

Reflection Nebula in Ophiuchus



TAAA member and Astrolmaging SIG Leader, Larry Phillips, photographed IC 4603 at the heart of the Rho Ophiuchus Complex. This area, only 500 light-years away, is one of the closest star forming areas. The bright star in the image shines at 7.9 magnitude. It is this star which illuminates the surrounding reflection nebula. Antares, which is out of the photo but astronomically close to this area, provides much of the red emission nebulosity in this image. Larry spent 14-hours photographing this object. It's barely detectable in large amateur telescopes. Used by permission.

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Our mission is to provide opportunities for members and the public to share the joy and excitement of astronomy through observing, education and fun. We fulfill this by providing Astronomy Services to schools, church groups, scout troops, and convention organizers. We support many organizations in the Tucson area that are involved in Science, Technology, Engineering and Mathematics (STEM) programs. Our members enjoy observing the night sky under the dark skies that our observing sites offer. We are an all-volunteer, tax-exempt, non-profit, 501(c)(3) organization.

Frequency

Desert Skies is published quarterly by the Tucson Amateur Astronomy Association, PO Box 41254, Tucson, AZ 85717.

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Publishing Guidelines

Desert Skies is published quarterly, near the dates of solstice and equinox. The deadlines for publication are March 1st, June 1st, Sept 1st, and Dec 1st. Submissions should be emailed to the editor at [taaa-newsletter\[at\]tucsonastronomy.org](mailto:taaa-newsletter[at]tucsonastronomy.org). Submissions should be in the form of a text or Microsoft Word compatible file. Photos and artwork are encouraged. Please send these as separate attachments with resolution of at least 200 dpi (higher is preferred). Submissions are retained by the editor unless prior arrangements have been made. Copyrighted materials will not be accepted unless permission to use is clearly stated. We will not publish slanderous or libelous material. All copyrights retained by Tucson Amateur Astronomy Association, Inc. or the original author.

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From Our President

Here we are, finishing up another year. We had a good year and I would like to thank everyone who helped make it possible.

Ben Bailey – Ben has been active for years in AFSIG and in volunteering for star parties and astronomy events. He was chair of AFSIG before becoming our Vice President. He continues to assist Dennis McMacken where and when he can with AFSIG and with running TIMPA. Also, he introduces the main speaker at our general meetings and fills in for me at meetings when I cannot attend. **Thank you Ben!**

Chuck Hendricks – Chuck has been very active in our club for many years volunteering for star parties and other outreach events. The last three years he has also served as Secretary, and he cheerfully takes on tasks when called upon. **Thank you Chuck!**

Ed Foley – Ed joined the Board of Directors as Treasurer last June. He works long and hard to fulfill the responsibilities of that position. In the short time he has been Treasurer, he has made needed improvements and innovations. Ed also finds time to volunteer for various events and special assignments. **Thank you Ed!**

Bill Lofquist – Bill is a long-time board member. He has been President, Vice President, Acting Secretary when needed, and is currently serving as a Board Member at Large. He chairs the Chiricahua Astronomy Complex Planning and Development Committee and still makes time to volunteer for school star parties. Bill is continuously looking for ways to move the club forward. **Thank you Bill!**

Mae Smith – Members know Mae from the Apparel Table which she has handled for many years. She has been ably assisted by Susan O'Connor and **Pati Dunlap**, as well as by her son **Carter**, who fills in when needed. As a Board Member-at-Large, Mae continues to improve and streamline our functions. She willingly takes on special tasks to move our organization forward. **Thank you Mae!**

Paul and Cathy Anderson – The Andersons have been very active not only in our club, but in other astronomy clubs in the area. They come together as a matched set. Paul is the TAAA representative to the Astronomical League (AL) and he and Cathy have streamlined our membership process for the AL. Cathy is our Welcome Table Facilitator, so you see her near the door welcoming visitors and members at meetings. They are regular teachers for our Introduction to Fundamentals of Astronomy course. In addition, they volunteer for star parties and other events. Paul still finds time for the added responsibility as a Board Member at Large. **Thank you Paul! Thank you Cathy!**

Terri Lappin – Everybody knows Terri – she schedules our meeting room and makes sure we have interesting speakers for our monthly meetings. Terri has held various positions on the Board of Directors and is a Past President. She is chair of our outreach committee, the Starry Messengers Special Interest Group, and is working hard in our quest for greater and more effective outreach programs. For the last several years, Terri published our monthly bulletin and quarterly journal. **Thank you Terri!**

Gary Rosenbaum – Gary gets the audio-visual equipment for our general meeting up and running properly. He is also a former Board Member of TAAA. **Thank you Gary!**

(Continued on page 3)

(Continued from page 2)

John Kalas – John is a Past President and former Board Member of TAAA. Currently, John is Director of the Chiricahua Astronomy Complex (CAC). The Kalases, along with three other members, bought land and donated 4 acres each to the TAAA, so that we could have this fabulous dark site. He has work tirelessly to ensure that it is developed and maintained at the highest standard. He is our Coordinator for Astronomy Services, which has enabled CAC to be developed and maintained without using membership dues. In addition, John also volunteers for various astronomy events throughout the year. **Thank you John!**

Liz Kalas – Liz is another of our members who has been very active over the years. She is our publicist who makes sure our events are announced and promoted in the Tucson community. She is also active in planning and running special events. **Thank you Liz!**

