



alpha

Astronomical League of the Philippines' *HerAld*

© 2009, Astronomical League of the Philippines

Visit our website at www.astroleaguephils.org

Vol. 7, Issue No. 8
August 2009 Special

✉ ✉ ✉

Francisco Lao, Jr.,
Editor-in-Chief

e-mail at:
<appulse2000@yahoo.com >



FEATURE IMAGE THIS ISSUE

The big news for July was the longest total solar eclipse of the century. ALP President James Kevin Ty led an expedition team to Wuhan, China to observe and document the eclipse along the path of totality. While clouds interfered, it allowed viewing of the partial phases, and when it thinned, showed the totally eclipsed Sun and the inner corona. Composite image above © James Kevin Ty

CLUB NEWS

Solar Eclipse

The July 22, 2009 solar eclipse is an eventful one for Filipino amateur astronomers. This eclipse is the return to our hemisphere of saros series 136, which was responsible for the longest recorded solar eclipse - the June 20, 1955 total solar eclipse, which our parents or grandparents may remember. That eclipse was particularly noteworthy as the longest duration of totality on record, at 7 minutes 8 seconds, over the South China Sea, just east of Manila, thus, observers in Manila were treated to close to the longest duration eclipse ever, with the Sun overhead. Its track crossed Sri Lanka, Southeast Asia, and the Philippines. This event marked the maximum duration of all total eclipses belonging to Saros 136.

Eclipses in this saros cycle were responsible for additional long-duration totality eclipses. The first successor to the 1955 eclipse occurred on June 30, 1973 and lasted 7 minutes 4 seconds from North Africa. It was followed by the total eclipse of July 11, 1991, with a duration of 6 minutes 53 seconds and a path through Hawaii, Mexico, and Central and South America. Notice the duration of totality continues to decrease with each successive eclipse. A complete cycle (55 years) later, the eclipse is back over Asia, but shifted north this time, which is why the path of totality is now over China and Japan. The total eclipse of 2009 is the 37th member of Saros series 136, and has a maximum duration of 6 minutes 39 seconds, although this occurred in the Pacific Ocean south of Japan.

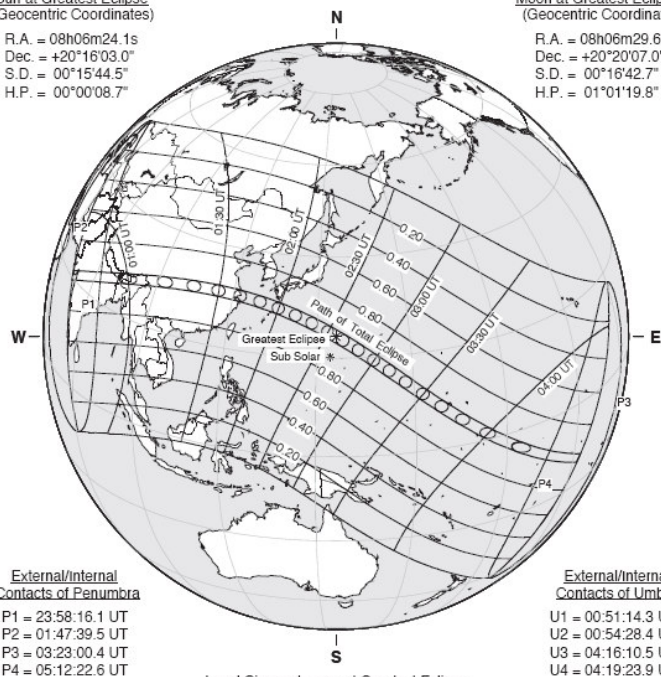
With the return of this saros 136 eclipse, the Astronomical League of the Philippines (ALP) divided itself into several teams to get the most chances of observing this solar eclipse that was observed by our parents or grandparents.

