The Observer

Newsletter of the Brazos Valley Astronomy Club

Volume 5, Issue 2

End of An Era

A local era in astronomy came to an end recently as Dennis Utley retired from teaching at Blinn College at the end of the spring semester. For many years, Dennis was the face of astronomy in the Brazos Valley as he led the Blinn astronomy program, ran the BRASS astronomy outreach program, and was a founding member of the BVAC. It is fair to say that nobody in recent memory has done as much as Dennis to promote astronomy in the region. Although Dennis says that others will continue the astronomy program and BRASS, it is hard to imagine that they can match Dennis' incredible energy.

Dennis came from a rural, west Texas background and was inspired, like many of his generation, by the space race. He grew up on a farm near Eula, Texas, and remembers sleeping outside in the summers with a roof of stars scattered across the sky. After his mother moved to town, he became interested in science fiction and was captivated by Sputnik and the space race of the 1960s. Dennis wanted to become an astronomer, but finding no astronomy undergraduate programs in college, he decided to study physics. He says that following a career in acting was a near miss, because in high school he was small in stature and was frequently asked to play the part of a child in school plays, but his path was set after he got a grant and loan to study science at Angelo State. After earning a BS in physics and math from Angelo State in 1969, he started teaching in high school, but had the bad luck to start during the turbulent year that Texas schools first integrated, so this experience prompted him to join the Peace Corps, which sent him to Nepal.

Dennis Utley (blue shirt at right) organizes BRASS observers on the Blinn campus during the transit of Venus, June 5.

Teaching is clearly in Dennis' blood because his career path bounced back and forth between teaching and advancing his education. After the stint in the Peace Corps, Dennis went back to school to earn teaching credentials and a BA in chemistry and psychology, again from Angelo State in 1975. Next he moved to Abilene Christian University, where he earned a MS degree in physical chemistry in 1979. The new degree led to a job for the Radian Corporation in Austin doing contract research in chemistry, mainly on coal fired power plants, and kept him mostly on the road for three years. Teaching called again and Dennis returned to the classroom at the high school in Eldorado, Texas, where he stayed for five years. After the death of his father, Dennis waffled between attending seminary school or graduate school. Grad school won out and Dennis returned to study physics at Texas A&M. His love of teaching was evident even while he studied for his PhD, as he was recognized with an excellence award as a teaching assistant After earning his PhD in 1993, Dennis went back to high school teaching with stops in Water Valley and Navasota, but he joined Blinn College when an opportunity arose. Dennis spent the last 15 years at Blinn and built an astronomy program, starting with one astronomy course and developing another three. He founded BRASS, a Blinn-based astronomy outreach program that achieved national recognition for its accomplishments. He also served as a founding member of a national board advising the Astronomical Society of the Pacific with its the "Share the Universe" program for NASA Night Sky Network. This spring, Dennis was one of two Blinn faculty recognized with a teaching excellence award. Dennis summed it up after the award: "There is no better way to spend your life than to share what you know with others. Besides, scientists have great toys, and astronomers the

best of all."

When asked what sparked his interest in astronomy, Dennis remembers the star-spangled nights on the farm and an experience from seventh grade at North Junior High in Abilene. An amateur astronomer came to school to show the students his telescope and Dennis was first and last in line. He still remembers seeing Saturn and credits this experience with profoundly shaping his view on astronomy outreach.

What is next for Dennis? He says he needs to rest, clear his head, and pursue interests that have lain fallow during many years of high-demand teaching. Dennis says that he looks forward to observing for the fun of it. Nevertheless, it is easy to imagine that before long Dennis will again be sharing his love of astronomy and science with students and the public.

Brazos Valley Astronomy Club

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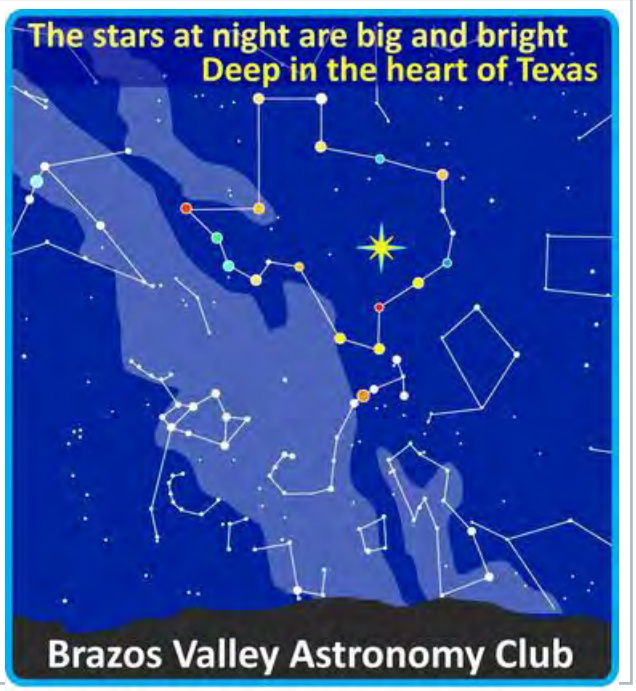
Member Astronomical League



Tales from the 20 May 2012 Annular Eclipse

Editors Note: The 20 May 2012 total annular eclipse presented a rare treat for astronomers. The path of totality landed shortly after sunrise in China, but then the shadow spent much of the day crossing the north Pacific Ocean. As sunset approached, the eclpse path arced across the western U.S. from northern California, across Nevada, Arizona, New Mexico, to the eclipse end at sunset in northwest Texas. Totality was not visible in Bryan-College Station, but the proximity of totality prompted two BVAC members to pack up their scopes. These are their stories.

A Road Trip to the Eclipse

By Mark Spearman

The plan was to meet David Oesper and several other amateur astronomers from around Alpine, TX at a Bed & Breakfast in Plains, Texas. Plains was close to the centerline of the eclipse and far enough West that you would be able to see annularity before the sun would set. The Rock'N R B&B had been host to amateur astronomers before and had a clear view of the western horizon.

Our trip began the day before the eclipse when Blair, our daughter Rebekah, and myself left Wheelock around 2:00 pm with our Casita travel trailer in tow. I took along my 4" Stellarvue, some eyepieces, and a solar filter that I made with a remnant of solar filter material that Anjal Sharma was kind enough to pass along. We got to Abilene State Park around 6:30, set up and had dinner. The neighboring campers noticed the mount and asked about it which started a conversation about astronomy. We then had an impromptu star party with particularly nice views of Saturn, a very small Mars, Izar in Bootes, and M3. Of course, the biggest hit was my laser pointer. When I pointed at Mars, my neighbor thought I had sprayed something out of a can!

Next day we made it to an early Mass in Abilene and headed down the road. As we got closer to our destination, clouds began to form and we were in doubt about the entire trip. When we got to Plains, TX around 3:30 in the afternoon there were fewer clouds but there were still an alarming number to simply wait-and-see. The weather app on my phone showed clear skies in Roswell, NM so we headed west.