Jim O'Connor – Jim has been chair of the Grand Canyon Star Party for several years. He works hard to ensure that it runs smoothly and efficiently. He not only loves astronomy, he loves to share his immense knowledge with others. Jim volunteers for school star parties and other astronomy events where he regales his audiences with many stories about the stars and constellations. He gives presentations at our monthly meetings. With his ties to the local Native Americans, Jim has become our resident expert in their interpretations of the night sky. Jim is also a former member of the Board of Directors. **Thank you Jim!**

Susan O'Connor – In addition to working at the apparel table, Susan is our calendar publisher. She has done an excellent job for several years. She also volunteers for special events. **Thank you Susan!**

Al Anzaldúa – Al has served as our Treasurer and in other Board of Director positions. Earlier this year, he agreed to coordinate speakers for our introductory lectures, the first part of our monthly meetings. Al also volunteers for various astronomy events. **Thank you Al!**

Jim Knoll – Late last year, Jim took the reins of the school star party program and agreed to coordinate these events. He has done a fabulous job. **Thank you Jim!**

Mary Turner – At the first monthly meeting of each quarter, our Chief Observer Mary does an impressive presentation on the objects that will

be visible that quarter. Mary has worked on creating the curriculum for the Introduction to the Fundamentals of Astronomy course. **Thank you Mary!**

Dennis McMacken – Dennis has been very active in AFSIG for many years. Not only did he help develop the curriculum for our basic astronomy course, but he is the moderator for the course and he also teaches. This year he stepped up and agreed to be the chair of AFSIG and manager of our TIMPA dark site, when Ben Bailey became Vice President. **Thank you Dennis!**

Vern Dunlap – Vern helped streamline our membership rolls and has been actively maintaining them now for several years. He also serves as back-up to the Treasurer. Vern is also a former member of the Board of Directors. **Thank you Vern!**

Cheryl Kelli – Cheryl Kelli approached me earlier this year about reinstating the door prize program at our meetings. She has worked diligently to get donations and we now hold drawings once a quarter. **Thank you Cheryl!**

Larry Phillips – Larry has headed our Astromaging SIG for several years. AISIG is here to help members who are interested in astromaging. Recently Larry submitted a proposal to help beginners get started. **Thank you Larry!**

Hunter Bailey – Hunter has been our librarian for several years now and he updated our inventory records. He has been very active in AFSIG as well, including teaching on occasion. **Thank you Hunter!**

Tim Van Devender – Tim became our Webmaster at a very critical time and he has worked tirelessly to create and update a website we are proud of. Tim is also a former member of the Board of Directors. **Thank you Tim!**

I thank these individuals and the many, many more who volunteer throughout the year and help us achieve our goals. To all of those unsung heroes, a big Thank you!

I wish everyone a joyous holiday season and a happy, healthy and prosperous 2015!

Bob Gilroy

(president[at]tucsonastronomy.org)

Classifieds

For Sale: Optical Guidance Systems (OGS) 12.5" f/9 Ritchey telescope Paul Jones optics (with test data), aluminum tube, Robofocus secondary focus, Losmandy dovetail plates top and bottom, Takahashi collimating scope. Scope is well used, images through scope are at : mshadephotography.com in the "astronomy" section Asking \$5500 OBO. Contact Mike Shade at [mshade\[at\]jq.com](mailto:mshade[at]jq.com) or 520-255-3019

For Sale: Celestron NexStar 8 telescope in good condition. Not used in last four years. Features GoTo mount. Can look up planets and deep sky objects using the key pad and it tells you what you are looking at. Runs on both 12 volts or 110 VAC house current. Two eyepieces: 40mm Celestron Plossl (model 93346) and Vixen 31.7mm (model 3865). Tripod has aluminum legs. Purchased new in 2001 for \$1500; asking price \$400 OBO. Contact John at 520-722-4199 or [jesdgs\[at\]gmail.com](mailto:jesdgs[at]gmail.com).

Fantastic Items Here!

For Sale: Meade Super Wide Angle 24.5mm, Series 4000, 1.25" eyepiece: \$115. **Televue Radian** 10mm, 1.25" eyepiece: \$145. **Celestron Wedge** for accurate astrophotography; fits Celestron Ultima 2000 telescopes: \$125. **Meade Nebula filter** for 1.25" eyepieces: \$60. **Night Sky Observer's Guide**, hardbound 2-volume set (Volume 1 Autumn & Winter, Volume 2 Spring & Summer): \$60. **Orion time lapse system for DSLR** astrophotography, includes tracking motor, hand controller, tripod, instructions New, partially assembled: \$125. Contact Jim Berger at [jamesberger39b\[at\]gmail.com](mailto:jamesberger39b[at]gmail.com), 520-744-3858, or 520-401-6769.

★ Community Involvement & Outreach

Grand Canyon Star Party June 13 - 20, 2015 Time For Reservations!

Contributed by Jim O'Connor (gcsp[at]tucsonastronomy.org)



It's time to begin planning for the 2015 edition of the Grand Canyon Star Party. GCSP '2015 is the 25th annual collaboration between the National Park Service and astronomers from around North America to bring astronomy outreach to Park visitors. The event is held concurrently on both the North Rim, coordinated by the Saguaro Astronomy Club, and the South Rim, coordinated by TAAA.