Sun at Greatest Eclipse (Geocentric Coordinates)

R.A. = 08h06m24.1s
Dec. = +20°16'03.0"
S.D. = 00°15'44.5"
H.P. = 00°00'08.7"

Moon at Greatest Eclipse (Geocentric Coordinates)

R.A. = 08h06m29.6s
Dec. = +20°20'07.0"
S.D. = 00°16'42.7"
H.P. = 01°01'19.8"



External/Internal Contacts of Penumbra

P1 = 23:58:16.1 UT
P2 = 01:47:39.5 UT
P3 = 03:23:00.4 UT
P4 = 05:12:22.6 UT

External/Internal Contacts of Umbra

U1 = 00:51:14.3 UT
U2 = 00:54:28.4 UT
U3 = 04:16:10.5 UT
U4 = 04:19:23.9 UT

Local Circumstances at Greatest Eclipse

Path of the July 22, 2009 total solar eclipse. © Fred Espenak

A delegation of ALPers went to China to place themselves in the path of totality, while those who were in the Philippines either observed on their own and were located across the country, or went to the official observing site at the PAGASA Observatory in Diliman, Quezon City. The following ALPers were able to have their images posted on Spaceweather.com: John Nassr (partial - Baguio), Raymund Sarmiento (partial - Metro Manila), Hernando Bautista (partial - Metro Manila), James Kevin Ty (Wuhan, China), Jun Lao (Wuhan, China). Shown in Yahoo! News were images of the observations done in the Astrocamp Observatory with Wilbert Palma, as well as the ALP observing site led by Henry So, who was also separately interviewed by GMA News. We'll start with the observations and images from the Philippines, where a partial solar eclipse was seen.

Members of the ALP went to China to observe totality for the July 22, 2009 total solar eclipse and were arrayed across the path of totality. The bulk of the members were part of the official ALP expedition team to Wuhan, in the inner part of China. This site was chosen for being more inland, and potentially farther away from clouds that would form on the coast due to the monsoon season. Dr. Armando Lee and Dr. Francis Sarmiento were in the Shanghai area, while Chris Go and Tomio Akutsu were located in Hangzhou, to the southwest of Shanghai.

Philippines

Here are some activity shots during the Partial Solar Eclipse when we were at PAGASA Observatory in UP-Diliman, Q.C. Though we didn't get to experience totality, it was fun to be part of the Solar Eclipse frenzy. - *text and images by Angie Tan*



Above, Maximum eclipse at 9:56 a.m. Top right, PAGASA staffers project the image of the eclipsed Sun. At right, ALPers take the customary group picture. Below, ALPers observing the eclipse, with Tommy Tan viewing through Angie's Orion Short Tube 80 equipped with a glass solar filter.



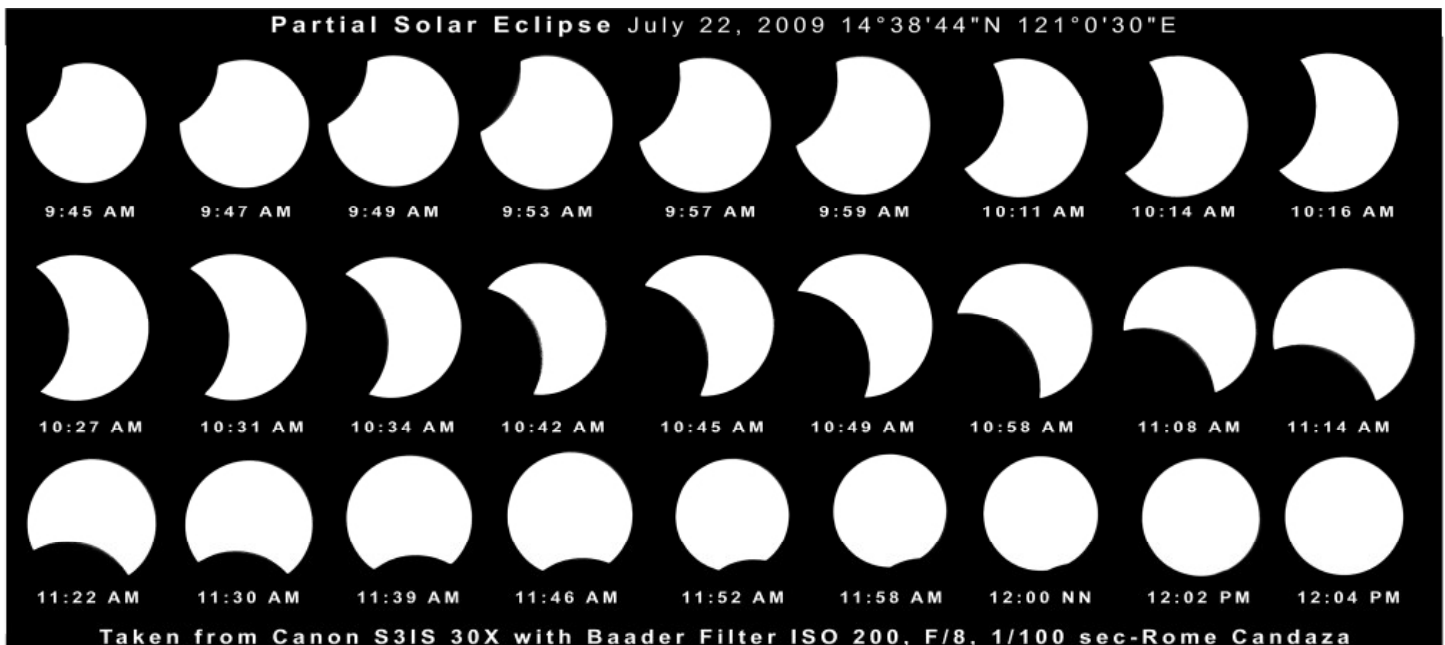
At right is my image of the partial solar eclipse using a Canon DSLR and a solar filter. The filter was given to me by Brian Davis a couple of years back. The shot was posted at gmanews.tv. - *Raymund Sarmiento*