Mark Spearman readies his scope before the eclipse

Comparing the eclipse map in Astronomy magazine with the highway atlas, Blair identified a rest stop on US 70 between Clovis and Roswell that would be very near the center-line and far enough west for clear weather. Just after we crossed the NM line we got in touch with Dave and the others and told them where we were headed. They too had left the B&B in search of better skies. A while later we took a "short-cut" that started out as a nice paved road but ended up with 30 miles of unpaved washboard gravel and dirt. When we finally got to the rest stop, there were two other parties already there, Micky Frank from Port Arthur and Paul and Bobbie Cain from Ft. Worth. Our friends from Alpine had arrived earlier and had left for Roswell to get something to eat just before we arrived. We leveled the Casita and began to set up. We had not had any lunch so Blair whipped up some spaghetti while Rebekah and I set up the scope. Soon Dave and company arrived and set up as well. Then other

The setting sun in eclipse

people began to show up from as far away as Arkansas and even England. Before it was over there were 15-20 people at the rest area.

It was an impromptu eclipse party! We had scopes ranging from binoculars with solar filters to a classic Astro Physics long focal length refractor and an even more classic Criterion ca 1970 4" reflector to the modern Coronado 60 mm and everything in between. As usual with astronomers, everyone was glad to share their view. It was very fun meeting everyone and looking through the different scopes. Dave even provided us with some eclipse glasses to allow viewing without a scope. The Coronado revealed some very nice solar prominences. As the eclipse progressed, these seemed to be sharper—perhaps because of the better contrast. At one point we could see a filament on the surface link to the prominence at the limb. Way cool!

But the real treat was the eclipse itself. It began right on schedule as the moon began to cover the solar disk. Almost immediately the air began to appear noticeably cooler and the sky darker. Our vista was superb with a clear view, but for a barbed wire fence, of the western horizon. There were almost no clouds when it started. Then, just as annularity approached, a lone demon cloud covered the sun. Our hearts sank. Fortunately, it was small and the sun appeared below it in short order. As you can see from the pictures Rebekah got on her little Nikon Cool Pix, we had good skies and saw almost the entire eclipse without any problem.

My Stellarvue with the home-made filter provided very clean visual images of the sun. Rebekah was able to shoot through the eyepiece and get several nice images, including one before the eclipse that revealed three large groups of sunspots. But the best was watching a crescent sun set without eye protection. Once it was down, we packed up and headed to Roswell where we spent the night and encountered some rather unusual characters. But that is another story …

Mid-totality from eastern New Mexico

An impromptu eclipse party gathers at a rest stop in eastern New Mexico

Eclipse in Albuquerque

By Will Sager

The hardest decision for the May 20 eclipse was deciding where to go. I missed the last one in the area back in 1992, so missing this one was out of the question. I have seen several total eclipses, but never an annular. Others say they are not nearly as spectacular as the true total eclipse, but worth a look. But where? The center line crossed a large swath of the western US, but where would the best spot be? Since it ended up in west Texas, maybe I could keep the cost down by driving. I thought briefly about joining Mark Spearman, but I got nervous about the altitude of totality. In Amarillo, mid-eclipse would occur only 1° above the horizon. All it would take is a small band of clouds at the horizon and the eclipse would be hidden. Consulting the map of the eclipse path I picked Albuquerque because it is in the desert, mid-eclipse would be at an altitude of 5°, and I could make the trip with one short flight out of Houston. I cashed in frequent flyer miles, got my ticket, signed up for a rental car online, and booked a hotel.

But then I had to figure out what gear and how I would get it there. I needed to get it all in one container or pay for the privilege of multiple boxes. I bought a rolling duffle and spent several days fitting gear into boxes that fit into the duffle. I used lots of bubble wrap and bought some inflatable pool floats for padding. The gear that I used is my Orion 4" Maksutov on an old Great Polaris mount that has slow motion controls to allow me to track the sun. I used my Nikon D80 for photographing the eclipse and a point and shoot for tourist shots.

My itinerary had me leaving Houston just before 9 am, so I hit the road before sunrise. Luckily, everything went as planned and my plane was on time. After picking up the car and driving to the hotel (of course, it was too early to check in), I figured out that it was very early to go sit in the sun at the observing site, so I went to the old downtown and had a leisurely lunch and played tourist.

A TV reporter records a report of the eclipse gathering

In the early afternoon, I headed to the eclipse observing site. Through a contact at the Albuquerque Astronomical Society (AAS), I learned that they would have a public viewing site at Mesa Del Sol, a park south of the airport. Conveniently, they had roped off separate areas for "astronomers" and the general public. Because of the crowd, I would cocnlude that this was a good thing.

I arrived and found a large parking lot and grassy area and in the latter there were several large, circus-sized tents and a mob of people.

Eclipse chasers line up at Mesa del Sol in prior to first contact.

Apparently the eclipse was going to be a big public event. I found a nice spot at the edge of the property where I looked over the edge of the park and the mesa, which meant that nobody could get between me and the eclipse. I got my scope up, tested everything, and checked it twice. There was still several hours until first contact, so I went to explore.

As the afternoon progressed, thousands of people had showed up. The big tents were ground zero for the public event. There were some lectures by AAS and university lecturers. They were giving out solar filters, but the crowd quickly snapped them all up and they ran out. I found the TV news reporters doing live event reports. The whole thing was quite a zoo.

There were many "serious" astronomers as well. Hundreds of people like me, with one to several scopes set up with filters for solar observing, lined the west end of the field roped off for astronomers. It was nice to walk through the group to look at equipment and strike up conversations. The astronomers were from all over the US and many other countries.

The eclipse began with first contact, when the first tiny, round nibble of the sun began to vanish at 6:30 pm. I started snapping photos every few minutes. The lunar disk inexorably covered the solar disk. True to form, the Albuquerque weather was perfect. There were only a few tiny clouds and otherwise the sky was clear. The temperatures were also mercifully cool for the desert, with the high temperatures only in the mid-80s.

During the eclipse, I did not notice any unusual effects. It did not seem noticeably cooler nor did the light seem odd as it does at other total eclipses. Indeed, it seemed just like sunset only a bit early. Second contact approached and the snapping of camera shutters from the crowd rose to a crescendo.