At GCSP, we astronomers act as interpretive rangers, unveiling the day and night cosmos around the Grand Canyon to the visitors just as the Park Rangers and guides explain the geology of the park. The level of public interest and involvement, and the opportunity for TAAA to make major contributions to public education and awareness, is profound. During the week we will have over 100 astronomers (nearly two dozen from TAAA) registered on-site with the National Park Service for part or all of the week and over 75,000 individual visitor contacts over the same interval. The visitor flow tends to end around 10:30 PM, so the rest of the night is free for your own pursuits. Think 7000 feet with dark skies! For GCSP '2015, a New Moon appears on June 16. We'll have some lunar viewing opportunities on the last two nights when the moon will form a triangle with Jupiter and Venus.

General information regarding GCSP is found at either <http://tucsonastronomy.org/gcsp-2/> or <http://www.nps.gov/grca/playourvisit/grand-canyon-star-party.htm>

TAAA member Jim O'Connor is the Coordinator of the Grand Canyon Star Party. If you'll be supporting this event, let Jim know as soon as you can. This is an exciting and extremely rewarding event for one night, eight nights, or anything in between!

[Editor's Note: As of newsletter publication, TAAA website hasn't yet been updated with 2015 information.]

Start Planning Now

25th Annual

Grand Canyon Star Party

June 13-20, 2015

We thank our supporters

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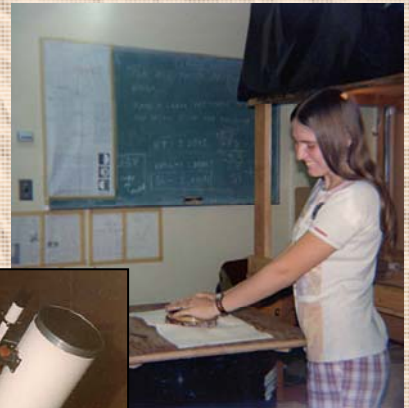
A History Lesson

As 2014 comes to a close, we mark the end of our 60th anniversary. Over the past year, your editor, Terri Lappin, has shared several History Lessons with you. In this, our last History Lesson, she tells us about our mirror and telescope making heritage.



Archive photo showing TAAA mirror making class. Note the number of young people in the photo. This was well before Flandrau was built.

I first learned of the TAAA back in the late 70's through the mirror making classes that were taught by TAAA members in the basement of Flandrau Planetarium. It is there that, as a teenager, I ground and polished a 6-inch mirror. Later, while in college, I ground and polished a 10-inch mirror, swearing that it was the largest mirror I could handle on my own. My 6-inch has since been partially ground to a shorter focal length. The 10-inch, my

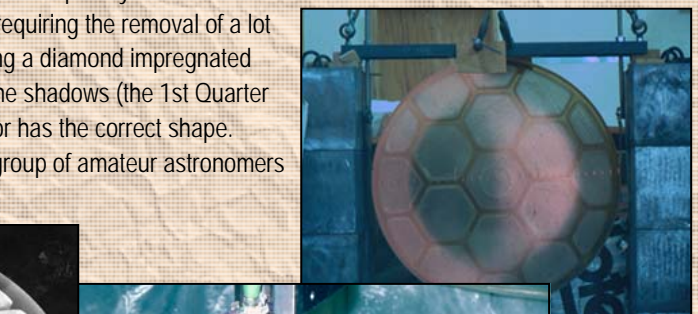


Photos of teenager Terri Lappin grinding her 6" mirror. Also shown are her 6" telescope at left and her 10" telescope at right.



favorite observing instrument, is currently disassembled, awaiting a time when I can put it into a new tube.

A benefit of membership in an astronomy club is that a club can do things that an individual would have a difficult time achieving—like making a telescope larger than 10-inches. In the 80's, a group of TAAA members, including myself, started work on a 30-inch telescope. Well, to be fair, I should say that Dean Ketelsen and the late Bob Goff started working on it—but they had lots of moral support from the rest of us. Pictured below is our 30" mirror, being lifted by Dean (left) and Bob. In the second photo below, you'll see a hexagonal pattern in the glass that will be familiar to anyone who's seen a mirror produced by the Steward Observatory Mirror Lab. Our mirror blank resulted from early tests of the spin-cast process developed by the SOML. This was before they were spinning melted glass, so it was flat on top, requiring the removal of a lot of glass. The third photo shows this being performed mechanically using a diamond impregnated grinding wheel. The last photo shows a "Foucaultgram". By "reading" the shadows (the 1st Quarter Moon appearance) of the Foucaultgram, the optician can tell if the mirror has the correct shape. Where is the 30-inch, you ask? It sits in a box at TIMPA, waiting for a group of amateur astronomers to finish it and put it into a telescope. Anyone up to the challenge?



Featured Article

Highlights from 20 years

Contributed by Christian Weis (weis[at]astroweis.de)



Total solar eclipse in Bulay, France, August 12th, 1999, a couple minutes before the maximum which was clouded out

To me astronomy is the most fascinating hobby someone can have. I have been interested in astronomy since my earliest childhood. I remember staring at the waning moon early in the mornings when my father went to work and when I accidentally woke up. This cosmic bowl was just so wonderful. That was in the mid 80s when I was some three years old and is one of my earliest childhood memories.

This great passion of mine has never left me. When I was 10 years old, I read books on astrophysics and cosmology – of course I did not understand a lot of what Hawking and others wanted to tell us. Nevertheless, I was not discouraged but encouraged to learn more astronomy.