I wanted to share my solar eclipse image taken at around 9 a.m. at UP PAGASA Observatory, using a Williams Optics 80mm ED II telescope at prime focus with a Canon EOS 1000D, and Thousand Oaks type 2 glass filter (right). - *Henry So*

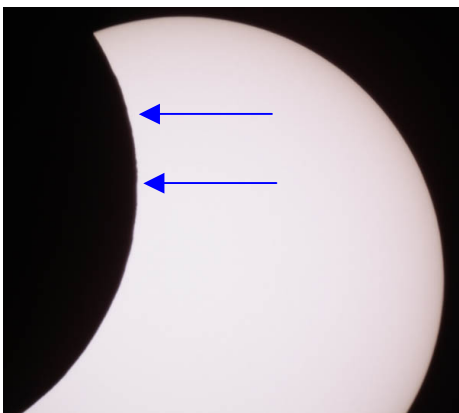
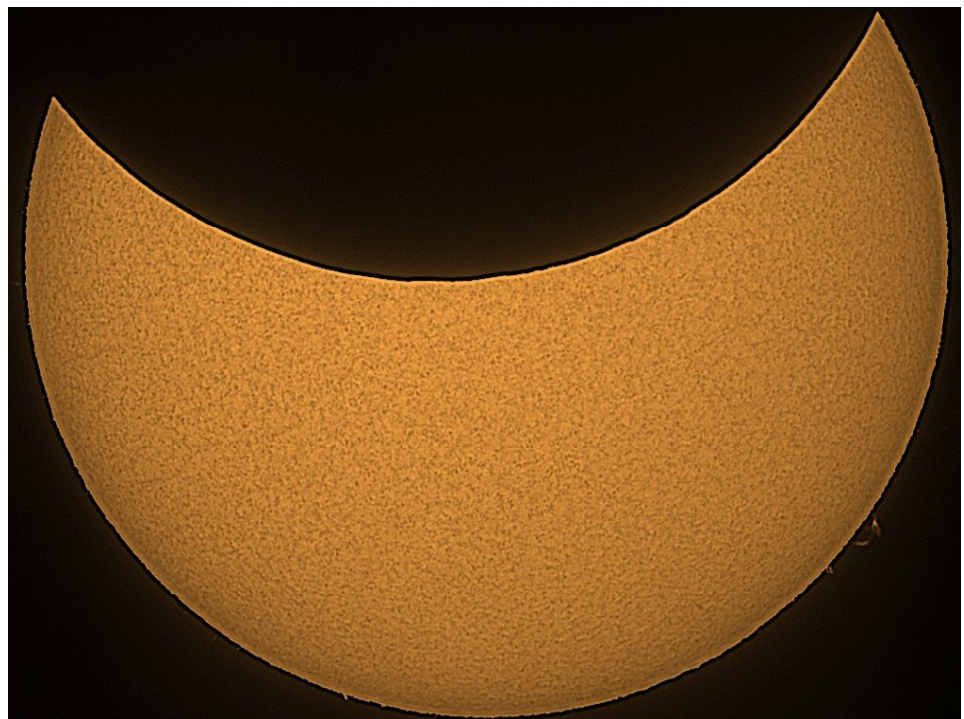