Mid-totality occurred right on schedule at 7:37 pm. I always wondered how bright an annular eclipse would be during totality and I found out that the sun was still bright enough to hurt your eyes. I tried to gaze obliquely at the sun in totality and it gave the impression of a bright sun with a big hole in it. It was a great

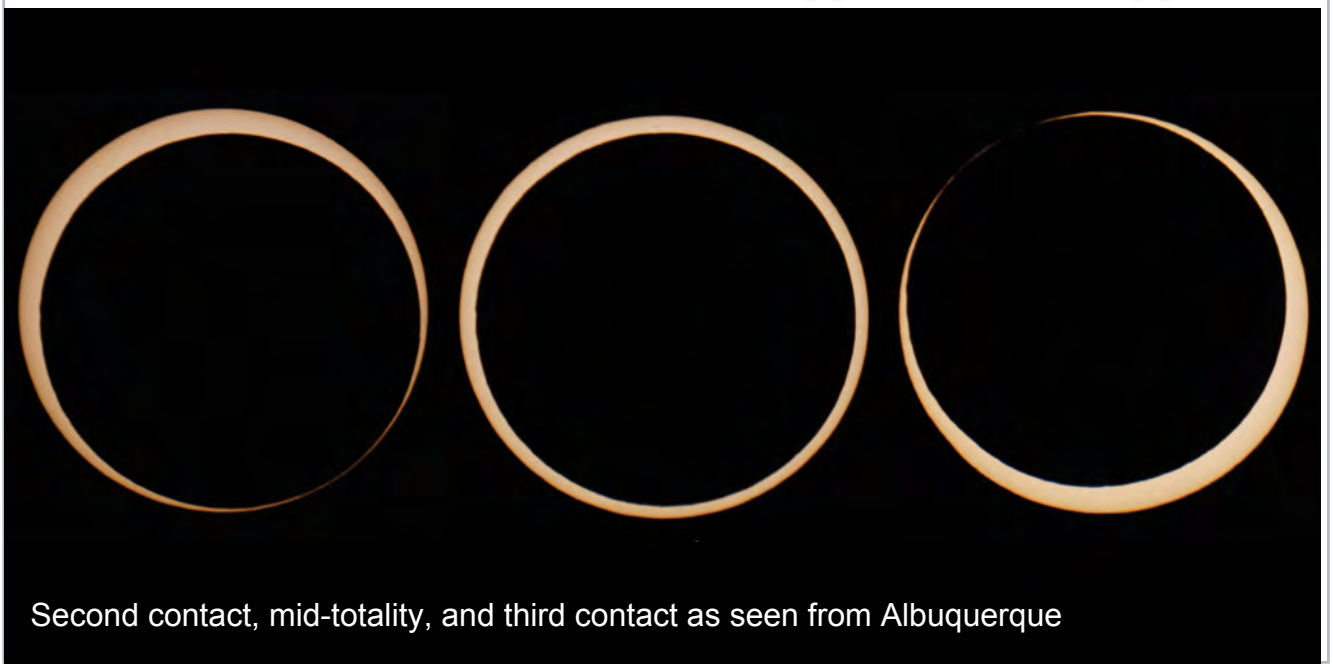
Will poses before the eclipse

The eclipsed sun setting in Albuquerque

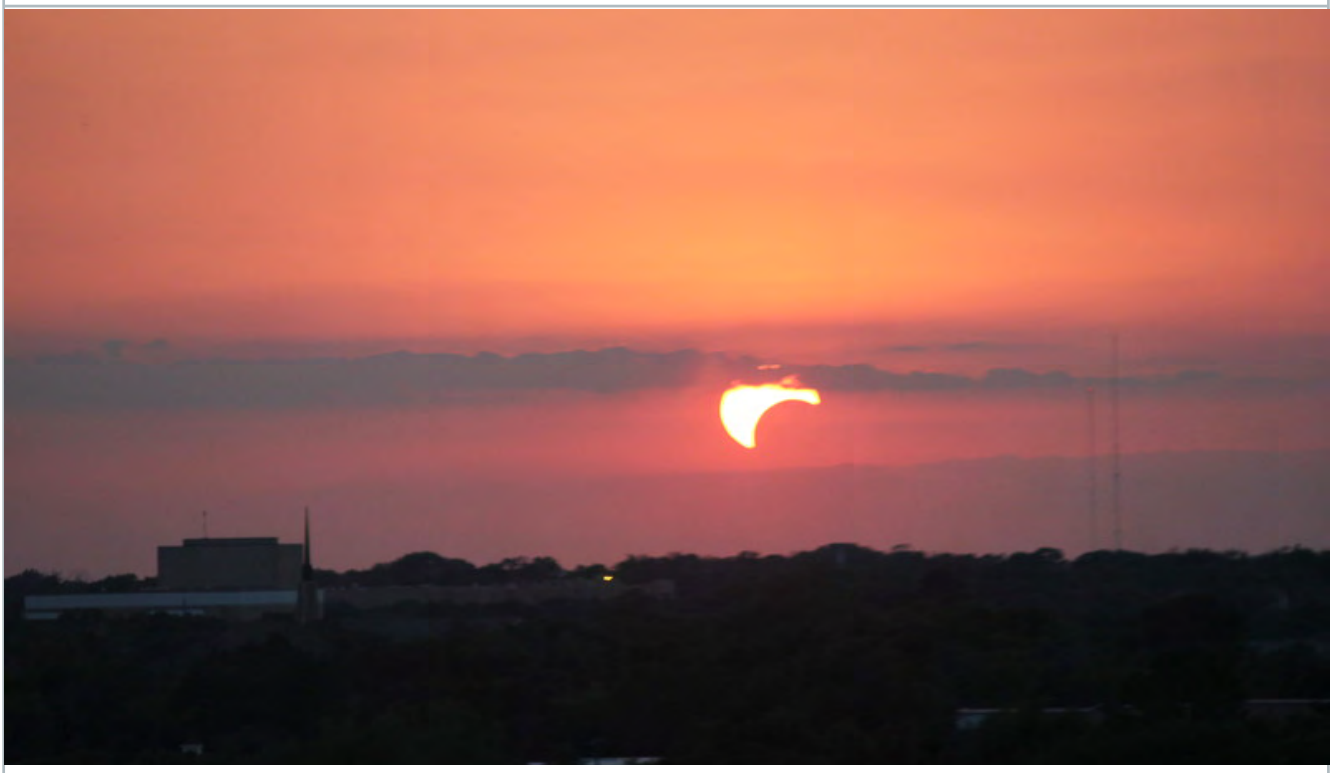
feeling to see the sun and moon aligned exactly.

All too quickly the moon moved to third contact and totality was over. I kept looking and snapping photos as the sun approached the horizon. Sunset occurred at 8:00 pm as the eclipsed sun sunk beneath the low mountains to the west. Enough of the moon had moved out of the way by then that the solar crescent was fat and as it set, it gave the impression of a bright shark's fin sticking up from the horizon. Because of the clear air, the sun was still dazzling even as it set.

After the eclipse, I packed up my gear and made it back to the hotel. It is always quite the come-down to go back to "normal" life after the excitement and tension of the eclipse. My plane left Albuquerque only a little more than a day after leaving home. It was truly a whirlwind trip and naturally on the way back, I was reading up on upcoming solar eclipses. I've got the itch and feel need to bathe in more moon shadow.