1994 was not a good year for our family. My father lost his battle against cancer in the summer and passed away at the age of 44. I was twelve at that time. In December my mother gave me my first telescope, on my 13th birthday. It was an exceptionally expensive gift considering our financial circumstances, but she wanted to give me something to ease my pain a little. This was the beginning of my observing activities: a 60/700 refractor telescope of rather poor optical quality. Again, instead of getting discouraged like many others, I was thrilled by the ability to see objects I could not see before. Of course, I had seen high resolution images of the objects, and what I saw in my telescope did not come close to that at all – but I saw it live, in real time so to speak. This still is extremely important for me.

Well, it is easy to see that I am celebrating my 20th observing anniversary. This seems to be the right time to recall some thrilling observations and other milestones of the past 20 years and to have the gentle reader participate in some wonders our sky gives to us.

Saturn ring-plane crossing 1995

Saturn is tilted to the ecliptic by some 27°, which is similar to the Earth's tilt. Since Saturn needs more than 29 years for one trip around the sun, Saturn's ring plane crosses the ecliptic approximately once every 15 years. Seen from the Earth, there were actually three nights in which we could look directly onto the rim of Saturn's rings or onto the unlit side of the rings. I only observed one of those.

In August 1995, the weather conditions were great. A night before the plane crossing I saw a bright line crossing the planet. On the night of August 10th, Saturn was naked. The ring had disappeared – simply spectacular! Even though I did not make any notes at all (I started logging my observations around 1996), I still remember this observation very well.

Hyakutake 1996 and Hale-Bopp 1997

In January 1996, Yuji Hyakutake discovered a comet which was to become one of the most imposing comets in the last decades. I do not remember having seen any comet before at all, so Hyakutake was a great debut. Even though I had observed it several times with my refractor telescope, I enjoyed it most with unaided eyes.

A year later, Hale-Bopp gave an extraordinary show. Unlike Hyakutake, which became a bright and huge object within two months after its discovery, Hale-Bopp was predicted to become a huge comet well in advance. If I recall correctly, Hale-Bopp's distance when it was discovered was the biggest ever, with the comet being located well beyond Jupiter's orbit. [Editor's Note: True of comets discovered by amateur astronomers].

Again, I mainly remember the views I had with unaided eyes – Hale-Bopp was simply beautiful.

Total solar eclipse 1999

On August 12th, 1999, a solar eclipse which could be seen across Europe took place. The central line was some 200 miles away from home and I did not have a driving license yet. My mother was kind enough to give me a ride to France, close to the German border, a day before the eclipse took place. The weather forecasts were not very promising. They said the best chances would be close to Saarbrücken in the very west of Germany, while the south (Stuttgart and Munich) should be clouded out. But it was to be different. My mom and I were able to see the sun a couple of times when it was partially eclipsed, but the total part of the eclipse was hidden behind thick clouds. It was kind of disappointing but at least it got dark.

The drive back home is also clear in my memory. While it took some four hours to get to France, it took us 11 hours to get back home. I have never seen a traffic jam of that order in my whole life. Back home and back to work, I talked with a workmate who by chance happened to be in Munich on the eclipse day. It was sunny and he could see it – but it did not mean a lot to him. Life can be so unfair...

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Aurora borealis 2000

The years around the turn of the millennium were kind of a golden age. In April 1998 I bought a Russian 114/800 reflector with pocket money which I had been saving for a year. It was a great decision to buy that fine instrument, which I still use. In 1999 I got my driving license, and in January 2000, a 1991 Fiat Cinquecento with 39 hp and 899 cc was mine. Yes, I did fit into that car...

When I finally was mobile, I looked for and finally found a good observing spot without street lights within a mile. The night of April 6th to April 7th, 2000, looked to be promising to go hunting down some galaxies. When the telescope (yes, it also did fit...) was set up, I saw some strange light coming from behind a forest. My first thought was: Who the heck would turn on skybeamers in the middle of the forest? It took me some time to realize that those lights were natural – Northern Lights! At first there were seven streaks spreading from Draco to Cassiopeia with the two eastern ones being reddish. Unfortunately, I forgot my camera at home – and I was not able to call my mom since I did not have a cellular phone back then. Shortly after becoming really bright they almost disappeared for about two hours – just to give an incredible show at 1:30 am. Half of the sky seemed to be glowing. At times, the polar lights were so bright that my feet cast a shadow onto the ground. At one time the streaks were crossing each other in the Coma cluster – a sight for the gods.

Ever since, I have not seen any polar lights again but I remember that particular night as if it were yesterday.

Mercury transit 2003

Every century, the innermost planet Mercury gets in the line of sight to the sun 13 or 14 times. The first time I saw one was on May 7th, 2003, in the early morning hours. The innermost planet is too small to be seen directly, so I used the 114/800 reflector. Mercury was very easily visible and it was fascinating to see our solar system move. Isn't it wonderful that we are able to predict such happenings? In 2003, I was attending a higher technical secondary school – and had a final test on that very date. Well, I made it just in time, and passed.

Venus transit 2004

Similar to a Mercury transit, our inner companion planet Venus can cross the sun's surface. This does not happen very often. Venus transits occur in pairs separated by eight years with gaps of some 105



Venus transit as seen from Werdorf, Germany on June 8th, 2004.

to 122 years. So, the probability of seeing a Venus transit in one's lifetime is rather low – we all had the opportunity to see two of them.

I was an undergrad student when the first Venus transit of the last transit pair occurred in 2004. A couple days before the transit, I gave a presentation and listened to some more talks on the occasion of that event. Here I learned that the date of the transit, 06/08/2004 was the first date since 04/02/806 which had all even numbers in it, without any odd ones. What are the bets that a Venus transit would happen on such a miraculous date...?