(⇒ p. 83)



Above is my first complete (except phases covered with cloud) Partial Solar Eclipse photo collection, taken with my Canon S3is 30X zoom with Baader filter at constant settings of ISO 200, f/8, 1/100 sec shutter speed. - [Rome Candaza](#)

The longest solar eclipse of the century was only partially visible from Baguio, but nevertheless was an awe-inspiring spectacle under bright sunny skies (right). Imaged July 22, 2009 01:28UT with a Borg 77ED f/6.5 with SM60 H α Filter and Dragonfly 2 camera, and an exposure of 15 seconds. - [John Nassr, Baguio](#)



The outline of moon mountains/craters that John pointed out is in the 7/22 eclipse image that I was able to successfully shoot (above, 1st solar image/use of solar filter, very thankful and lucky it had decent focus!) has intrigued me and I just want to ask if there is a daytime moon map at that exact time that I took the moon shot, July 22, 2009 9:15a.m. where I can match the bumps and contours of the moon in the image with specific named mountains/craters. - [Hernando Bautista](#)

Picture at the right was taken afocally during the Partial Solar Eclipse on July 22, 2009 at 9:52 a.m. in Iloilo City, using my Vixen R130sf Newtonian with Baader White Light Solar Filter 5.0 and LVW 22-mm eyepiece. - [Ted Gonzaga, Iloilo City](#)

Net, the partial eclipse was visible in the Philippines, where, contrary to expected cloudy or possibly rainy conditions, the skies were open to allow viewing of the partially eclipsed Sun. Coverage of the spectacle in the media (newspaper and TV) was great, and there was a respectable number of images posted in Yahoo! (\Rightarrow p. 84).



Wuhan

The ALP expedition team arrived in Wuhan, China, on Sunday afternoon, July 19, and immediately went about scouting for an observing site. The site chosen was Jiangtang Park, the very large public park along the shore of the Yangtze River in Wuhan's business district. The team went about walking the length of the immense park, and finally chose one near the entrance, which had a railing to the east – this was to have an unobstructed view of the east to capture the horizon glow during totality, as well as provide an area where no onlookers would be bumping or hindering our view of the eclipse from our equipment. This arc-shaped area meant that we would only need to worry about our backs when it came to onlookers.



The image above by Andrew Ian Chan shows our equipment set up during the dry run to the eclipse. Note the railing with the sign in front of our equipment that we used to block possible interference in front.

That Sunday afternoon turned out to be quite hot – probably hitting 36 to 38° C, as we were sweating like crazy while just walking the length of the park. Along the way we saw people swimming or just dipping on the banks of the river to cool off, and a number of kite flyers, including ones which were multiple kites on a long string, looking like a big centipede in the sky. On the way back, we stopped by a department store to buy water and some food, and ate dinner at KFC.

Monday and Tuesday were dry run days to set up and test our equipment. Monday was testing set-up, alignment, and equipment shake down. We later connected with Johnny Quinto and his family, who arrived after lunch, and went to East Lake Ocean Park to check out the site as well as go in and see the sharks, turtles, and other large fish from the Amazon (they had huge arapaimas, arowanas, and sturgeons, on top of large rays and sharks). We also discovered a great Chinese restaurant, Mr. Xie's, within walking distance of where we stayed, the Holiday Inn Tian An Hotel, and where we would eat our lunch over Monday and Tuesday. We also passed by the grocery to buy more water – we would use the water bottles as our stabilizing weights to our tripod mounts (and of course drink from them after).