Second contact, mid-totality, and third contact as seen from Albuquerque



The eclipse from Bryan. Don Bray, Bob Brick, Derek Kuhl, and Kevin Gassen and family members convened atop the parking garage at St. Joseph's Hospital to catch the partial phases of the 20 May eclipse. The sun set before the beginning of totality. Photo by Keven Gassen.

The 6 June 2012 Transit of Venus

Compiled by Will Sager

Local astronomers were treated to a rare event on the 6th of June when the planet Venus crossed the face of the sun (an event known as a transit). Because of the periodicity of the orbits of Venus and the Earth, transits of Venus come in pairs, separated by 8 years, that occur at intervals of 106 to 122 years. The last transit happened in June 2004 and was not visible from most of the U.S. That meant that the 2012 transit would be the last chance for all living astronomers to witness such an event. The US was still not in the best position because only about half of the 6.5 hour transit was visible before sunset. Nevertheless, local observers waited with anticipation for the event. No club gathering was planned and most members watched from their homes. The following reports were posted on Brazosastro.

From Mark Spearman:

I got back from Atlanta around 7:10. Blair brought my car in which I had left my scope, filter, eyepieces, and mount. We left Easterwood and set up on the road between the airport and 60. I wanted to set up ASAP before clouds might come in. The transit was fantastic through the little 4" Stellarvue with my homemade filter from the material Anjal provided. Several people stopped to view the transit including a new friend from Phoenix, AZ. My son and his family came by as did a few friends that we called and told about the event. It was a blast. The second roadside solar event in as many weeks!

From Anjal Sharma

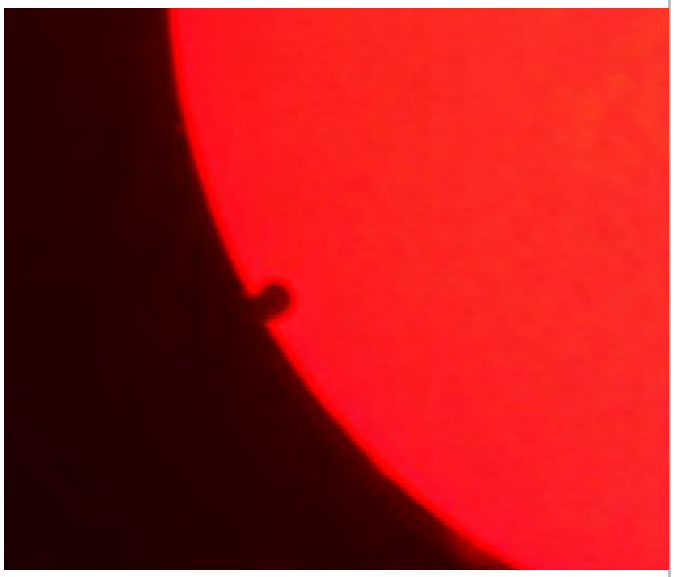
Ever notice how old man Murphy has a way about him? I took an hour off work, just so I could get images of first and second contact, and the danged camera adapter messed it up (actually Murphy messed it up - he probably doesn't like anyone who isn't Irish). I'm glad you had so much fun with friends and family. This truly was an event that'll stay with you until you depart this world. I'm glad to be alive and equipped on June 5, 2012.

Dratted camera adapter - can't find it when you need it!! I missed both first and second contacts, but I got a series of 8.3 MP 1.12 arcsec/pix monochrome images of the sun through the 6 inch refractor and the FLI ML8300 with a Baader contniuum narrowband filter. And the H-alpha scope riding on top of the refractor was off so I couldn't simultaneously image in both H-alpha and solar continuum wavelengths although I did manage to catch a couple of H-alpha videos as it was setting. Local sunset for me was around 7:30PM. This event was LEGEN-WAIT FOR IT-DARY!!!! I'll remember this till I'm gone. My kid and wife saw some of the views but they ducked back in - it was so darned HOT!! Why can't these transits occur in the winter???? Rakesh showed up for a short while and saw the transit at my place too. I hope everyone enjoyed the views. Everything the hype made it out to be in my opinion.

Kevin Gassen's photo of the transit

From Kevin Gassen

Got some good pics after a rough start. Missed first contact due to a bad computer cable. Took the rest just trusting in the tiny camera screen for focus. Keeping my fingers crossed. I was hoping to get a shot of Venus amid the sunspots, but I don't think I'll last that long. It will be almost down by then anyway. It's been a long HOT day. Think I'll go home and watch reruns of it in the AC.



Black drop effect imaged by Mike Prokosch. He shot this photo with a Coronado PST in H-alpha light using a NextImage webcam

From Vijay Sundaram

I was at the MSC witnessing the first contact and the black drop. There were a couple of telescopes fitted with filters for the public to view. In addition, Dr. Kevin Krisciunas (who gave a talk in our April meeting) was showing a projected image of the sun through his telescope on a screen. The place was kind of crowded but it was worth the wait in the sun!! I also managed to get a projected image from my binoculars back at home.