June 8th, 2004 was a hot day. There was not a single cloud in the sky – so perfect conditions for solar observing. I took the 114/800 reflector, a camera, and some solar filters to a location about two miles from home and observed the complete transit. Sometimes, walkers stopped by and were very enlightened to see the transit. Obviously, not everybody knew about it.

In a nearby forest I actually could see Venus on images of the sun formed by leaves. Besides witnessing an absolutely rare event, I also learned that a quart of water might be a little insufficient for a six-hour solar observation...

Annular solar eclipse 2005

How far would you travel in order to see a partial eclipse? On October 3rd, 2005, an annular eclipse took place which could be seen from Spain. Spain is known for its sunny weather conditions in



Annular solar eclipse from a field close to Teruel, Spain, on October 3rd, 2005.

summer, so three friends and I took the opportunity and rented a caravan. The ride to Spain took us 21 hours and we did not have any breaks in between except for refuelling and toll-paying interruptions. It is quite interesting how being more or less fluent in English does not help you at all when you are in the middle of nowhere in Spain. Fortunately, I brought a dictionary along, so we were able to get us some food and a campsite spot. On eclipse day we drove into the small path in which the eclipse would be annular. Easier said than done, since all dirt roads which would get us a little off the main street were marked as private property. When we were finally running out of time we just took one of these roads and set up our telescopes. It did not take very long before a native stopped by who turned out to be the proprietor. Instead of chasing us off he was enlightened to find out that we drove 1200 miles just to

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see the eclipse from his land. Boy, was I happy that I took my dictionary with me. I still remember the two magic words that made his eyes sparkle: "Perfetto panorama!"

He had heard of the event on the radio but did not seem to be very interested in observing it, so he went off a couple minutes later. The eclipse was spectacular. We took tons of pictures but what I remember



Sunset at Saguaro National Park East

best was the surreal light around the maximum.

Arizona 2010

This article is about highlights. If I had to pick just one single highlight out it would be my stay in Tucson in 2010. In order to conduct research for my master's thesis, I had the great opportunity to go to the University of Arizona and to work in the field of adaptive optics. In my 7-months stay I visited almost all famous observatories of the Southwest. I will never forget the view out of the 6.5m Multi-Mirror-Telescope (MMT) building onto Tucson when the doors opened at night. It was, for lack of a better word, magical.

With a 16" Dobsonian which I bought from Starizona, I managed to observe more than 150 objects, including all 110 Messier objects within 5 months. It might be interesting to hear that I could observe more often

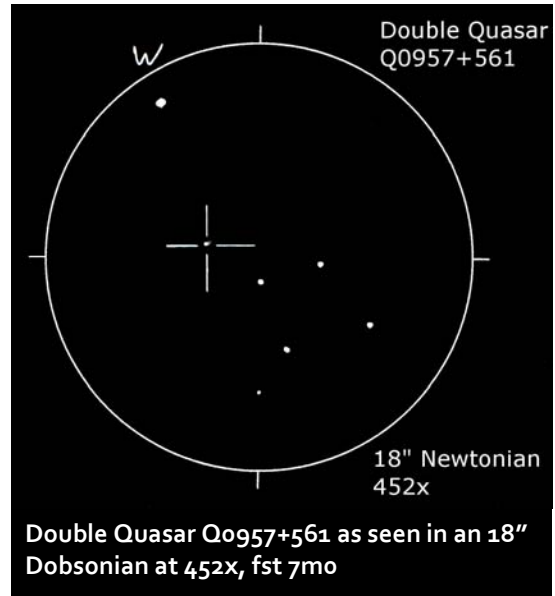


Annular solar eclipse at the Grand Canyon on May 20th, 2012

during the monsoon season than I can in a standard summer in Germany. I truly miss Arizona's dark and pristine nights.

Gravitational lens 2011

When I came back from the states and returned to Switzerland I quickly found a new interesting job and reactivated my 18" Dobsonian. Since living in the Alps, I am used to already good skies. However, sometimes we can have very good or even superb sky conditions. This is the case when an inversion layer is pushing fog down the valley, hence blocking all lights from the quite light-polluted area I live in. In March 2011, I took the telescope and went to a dark site in Austria which is at some 3000ft in elevation, leaving all the lights and fog behind (I should better say, below) me. The faintest star I could see on that night was 7m4. This is my all-time record for Europe – time to try some extraordinary objects. In Ursa Major there is a gravitational lens with the name Q 0957+561. It actually consists of two images of the same galaxy and is known as the twin quasar. The magnitude of both lensed objects approximates 17mag. Now, this is quite bright for imagers but when doing visual



Double Quasar Q0957+561 as seen in an 18" Dobsonian at 452x, fst 7mo

observing it is challenging – very challenging. It took me a while to starhop to the right place but after some time I actually saw the gravitational lens. I have to admit that I was not able to resolve both objects, so the integrated magnitude of both objects is a little higher (brighter) – however, it does not happen frequently, seeing an object at a distance of some 8 billion light-years. So far, Q 0957+561 remains the most distant object I have seen.

Venus transit 2012

The second transit – and last one of my life – took place a week after I returned home from a vacation in Arizona. Since most of the transit took place before sunrise, we were only able to see the last 15 or so minutes of the event – if at all, because we were overcast. On the radio I heard

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Program

The Night Sky Network

Contributed by Terri Lappin
(terrilappin[at]tucsonastronomy.org)

How can one learn about astronomy events in Southern Arizona? When and where is the next public star party? Is there a meteor shower next month? Do you need to download a sky map for the year? The answer to all these questions is the Night Sky Network website.

