apparitions, and eclipses.

Other suitable locations for casual urban stargazing are in the grounds of the Manila Planetarium near Rizal Park and the vicinity around the Manila Observatory.

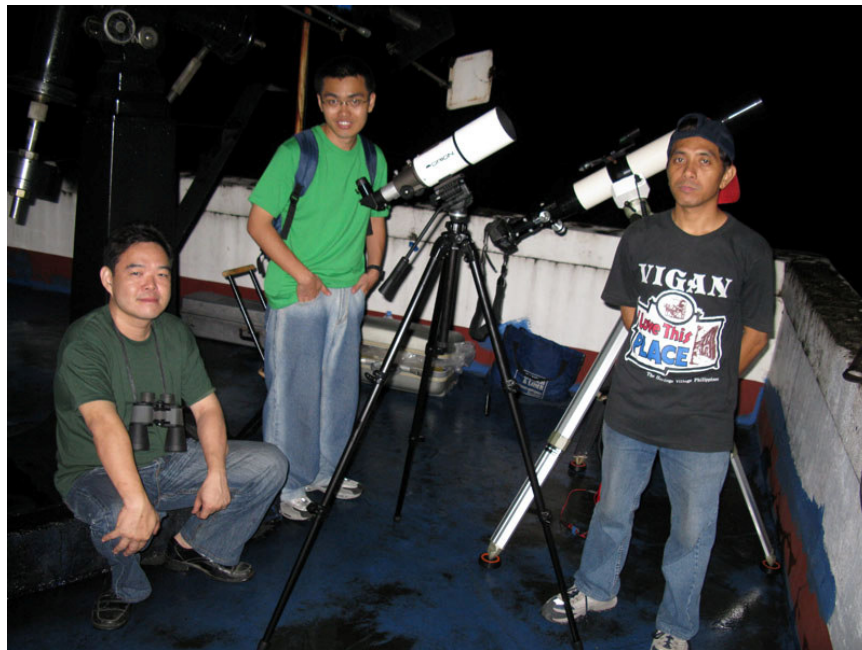
When it comes to stargazing, especially deep sky observing, every backyard astronomer knows that aperture rules. The larger the main lens or mirror of your telescope, the more photons you are able to observe and magnify. Aperture fever does get a hold of a lot of amateur astronomers. But for backyard astronomers

based in light polluted metropolitans, a suitable observing site must be found beyond city limits, going in out-of-town observing trips. But don't be mistaken, you can still enjoy the night sky even if you are surrounded by city lights.

On a clear and moonless night, try to observe the major constellations to get yourself acquainted with the night sky. Note of the brightest stars in each

constellation and where they are located. Also, be

familiar with the orientation of one constellation to another. By being able to successfully navigate from one constellation to the next, you train yourself in celestial navigation, a skill which will prove vital when doing binocular or telescopic observations. Other interesting sights for naked-eye observers are the phases and dark mare on the moon, meteor showers, naked-eye variable stars and the motion of the planets. You do not need to go to a dark site or acquire expensive gear to observe these objects, only clear skies.



*Amateur astronomers at the roof deck of PAGASA Observatory observing a partial lunar eclipse. Source: ALP*

A step up from naked-eye observing is stargazing with binoculars. Binoculars are essentially two refracting telescopes mounted in alignment to produce a much clearer image with comfort. Popular among binocular sky gazers are 7x50's and 10x50's, though aperture can range from 35mm to 150mm or 6 inches wide. These instruments are perfect for observing large or bright celestial targets, such as the Andromeda galaxy, the Pleiades, Hyades, Orion Nebula and occasional passing comets or bright asteroids. A few experienced binocular astronomers use these giant binoculars in hunting comets and having their names immortalized in the heavens. Like naked-eye observing, one does not need to travel to a dark area to observe these binocular objects. But for better viewing experience, apertures of greater than 70mm must be mounted on a sturdy tripod.

I'm sure you know by now that the next instrument I will discuss is the telescope, the astronomer's scepter. For most beginning in the field of astronomy, their picture of an amateur or backyard astronomer is someone peering through the back-end of a refracting telescope or the ocular lens of a Newtonian



Members of the Astronomical League of the Philippines promoting Sidewalk Astronomy through stargazing and meteor shower activities. Source: ALP

URBAN ASTRONOMY OR STARGAZING IS THE ENJOYMENT OF THE HEAVENS IN CITIES OR URBAN METROPOLITAN AREAS...

reflector on a dobsonian or German equatorial mount. I must admit that when I entered the hobby more than fourteen years ago, I had the same view of how backyard astronomy is done. But browsing through articles on the web and reading through pages of astronomy magazines, I got to see what astronomy is really about. It is the enjoyment of the heavens and camaraderie with fellow astronomers.

Now back to telescopes. For those living in highly urbanized areas where light pollution is a real problem, small to moderate sized instruments are recommended since the full potential of a large aperture light bucket can only be experienced outside city lights, maybe an overnight stay at a resort, atop a mountain or a level plain field. Refractors with 60 to 90mm objective lens will show you the craters on the moon, rings of Saturn, the cloud belts on Jupiter, other planetary details, and a few bright nebulae. With larger aperture, say a 150mm or 6 inch reflector, you will better appreciate lunar and planetary features, and view distinct details on clusters and nebulae.

A fascinating object to observe is the nearest star to our planet. The Sun is one of the most widely observed celestial objects, especially during eclipses and periods of high sunspot and prominence activity. You do not need huge telescopes to view the Sun. Using a 60 to 90mm refractor, projecting the solar image onto a piece of cardboard will enable you to observe sunspots and bright faculae, and trace their motion on the sun's surface. With appropriate filters, you can observe Sol in

various wavelengths and record subtle features not visible in white light. Attach a camera to your telescope setup and you now have an astrophotography system for capturing solar images.

During clear and moonless nights, you might be able to take a glimpse of a few shooting stars, astronomically known

as meteors. These are small solar system objects which enter

the earth's atmosphere and shine due to heat caused by friction. On some occasions, an observer would observe a great number of meteors in an hourly basis radiating from a certain point in the sky. These are instances of high meteoric activity, other wise known as meteor showers. Anyone can watch for meteor storms, even with urban lights. The key is to look for a suitable observing site with less light pollution, little or no clouds, and with the moon below the horizon. Meteor observers are advised to keep a record of their meteor watch. Data, such as time, frequency and magnitude distribution, can easily be noted by even the novice of stargazers.

So even if you live in a light polluted area, I urge you to go out, gaze at the sky, if you have a telescope or binoculars, much better. You don't need to become a professional astronomer to enjoy these celestial sights. If you haven't joined an astronomy club yet, now would be the best time to do so. Ask your fellow enthusiasts if you need help acquiring your own telescope or binoculars. Before delving into astrophotography, my advice is to get acquainted with the night sky first using your naked eyes and a pair of binoculars. A common mistake among amateur astronomers is purchasing their first instrument without asking advice from experience stargazers. The end result is they get frustrated with their equipment and finally decide to abandon the hobby.



The  
***Astronomical League  
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*Join us as we explore the universe,  
where imagination has no limits*



*People lined up to get their turn at the different scopes  
during one of the public stargazing sessions held at Baywalk, Luneta.  
Learn to observe heavenly bodies by joining and participating in our activities!*