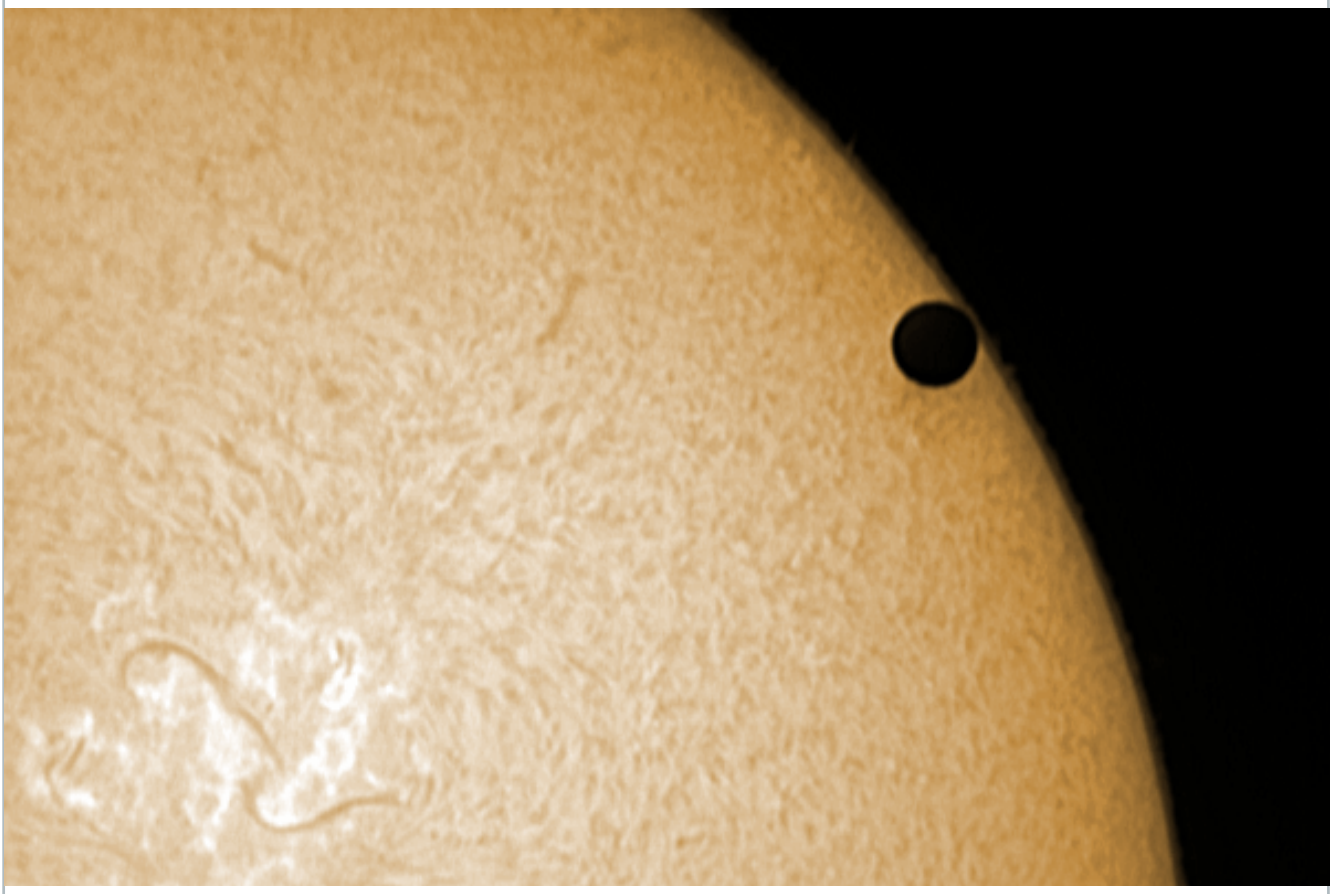
From Judy Culver

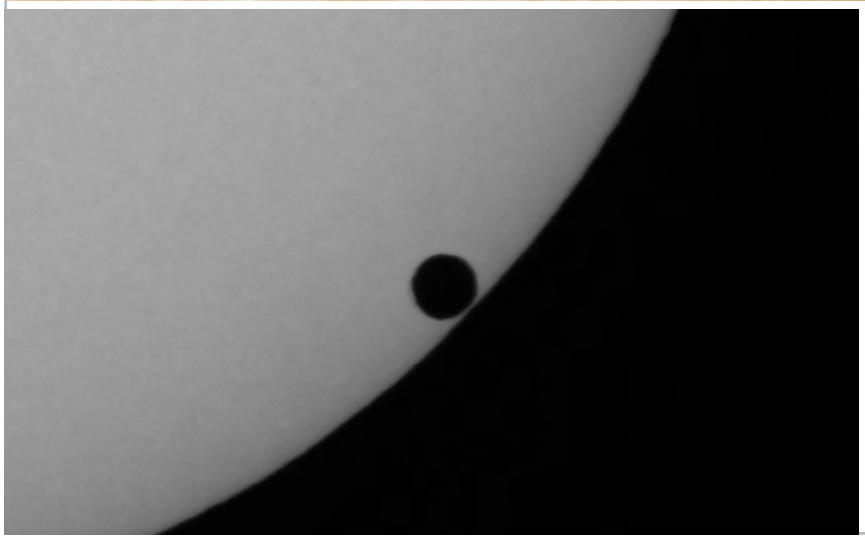
I didn't make it out to A & M. A friend stopped by and the three of us viewed the transit through my Vixen and PST. It was so cool! We also watched SLOOH on the iPad. After checking NASA TV (very nice), I'm packing up and heading home. Cold weather is MUCH better than this

heat.

From Will Sager

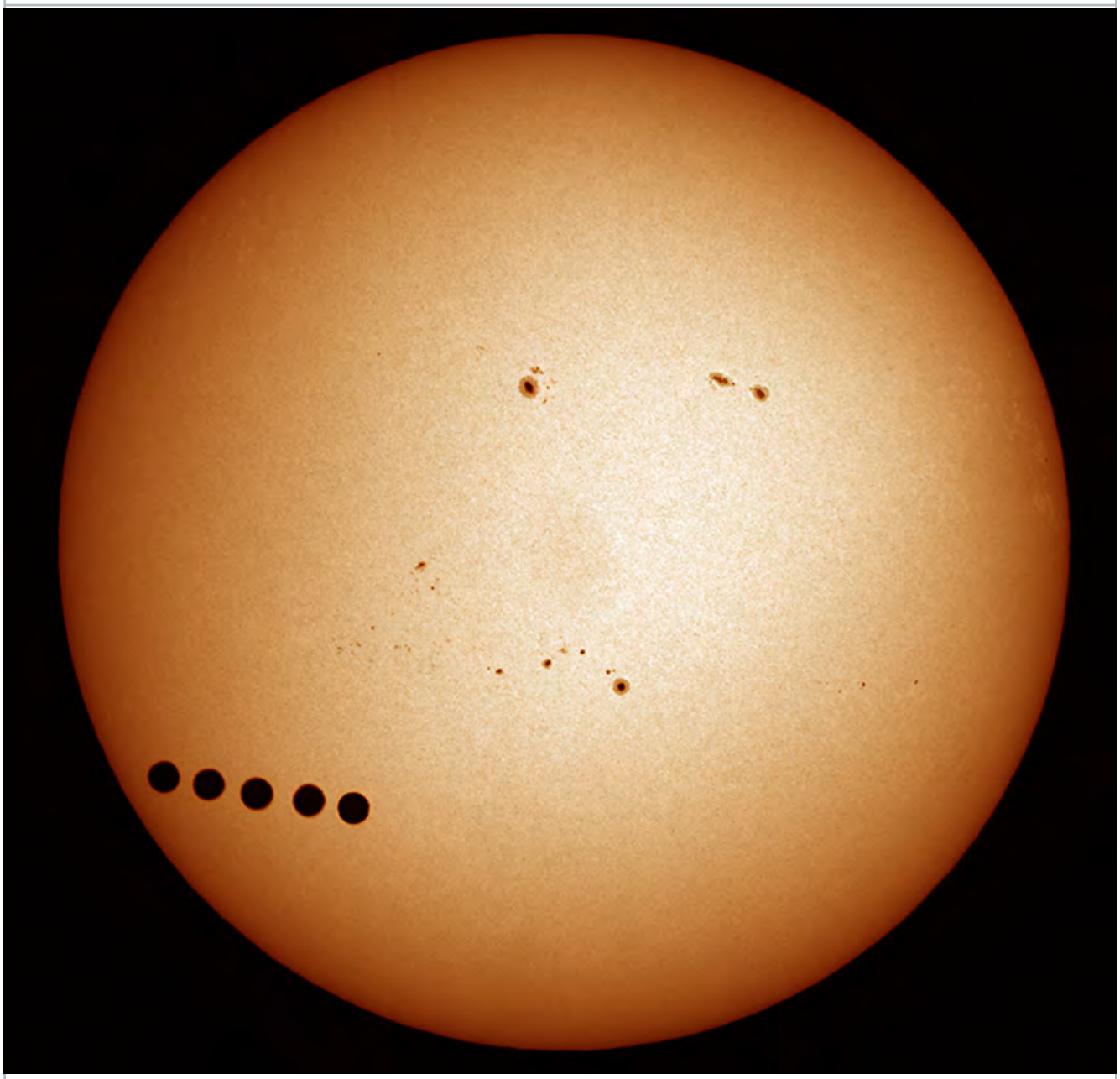
I watched from my yard, which turned out to be a good decision considering the heat. I shot a bunch of photos around first and second contact and then retired to the computer to cool off and watch on the internet. I went back out about every half hour to shoot another set of photos. I had a great photo planned to catch the sun setting over Texas A&M from the west-facing bank of the Rock Prairie off ramp. But the sun set behind distant thunderheads before it got to the horizon and was dim enough to try that photo.