Consider these features of the Night Sky Network website:

- Using your location, you can instantly see public events and a list of astronomy clubs within 100 miles. Going on vacation? Enter your destination and find out what's happening during your visit. Celestial events, like meteor showers and eclipses, are also listed on the calendar.

EVENTS IN YOUR AREA	
5:00 PM - 8:00 PM Sun 12/28/14 community event	Star Of Bethlehem Star Party Green Valley Community Church 300 W. Esperanza Blvd. Green Valley, AZ
6:30 PM - 9:00 PM Fri 1/2/15 club event	General Meeting Steward Observatory Lecture Hall 933 N Cherry Ave Tucson, AZ
6:00 PM - 8:00 PM Sat 1/17/15 community event	Star Party-Agua Caliente Park Agua Caliente Park 12325 E Roger Road Tucson, AZ
6:30 PM - 8:00 PM Mon 1/19/15 community event	Starry Messengers Meeting Beyond Bread 3026 N Campbell Tucson, AZ

[+ more events](#)

- The Night Sky Planner is a one-stop location for planning observations. A prominent diagram shows you what's interesting in the night sky. Sun and Moon information are at your fingertips, as well as your area's weather forecast for the next few days. You'll also find sky charts to download and a link to the ClearSky website. Want to know when the Space Station will be visible? You'll find a link to that website, too. Finally, there's a monthly video produced by the NASA Jet Propulsion Laboratory describing celestial events that will be of interest.

- The Night Sky Network excels in reaching out to the public, making astronomy fun for all ages. Planning an astronomy themed birthday party? Have you been asked to talk about astronomy at your kid's or grandkid's school? Do you want a more comprehensive understanding of supernovae? With over 150 activities and resources described on the website, you're sure to find something that fits your liking. Borrow one of our NSN Outreach Toolkits and you'll have nearly all the materials needed for these activities. You'll also find links to the NASA Space Place, Solar System Ambassadors, PhotoJournal, and other websites of interest.

(Continued on page 10)



JOIN THE NIGHT SKY NETWORK

Go to <http://nightsky.jpl.nasa.gov/>

Search for "Tucson" in the Location Box.

Click on "advanced club search".

You will be presented with a list (below the map) of clubs within 100 miles of Tucson. Did you know there were so many? Click on the link to "Tucson Amateur Astronomy Association".

On our "About Us" page, click on "Register" (found directly under our association name).

Fill out this form as completely as you can. Answer the question to prove you're a human and then click "Submit"

That's it! Once approved, you'll receive an email with your login information.

(Continued from page 8 - Highlights from 20 Years)

that in the Swiss town Davos, which is about a two-hour drive from home, there might be a slight chance to see the transit. Well, the radio was right. There were clouds passing by but they vanished a couple minutes after sunrise, so we were able to see the last five or six minutes of the transit, bringing back memories from 2004.

Back home I learned that my friends from the local astronomy club were not lucky. They missed the whole event due to the bad weather situation.

Conclusion

Unbelievable, 20 years, and a lot of wonderful things happened. The above enumeration of course is not a thorough list of all interesting astronomical events that I have witnessed. There is so much to see and I still enjoy each and every night (or day) that I have the opportunity to observe. I do not know what the next 20 years will bring from an astronomical point of view – but I am definitely looking forward to it!

(Continued from page 9 - The Night Sky Network)

So far, what’s been described is available without membership in the Night Sky Network. Visit <http://nightsky.jpl.nasa.gov/> and start browsing.

If you’re a NSN member, you’ll have access to even more. Oh, did I mention that NSN membership is absolutely free? Directions for joining are given below. Here are some of the benefits of being a Night Sky Network member:

- ◆ Magazine subscription renewals at reduced rates
- ◆ Calendar of all TAAA events with door-to-door directions from any starting address of your choice
- ◆ Track your TAAA volunteer hours and mileage
- ◆ List of other TAAA members also part of the NSN and the ability to email them (members control what contact information is made visible to others)
- ◆ Sign up with our Special Interest Groups to receive their email messages
- ◆ Link to the TAAA website (you’ll need to use your TAAA login)

Membership in the TAAA grants you the right to belong to the Night Sky Network, but membership is not automatic. To join the Night Sky Network following the instructions in the box to the right.

Within a couple days, your membership in the TAAA will have been confirmed and you’ll receive an email message from the Night Sky Network containing your login information. It’s recommended that new Night Sky Network members check the default member settings are applied to your profile. They are pretty conservative, but you should verify that they are acceptable to you. Go to “My Profile” which you’ll find

Sighting Locations

Location: **Tucson, Arizona, United States**

← Location Lookup
✎ Sign up for Alerts!
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🖨 Print

The following ISS sightings are possible from Friday Dec 19, 2014 through Thursday Jan 1, 2014

Date	Visible	Max Height	Appears	Disappears	Share Event
Wed Dec 24, 6:09 PM	1 min	11°	10 above NNE	11 above NE	f t
Thu Dec 25, 6:53 PM	2 min	40°	11 above NNW	40 above N	f t
Fri Dec 26, 6:03 PM	5 min	24°	11 above NNW	11 above E	f t
Fri Dec 26, 7:40 PM	< 1 min	20°	16 above W	20 above WSW	f t
Sat Dec 27, 6:47 PM	6 min	48°	10 above WNW	11 above SSE	f t
Sun Dec 28, 5:56 PM	6 min	72°	10 above NW	10 above SE	f t
Mon Dec 29, 6:46 PM	1 min	14°	14 above SSW	10 above SSW	f t
Tue Dec 30, 5:51 PM	5 min	32°	12 above WNW	11 above SSE	f t

Visibility of the International Space Station from Tucson, AZ. Some passages are more favorable than others. Note the events on December 27th and 28th when the ISS will be visible well above the horizon and the passage duration is 6 minutes long. This is taken from the NASA Spot the Station website reached through the Night Sky Network website.

directly under the TAAA name on the NSN website (assuming you’ve logged in). You can change settings as you desire, including changing your user name and password (highly recommended). Then start looking through the rest of the menus reserved for members only.