Tuesday was a full dry run – we left at 7 a.m. to see if we could set up and be ready for the 8:13 a.m. first contact, and we did. We also simulated the imaging and videos that we would do during the time of totality, so that we could test the altitude and settings for the following day. Given it was another hot day (34-36° C, with nearly 50% humidity), we decided that we would rest and fine tune our equipment and schedules during the afternoon, in preparation of E-Day. Tuesday afternoon was quite tense, as weather forecasts had started to turn bad – clouds and chances of thunderstorms were looming in Wuhan, while James kept in touch with ALPers Chris Go and Dr. Lee regarding their plans in their respective sites near the Shanghai area. We were also trying to touch base with Edwin Aguirre and Imelda Joson who were also close to, but outside the Shanghai area. Shanghai was already being flagged as having unfavorable weather for E-Day, and there were rains in the area on Tuesday afternoon, and more forecast on E-Day. The only other area in China that was forecast to be good was Chongqing, quite a distance to the southwest of Wuhan.

Despite very hot and clear skies during our dry runs on Monday and Tuesday (with accompanying sunburn), it was a mixed bag in Wuhan on E-Day. Weather was forecast as iffy – partly cloudy to cloudy, and the morning started off with the Sun in the East hidden in clouds – probably the clouds that were busily bringing bad weather to Shanghai.

There was a knock on our door at 3:30 a.m., as the hotel provided us with a packed breakfast. We left the hotel at about 4:30 a.m. to grab our choice location in Jiangtang Park.

When we arrived around 5 a.m., we were told that the gates would open at 6, so there we were – a small gathering of people who wanted to get into the park early. Once the gates opened around 5:30, we were this mass of people released into the park – we asked the Quinto family to head quickly to secure our spot, as most of us ALPers had heavy equipment so that we could not sprint ahead to the area – and what an area it was – a lot of people wanted to get into our spot. When the ALPers got in, the Quintos and Bernice Viola Chan, Andrew's sister and their mom, Elaine, were already at the site to prevent others from coming in. We then proceeded to set up our equipment and waited for first contact, all the while noticing the increasing number of people filing into the park and hovering around our area.

It was nice that as the Sun rose a bit higher, and while it was still hidden in clouds, we had high altitude clouds (likely containing ice crystals) that provided a wonderful 23-degree halo (*Jett Aguilar's image above*) around the hidden Sun, and which lasted for a long time! At a point in time, we were even treated to a faint display of a 46-degree halo, so we had a double halo around the Sun. It was quite a very pretty start to the day. As time went by and more and more people came, our guide, Ma Cheng, took the initiative to cordon off our area by placing nylon rope around the trees around us, as it became increasingly hard to concentrate as more and more people wanted to observe through the scopes or were taking pictures, while increasing the potential of bumping onto the tripods or equipment. A tent was also set up by Andrew's mom, and we placed a white bed sheet that we borrowed from the hotel in front of the tent, for shadow band viewing (⇒ p. 85).



The huge mass of people across from our observation site in Jiangtang Park to observe the eclipse.



James aligning his video and still camera to the Sun



Jett making sure his equipment (video camera, still camera, and flash spectrum video), are all tracking, while connected to a laptop computer.



Jun's rolling luggage served as "mount" for the point-and-shoot digital camera to capture the shadow bands. Note the Eclipse gum that Jun brought for each member of the expedition team.



Jun also set up a small digital camera to take a video for pre-totally, in the hopes of capturing the elusive shadow bands. The Quinto sisters were also going back and forth between recording the temperature and relative humidity readings on two hygrometers, while also taking pictures of the diminishing light. They were also going to be on the lookout for the shadow bands.

The eclipse started at around 8:15 a.m. with first contact (time in all of China is the same as that in the Philippines). What caused us to worry was that the high clouds we started off with had started to thicken. Andrew was joking that the increasing number of people with their sweat and breathing was causing more water vapor to rise in the air and cause cloud formation. There were a lot of people around the area, and it was interesting at one point to see pastel pink and purple umbrellas open up when the Sun broke free of clouds during the early partial stages.