Above: Second contact by Rory Glasgow. The image was in H-alpha light using a Coronado PST and Meade DSI camera. Rory observed from the Texas Prison Museum grounds with Mike Prokosch.

Left: Second contact by Derek Kuhl. Derek used a 130 mm refractor at f/30 with a Canon T3i camera shooting video.



Transit time lapse photo by Anjal Sharma. According to Anjal: “I took images of the transit using my Celestron 150 mm f/8 achromatic refractor from my backyard observatory. A Baader Continuum filter was utilized to isolate wavelengths centered around 510nm. I used my FLI ML8300 digital camera to capture 50 msec exposures. The capture program was set to automatically capture an image every 60 seconds. I collected over 100 such 50 msec images. I then utilized five images with time interval of 20 minutes between successive images to prepare the above composite image that shows how Venus appears to move across the solar disc.

Member Profiles

Gloria and Art Langrish

We were both born in England and left the day after we married, in 1967, with Art's job transfer to the States. We first lived in Portland Oregon, where our childen were born. After 9 years and becoming US citizens, we were transferred to Danville, IL, and after another 16 years to Greenville, North Carolina. This is where Gloria became more interested in astronomy and we became members of the Carolina Skies Astronomy Club. We had pretty good skies in our own back yard so Gloria enjoyed exploring the night sky with her small ETX. We both retired in Greenville, Art from NACCO Materials Handling Group and Gloria from Pitt Community College as an educator. Both of us were trained as engineers: Art at Jaguar Cars in the U.K, Gloria at General Motors and Indiana State University.

When our son and his family transferred to College Station we researched this area and then enthusiastically followed in 2010. Despite the poor night skies here, Gloria has

Vijay Sundaram

I grew up in the densely populated city of Chennai, a major city in India. Throughout my childhood I never really got a chance to admire the beauty of the star-studded sky let alone do any astronomy with a telescope or a pair of binoculars because of the light pollution in my city. After completing my undergraduate studies in Mechanical Engineering I moved to Texas A&M University to pursue my MS and PhD in mechanical engineering. I completed my MS in 2010 and I am working towards my PhD. My research is primarily in the area of nanoscale laser processing of materials which in layman's terms is just using laser energy to melt and vaporize a material to study its emission, generate patterns, machine the material etc.

When I moved to College Station a friend of mine, Soma, invited me to view planets and star clusters through his binoculars from his apartment. I remember being amazed looking at the butterfly cluster, orion nebula etc through his 7x50 binoculars. Soma introduced me to BVAC and I became a member in 2010. At

Continued p. 14

Langerish from p. 13 rekindled her love of astronomy and has a Celestron Sky-Prodigy 6 telescope. She is looking forward to clearer skies as the weather cools so that she can share sky viewing with our son and young grandchildren. Art's interest is more focused on antique cars than astronomy, but he enjoys the fellowship of the BVAC members and drives at night! We both enjoy old time music and dance and serve as volunteers at the Fanthorp Inn State Historic Site and Washington on the Brazos State Park. You can always catch up with us playing fiddle and guitar with our band outside Caffe Capri in Bryan on "First Friday" nights.

Above: Lunar craters by Judy Culver. Below: Derek Kuhl trains his scope on the crescent moon just after sunset at a *Regina Caelorum* observatory star party in March. Photo by Kevin Gassen.

Vijay from p. 13 that time I had begun the experimental part of my research and I started developing a fascination for physical and experimental optics. During my second BVAC meeting, Don showed us live demonstrations of photometry studies of Beta-Lyrae through the telescope at A&M observatory and I began getting interested in astronomy too. I realized that BVAC was the perfect place to pursue my hobby further with its informative meetings, friendly members and great learning opportunities.

I enjoy star gazing, particularly the star hopping part, through my binoculars at the BVAC star parties. Recently I developed an interest in imaging and I try to get images of constellations with my camera. Thanks to the club members my observing skills have really improved in the last 2 years. For the past year the club meetings have become even more interesting with talks and presentations by physicists and professional astronomers every month. I have now started reading books about fundamental astronomy and astro-physics.

I wish to pursue observational astronomy as a hobby for the rest of my life and I draw inspiration from members of the club like Anjal, Derek, Judy, Mark and Tim.