If you should need assistance, please contact Terri Lappin at 520-977-1290 or email her at [terrilappin\[at\]tucsonastronomy.org](mailto:terrilappin[at]tucsonastronomy.org).

★ Observing and Imaging

Planetary nebulae of the quarter – Winter 2014

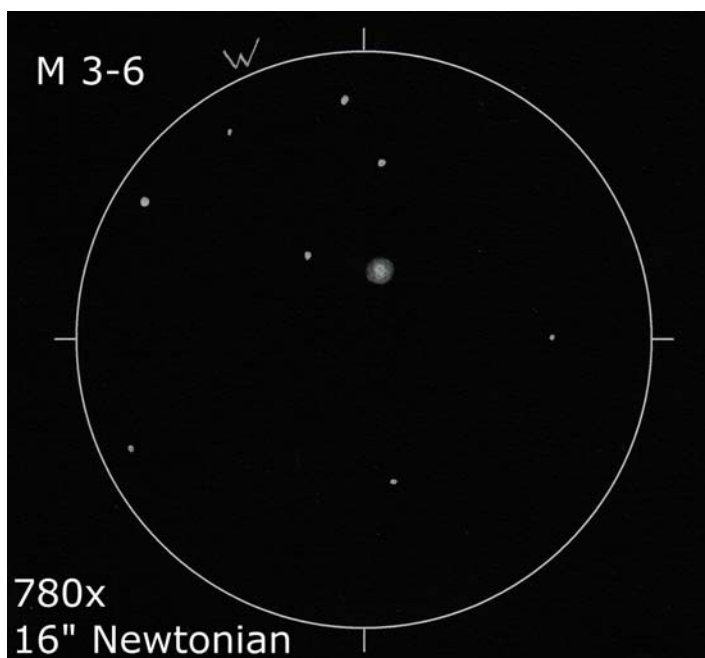
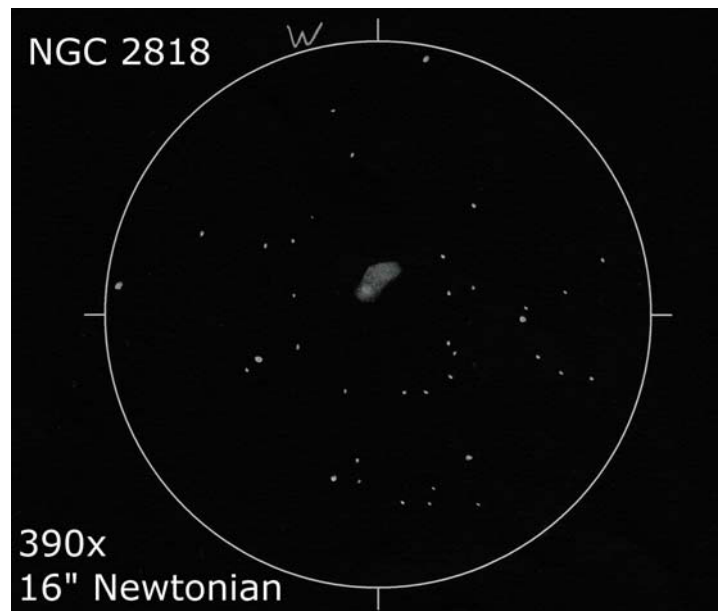
Text and Drawings by Christian Weis (weis[at]astroweis.de)

Planetary nebulae (PN) are fascinating objects which come in numerous forms or appearances. Besides the well-known grand four Messiers (M27, M57, M76 and M97), there are hundreds more to explore. This article suggests two PN's, a pretty bright and easy-to-observe one, and a harder one for the more ambitious observer who is equipped with a bigger scope.

Pyxis, the compass, is not a very well known constellation in my home country which is due to the fact that it does not rise high above the horizon. This quarter's bright planetary nebula is NGC 2818 which was discovered by James Dunlop in 1828 and ten years later identified as a PN by John Herschel. It is located in the line of sight to an open cluster which makes for a very beautiful view. There is different data on the brightness of this nebula, ranging from some 8m2 to well below 11m. I would rather tend to believe in the brighter value as it appeared quite bright in a 16" Dobsonian when I observed it at the Kitt Peak Picnic Area in May 2012. Having good conditions but being forced to an uncomfortable observing position due to the nebula's low position in the sky, I noted: Bright, big, embedded in open cluster which makes it beautiful at any magnification, structures and brightness variations at 390x, no central star, filters do not really help; 390x, fst 6m4 (Gem).