We were able to observe and image first and fourth contacts and the partial phases to the point of slivers of sunlight, but had clouds mixed in the middle during the critical stages, up to a few seconds before and after Bailey's Beads (sigh...). It was quite interesting to shout "filters off" typically reserved to the last few seconds before 2nd contact, way ahead of time, because there were instances that the clouds were thick enough to allow naked eye viewing of the eclipsed sun, even with instruments (otherwise it was too faint viewing with solar filters - we had to adjust our exposures to compensate for some cloud cover), so we had images of the partially eclipsed Sun through solar filters and through natural

cloud filtration. The presence of clouds, though, prevented pinhole projection of the partially eclipsed Sun on the ground, as the sunlight was becoming diffuse. The composite image above compiles images of the eclipse, from before first contact, first contact, the partial phases (every 15 mins.), the surroundings during totality, the subsequent partial phases (every 15 mins.), fourth contact, and after fourth contact.



Andrew's image of the overflowing crowd and the eerie pale light just prior to totality.

As the eclipse moved closer to 2nd contact, you could start noticing the intensity and quality of light change over to a grayish light that felt eerie. A cool breeze had also started to come in from the southwest, approximately where the shadow would be coming from. While these were tell-tale signs of the incoming shadow, we were also starting to feel more and more uncomfortable with the clouds not moving away too quickly - we spied an opening in the clouds to our north and it was not moving fast enough to get to our site, but at that point we were resigned to the fact that we won't get an opening in time for totality (⇒ p. 86).



James used the fisheye lens lent to us by Canon to capture the sky and the eastern horizon glow during totality (*right*). Notice the range of light intensity across the sky. This image faced north (*center*).

As totality was about to happen, the clouds lingered in the area, but it was quite interesting to see the approach of the shadow across the clouds – you could see the darkness as the Moon’s shadow approached our area from the southwest.

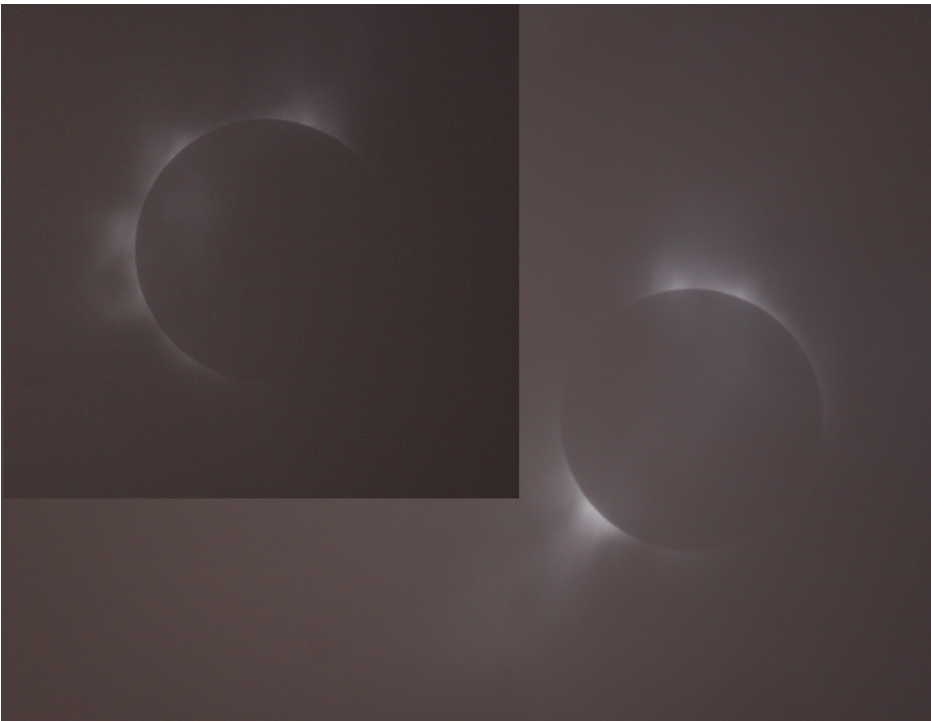
Alas, a few seconds before Baily’s Beads and the first diamond ring, a thick cloud blocked the view, so we got to get dark prior to actual totality, and the crowd roared as we were plunged into premature darkness.