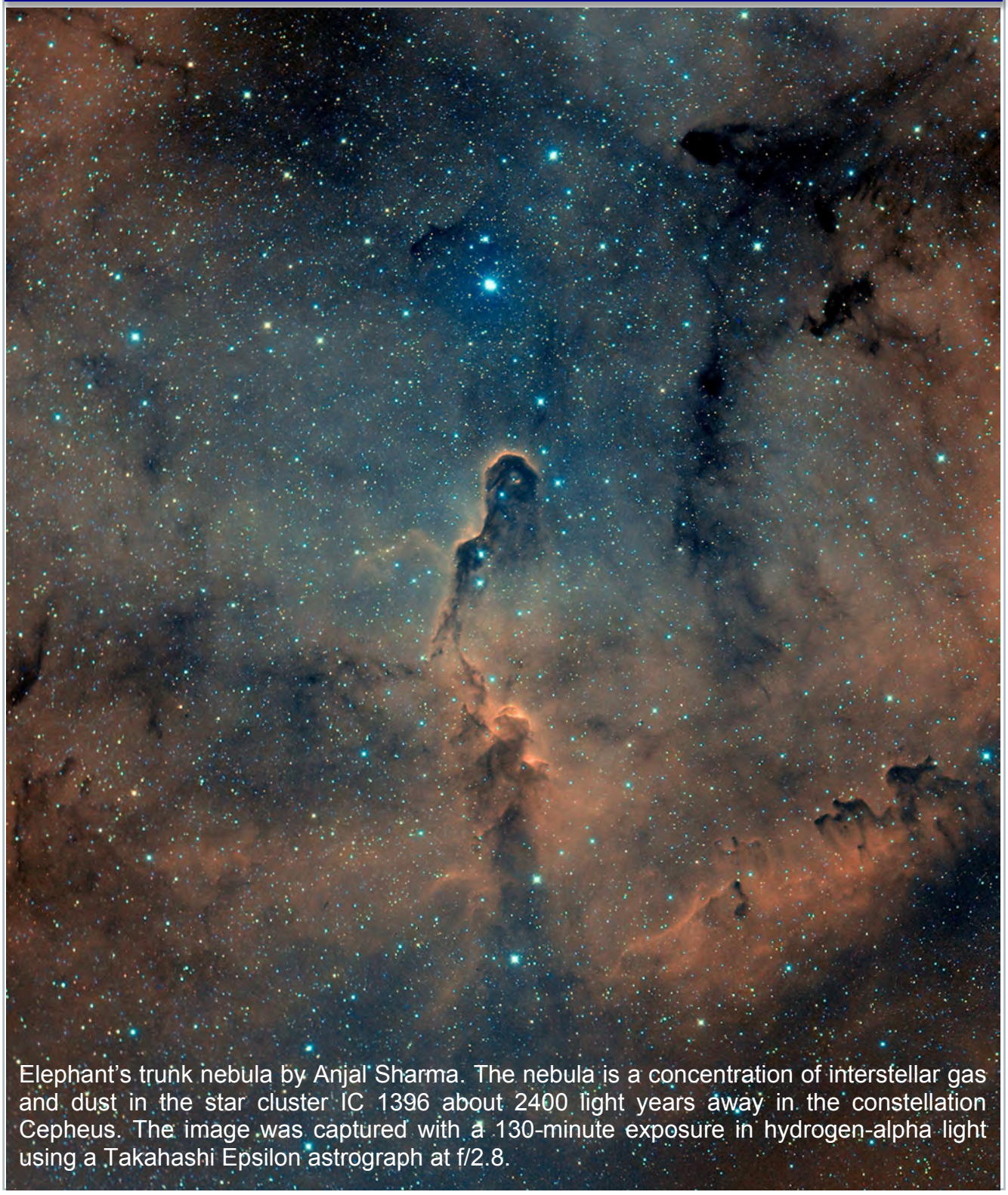
Annual BVAC Messier Marathon

Messier Marathon attendees pose at sunset. (L to R) Rakesh Mithal, Vivek Sundaram, Judy Culver, Joe Powell, Soma Essakiappan, Vijay Sundaram, Kevin Gassen, Don Corona, Derek Kuhl, Thomas Mather, Erin, Gloria Langerish, Mark Spearman, Art Langerish, Tim Cowden.