NGC 2818

RA: 9h 16.0min
Dec: -36° 38'
Constellation: Pyxis
Brightness: 8m2
Central star: 19m4
Size: 8 arcmin
Distance: 10,000 ly



Interestingly, the brightness of this quarter's harder-to-observe planetary nebula, Minkowski 3-6, is close to the lower values given for NGC 2818. This object is also located in Pyxis. It was discovered by Rudolph Minkowski in 1948, who discovered 188 planetary nebula, most of which were made with the help of an objective-prism using just a 10" telescope. With a diameter of only some 20 arcseconds, this nebula is best identified by the blinking method. However, when using high power, an extent is clearly visible. When I observed M 3-6 an hour prior to NGC 2818 I recorded: Identified with the blinking method at 195x and using an [OIII] filter, at this magnification a small circular disk is visible, [OIII] and UHC improve contrast but do not reveal more details, the center is brighter, an inner shape can not be grasped definitely, circular rim, quite bright, no central star; 780x, fst 6m4 (Gem).

PK 254+5.1 (M 3-6)

RA: 8h 40.7min
Dec: -32° 23'
Constellation: Pyxis
Brightness: 11m0
Central star: 13m9
Size: 19 arcsec
Distance: 9,000 ly

★ Observing and Imaging

Constellation of the Season: Camelopardalis—The camel leopard, or giraffe

Text and artwork provided by Chris Lancaster

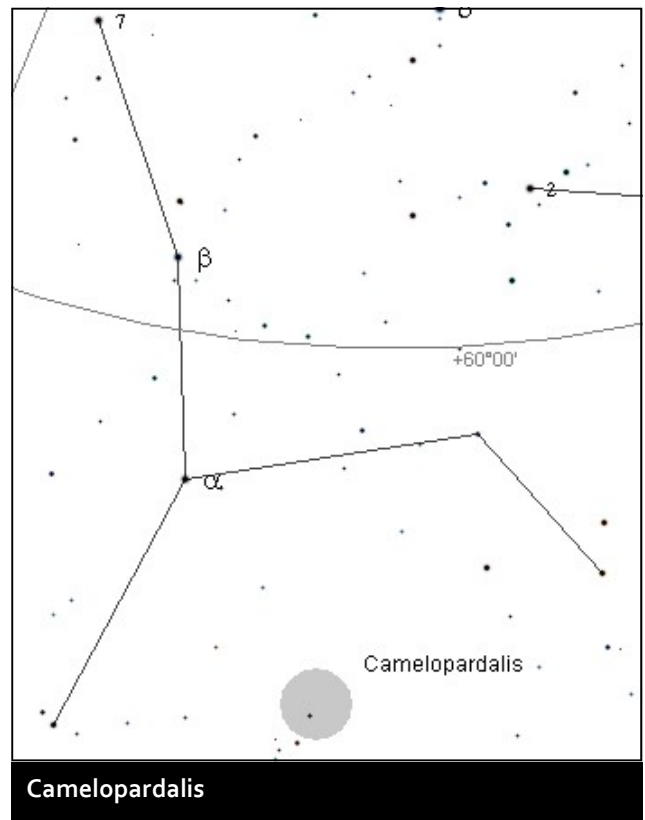
One of the more challenging constellations, both to find and to pronounce, is nestled among Auriga, Perseus, Cassiopeia, Ursa Major, Draco, and Ursa Minor. If you make an imaginary triangle with Capella, Alpha Persei, and Polaris, the brightest stars of Camelopardalis (pronounced kah mel o par' dahl is) will stretch across it. The rest of the constellation moves westward to the nose of the Great Bear and the tip of Draco's tail. You'll notice that this group of stars is not conspicuous at all. The brightest is only of magnitude 4. The constellation was established by the German astronomer Jacob Bartsch in 1624 to fill in a bland area of the northern sky and was named after the giraffe, or "camel-leopard," which is what the Greeks called the animal with the head of a camel and the spots of a leopard. On some star maps, Camelopardus, which is the older version of this constellation's name, is indicated.

Navigating through Camelopardalis by star hopping could be difficult due to the scarcity of bright stars, but there are two bright deep sky objects which should still be easy to find. The first is NGC1502. This is a sparse open star cluster of magnitude 5.5 located at RA 4h 7.5' Dec +62d 18'. This cluster sits roughly in the center of the five brightest stars that make up the main shape of the constellation. You can find it by moving 56' west in RA and 2 degrees north in dec from Beta Camelopardi. It contains about 25 stars having a wide range of brightness plus two notable double stars.

If you have a keen set of eyes and a sizable telescope, try searching for NGC1501 only 1.5 degrees directly south of NGC1502. This is a magnitude 12 planetary nebula about 50" in size with a central star shining weakly at magnitude 13.5. Some reports give this nebula a bluish tint with uneven texture across its face. It is found at RA 4h 7' Dec +60d 54'.

Toward the east is a striking spiral galaxy, NGC2403, which resembles M33 in Triangulum, except that it is only about 1/15 the size. At magnitude 9, this galaxy is an easy target through any telescope, and can even appear in binoculars as a soft oval smudge. Through a telescope, its nearly face-on orientation is evident and some mottling across its broad arms may be seen in larger instruments. Two foreground stars make an interesting sight on opposite flanks of the galaxy, giving the impression of dual supernovae occurring within the galaxy's outskirts.

To escape the more well-known constellations, try turning your telescope toward Camelopardalis, which some observers may find as unfamiliar territory.



Get all the Constellation articles in one book!

Under Dark Skies - A Guide to the Constellations

By Chris Lancaster

Available online for \$14.99 <http://bookstore.trafford.com/Products/SKU-000158114/Under-Dark-Skies.aspx>

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