As we could not see the totally eclipsed Sun, we decided to take the time to take in the surroundings – it was not as dark as we were expecting (likely due to clouds dispersing the available light) – buildings and park lights were now open – but you feel the darkness all

around you – somewhat eerie – as all around you, you could see the yellow of sunsets all around, especially in the east, as we were plunged in the Moon’s shadow cone. The image below left shows the surroundings from our observing site, with Andrew’s sister, Bernice, in the picture, showing the darkness around us during totality.

Reviewing the videos and images taken with mounts which tracked the Sun, we found out later that James and Jett were able to capture portions of totality when the clouds thinned enough to reveal the eclipsed Sun with the inner corona. Further review of the videos showed that we were also able to capture third contact, with the appearance of the diamond ring seen in the high magnification videos, while the sudden appearance of light on the clouds was apparent in the low magnification videos, signaling the appearance of the diamond ring. So while we could not view directly the 2nd diamond ring that signaled 3rd contact, we were able to see its effect on the clouds as the clouds lit up with sunlight once again. It was amazing to see the Moon’s shadow travel quickly above the clouds, only this time, it was moving away from us. Dr. Jett and James were able to eke out some inner corona during totality by exposing their tracked images for a few seconds (and the video showed there were episodes of quick thinning in the cloud cover) (⇒ p.87).





These two images above were taken by Dr. Jett Aguilar, when clouds thinned enough for him to image the totally eclipsed Sun and parts of the inner corona (some of the white portions are likely cloud reflections, but some of these which show detail are actually coronal streamers). As he was using a mount to track the Sun at high magnification, he (and James) were able to capture the totally eclipsed Sun, whereas most people were observing the surroundings and did not notice the totally eclipsed Sun peeking through thin portions of the clouds.

Andrew took another image of the crowd at mid-totality, showing the dark sky where the Moon's shadow was projected.



With the clouds, we couldn't see the planets during totality, but again, it was amazing to see the Moon's shadow move across the clouds. Going through my wide angle videos from my digital camera, it was interesting to see the movement of the darkness (the Moon's umbral shadow) across the clouds toward the Sun to 2nd contact, and then move away from the Sun at 3rd contact - quite a different experience that we would not have noticed if we had clear skies - so, it is a mixed bag - we were treated to a different spectacle of a very noticeable umbral shadow moving across the sky - but we were not able to see the awesome total stage of the eclipse. Had we paid attention, we would have seen when the cloud thinned enough to show glimpses of totality.