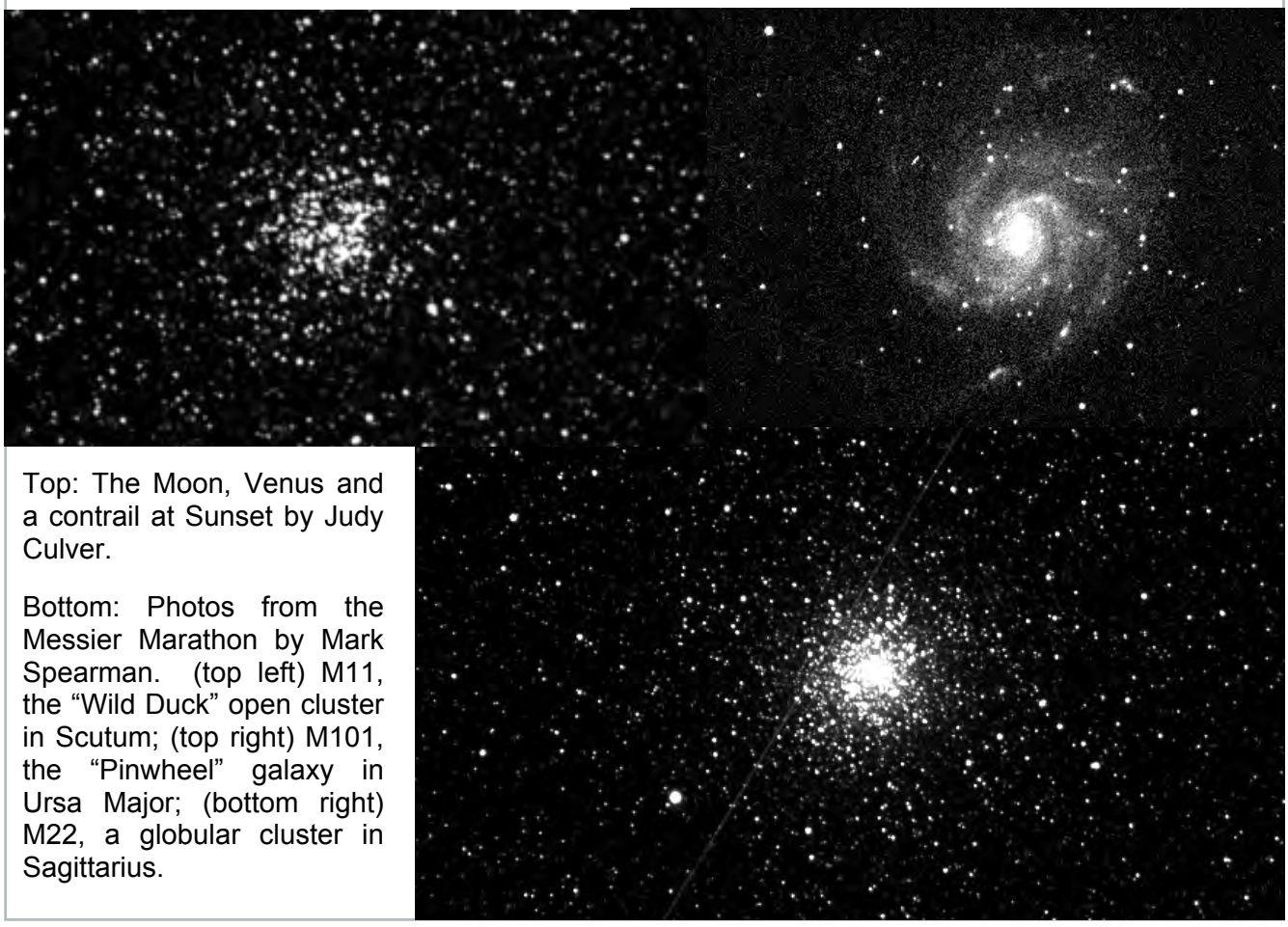
Reported by Derek Kuhl

After what seemed like an eternity of clouds and rain, the week of the Messier Marathon contained a forecast of clear weather. Anxious preparations were made and the group again gathered on March 23, 2012 at Mark Spearman's *Regina Caelorum* observatory. The night was clear and warm, for a Messier Marathon night. We had 17 total attendees. Mark Spearman managed to image all 110 objects in one night using computerized goto with a Takahashi TOA 130! The most remarkable part of this accomplishment is that M30 did not rise above the trees before it was very late. Mark was actually able to image the globular cluster through the branches of the obstructing trees! Derek Kuhl logged 106 objects without setting circles or goto with his orange tube Celestron 8. He missed M74 because it was too dim and thus invisible in the decreased transparency of the twilight sky. He missed M32 and M110 because they set while looking for M74. He was only able to log M31 by jumping up on Mark's deck and spying it with binocular before it set for good. M30 was missed due to aforementioned horizon problem. Tim Cowden managed to log 59 objects before the dew caught up with him on this very warm and moist night. Judy Culver and Joe Powell collaborated on her Vixen VMC200L to log 31 objects. Kevin Gassen logged 15 objects with his 10x50 binoculars and Soma Essakiappan logged 18 objects with 7x50s. Mark again managed to pull out another patch of perfect weather for the Messier Marathon and the group thanks

Member Astrophotos

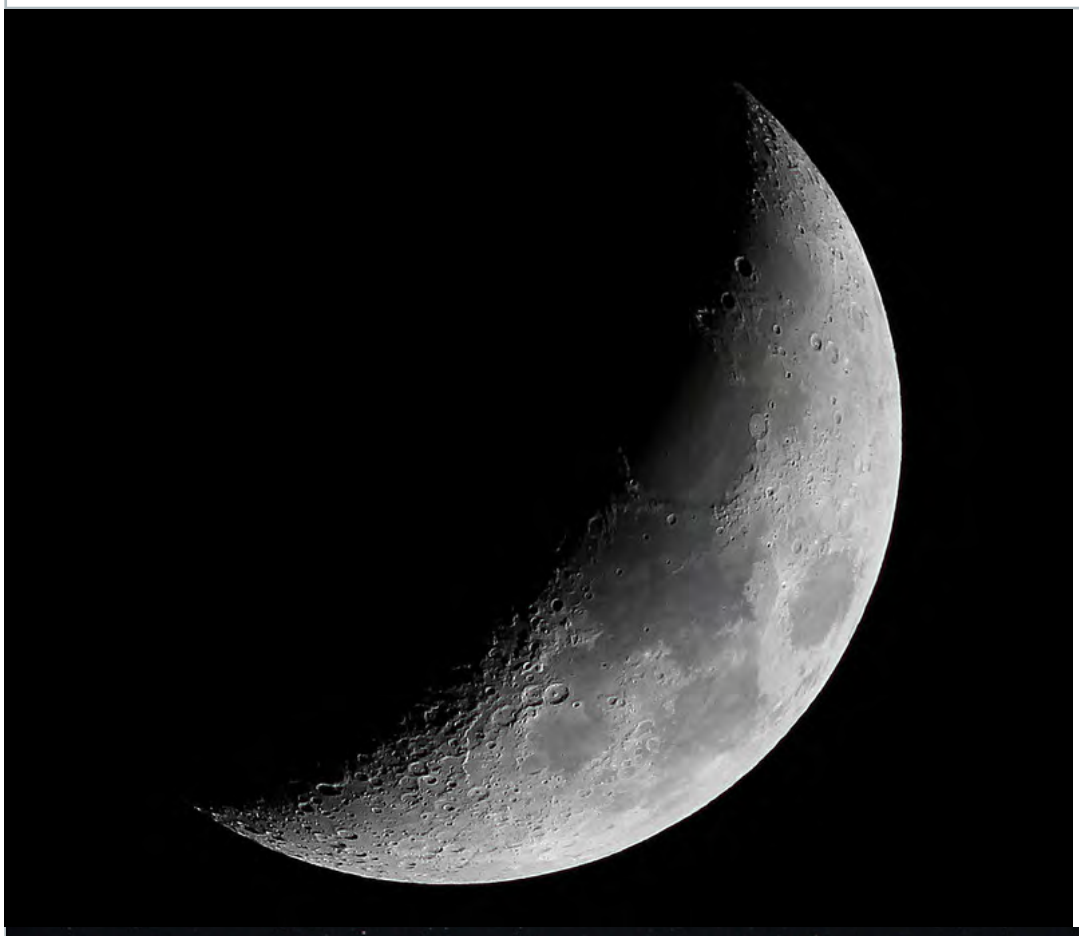


Elephant's trunk nebula by Anjal Sharma. The nebula is a concentration of interstellar gas and dust in the star cluster IC 1396 about 2400 light years away in the constellation Cepheus. The image was captured with a 130-minute exposure in hydrogen-alpha light using a Takahashi Epsilon astrograph at f/2.8.



Top: The Moon, Venus and a contrail at Sunset by Judy Culver.

Bottom: Photos from the Messier Marathon by Mark Spearman. (top left) M11, the “Wild Duck” open cluster in Scutum; (top right) M101, the “Pinwheel” galaxy in Ursa Major; (bottom right) M22, a globular cluster in Sagittarius.



(Right) The first quarter Moon by Kevin Gassen.

(Bottom) Venus setting over the lake by Derek Kuhl.

(Top) Double rainbow photographed near Franklin by Kevin Gassen.

(Bottom) Venus, Taurus, and the Pleiades by Vijay Sundaram.

M46 open star cluster with planetary nebula NGC2438 (right of center). Photo by Mark

Perseid shower meteors caught by an all-sky cam. Photo by Mark Spearman.

Recent Meetings and Club Events – Spring & Summer 2012

March 23, 2012
Annual Messier Marathon Star Party at Mark Spearman's *Regina Caelorum* observatory in Wheelock.

April 20, 2012
7:30 pm at the Texas A&M Observatory

Dr. Kevin Krisciunas of the Texas A&M Physics and Astronomy Department gave a talk: The First Three Rungs of the Cosmological Distance Ladder"

May 18, 2012
6:30 pm at Texas A&M Observatory

The meeting program was a service project for BVAC members to help Don Corona with an open house for university academic advisers.

July 16, 2012
Star party and barbeque at Mark Spearman's *Regina Caelorum* observatory near Wheelock.

June 22, 2012
7:30 pm at the Texas A&M Observatory

Dr. Kim Vy-Tran of the Texas A&M Department of Physics and Astronomy gave a talk: "The Great Observatories: New Windows into the Universe"

July 20, 2012
7:30 pm at A&M Observatory

Tim Cowden and Bob Frenzel talked about mirror grinding and telescope making.

August 17, 2012
7:30 pm at A&M Observatory

Member bull session and show-and-tell.