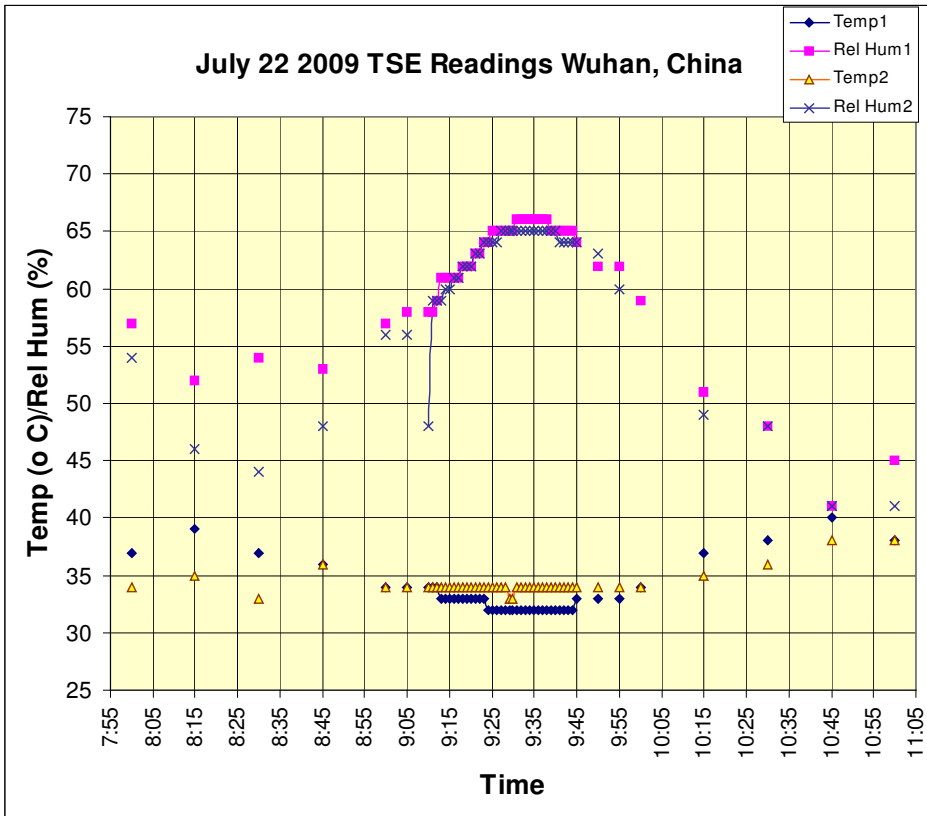


Totally eclipsed Sun - stacked image prepared by eclipse expedition leader James Kevin Ty. Note some delicate coronal streamers showing up in this image, consistent to Jett's image at left.

We continued capturing the partial phases to fourth contact, all the while seeing the great mass of people start heading out of the park after totality. There continued to be a crowd about us all through fourth contact, and it became much more relaxing to talk to them and take pictures with them. In fact, it turned out that we became somewhat like local celebrities as local newspapers featured pictures of us and our equipment on Tuesday, Wednesday, and Thursday (probably not a lot of local news in Wuhan so that we were extensively featured). We even had an interview on Tuesday to accompany an article that would appear on E-Day.

Taking the time to review the images of diminishing light, you could definitely see the difference in the light intensity through totality and back to full Sun. The images were taken at 1/125 second at f/5.6 with a Canon camera. The setting was fixed so that we would always have the same setting, and any changes in the light would really be coming from the eclipse (page 94). This camera was handled by Jamie Quinto, following a schedule of exposures from Jun.

Analysis of the temperature and relative humidity showed the impact of the Moon's shadow on the Earth. Since there were clouds and the event started early enough in the morning, we did not see as dramatic a drop in temperature, but did see a dramatic rise in temperature as totality ended, and going to fourth contact ($\Rightarrow p.88$).



What was probably more dramatic was the increase in relative humidity as the temperature dropped (see above, where you see the steep rise going toward totality). Many thanks to Jamie and Joanna Quinto for continuing to monitor and record readings from the hygrometer all throughout the eclipse.

Packing up the equipment after fourth contact was time consuming, as by then (around 11 a.m.), the Sun was already free from the cloud cover, and it was quite hot (36° C), and we were tired, so we were dragging our equipment back to the mercifully air-conditioned bus. Our treat though, was that lunch was a celebration

both of the eclipse and Andrew's birthday, which occurred the day before. Our guide recommended a fine Chinese restaurant that had local Wuhan delicacies, including lotus seeds and flowers, turtle, frog, etc. - we were stuffed so much with food, that we had to bring home so much of the extra - this was all courtesy of Andrew's mom, who paid for our lunch.

The ALP Wuhan Total Solar Eclipse Expedition team was composed of James Kevin Ty as leader (who handled video, digital telephoto SLR, and horizon glow fisheye), with Dr. Jett Aguilar (flash spectrum, video, and digital telephoto SLR), Jun Lao (digital telephoto SLR, point and shoot video, documentation, diminishing light handled by Jamie Quinto), Andrew Ian Chan (documentation, and telescope + digital SLR), Bernice Chan (documentation), and Johnny Quinto (video) as members, with Zed Contractor, the Quinto family, and Andrew's mom as guests. Of course, we would have been remiss if we did not get a group picture (below). Our thanks also go out to our ever-reliable guide in Wuhan, Ma Cheng. - text and images (unless cited) by Jun Lao

BREAKING NEWS

Jupiter Impact

One exciting piece of news before the total solar eclipse was the discovery of another impact (suspected to be a comet) on the clouds of Jupiter. The Jupiter impact scar was discovered by amateur astronomer Anthony Wesley on July 19th (→ p .89).

