

Desert Skies

Tucson Amateur Astronomy Association

Observing our Desert Skies since 1954

Summer 2013

Volume LIX, Issue 2

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Comet PanSTARRS (C/2011 L4) & Comet Lemmon (C/2012 F6)



20 May 2013

Two comets grace our skies: Comet PanSTARRS (C/2011 L4) and Comet Lemmon (C/2012 F6). Both images displayed here were taken by Dean Ketelsen from Geology Vista on Catalina Highway. Comet PanSTARRS, above, sports a very long anti-tail. This image was taken with Dean's 70-200 Canon F/2.8 zoom, set to 90mm. This is 8 stacked images, three minutes each. The separation between Polaris (at the left edge) and γ Cephei (at the right edge) is 13.5 degrees. The comet's anti-tail is over 7 degrees long. Comet Lemmon, at right, was photographed



18 May 2013

This image has a total exposure of 8 minutes. Visible is both a blue ion tail towards the right and a more diffuse dust tail below. Note that Comet Lemmon was discovered by the Mt Lemmon Survey. For details about these images and more interesting stuff (astronomy and otherwise), visit The Ketelsen's Blog at <http://theketelsens.blogspot.com/>. Images copyright © Dean Ketelsen, used by permission.

Attention Astrophotographers!

Want your astrophotos to appear here? Send them along with a description of the object and how it was taken to taaa-newsletter@tucsonastronomy.org.

President's Message

It is an honor to be the 18th president of the Tucson Amateur Astronomy Association. I want to thank everyone for giving me the opportunity to take this great organization forward. We have come a long way under the capable leadership of those who came before me.



- Our education and outreach programs are second to none – and we are going to continue to improve and expand them.
- In an effort to keep you, our members, better informed and do it more efficiently the Newsletter has been redesigned. We have had a favorable response to our Monthly Bulletin with its listing of current events as well as our Quarterly Journal with its more in-depth articles.
- Over the past three years, we have launched several observing programs (clubs) for those who are interested in a more intense observing protocol. There are guided observing sessions for those who want or need instruction and guidance. For the more daring of us, they can fulfill the requirements of any program on their own.
- In January of this year we launched an observing club that was slightly different from most other clubs – Our Family Observing Program. The family works together as a unit to complete the requirements.
- Our school star parties continue to be popular and we have been able to keep up with the requests.
- Improvements continue at the Chiracahua Astronomy Complex. The RV area has been completed and progress is being made on the Ramada. And remember, no general funds have been used on the CAC project.

Over the next year I would like to us continue this forward-looking agenda. You have elected a board of directors that is capable, qualified and has the enthusiasm and "can-do" attitude to accomplish our goals. Some of the projects we will be working on are:

- ❖ Expand use of our TIMPA site:
 - Invite members of public to star party.
 - Host astronomy event for school children.
- ❖ Expand use of our CAC site;
- ❖ Expand our cooperation with other Astronomy, Science, schools and other organizations;
- ❖ Implement a ride-share program.
- ❖ Your suggestions, please...

However, we cannot do it alone – we need your help. In the near future we will be reaching out to you, our members, to help us in our quest. The following is just a partial list of volunteers needed:

- Presenters for outreach programs using the Night Sky Network kits and other materials;
- Teachers and Teacher Assistants for our basic astronomy course;
- Mentors for special programs;
- Apparel Assistant;
- Administrative assistants in different areas;
- Committee work as needed;
- Your suggestions...



The mission of the Tucson Amateur Astronomy Association 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 Science, Technology, Engineering and Mathematics (STEM) events in the Tucson community. 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.

We value your input, so please do not hesitate to call or email me with any questions, concerns or suggestions you may have. Through understanding, cooperation, enthusiasm and dedication we can accomplish great things.

Thank you,

BoB Gilroy
TAAA President

This is Your Newsletter

This newsletter is what you make it to be. No longer is it cram packed with announcements. This new format allows for in-depth articles about all aspects of amateur astronomy. Here are some suggestions:

- Astrophotos w/ detailed description
- How-to articles of interest to beginners
- New product reviews
- Astronomy humor
- Book report
- Astro-travel journals
- Observing reports

The next deadline is September 1st. Send articles to:

taaa-newsletter@tucsonastronomy.org

Programs

Night Sky Network Toolkits Help Us Teach Science is Fun

Text and Photos by Terri Lappin, terrilappin@tucsonastronomy.org

The Night Sky Network toolkits continue to add a valued aspect to our outreach program. They allow the public to discover astronomical concepts on their own – sometimes with a little coaching from us – and in the process they learn that science can be fun. Toolkits include projects, like “*Making a Planisphere*” that can go home with the visitor. The NSN also makes it easy to order NASA materials to give away at our outreach events.

We have all 11 toolkits developed by the Astronomical Society of the Pacific. (See the complete list of toolkits and other resource materials on the next page.)

Toolkits were brought to 19 TAAA outreach events between July 2012 and June 2013, reaching about 4,600 people. These are respectable numbers compared to the last few years. During this time, the most used toolkits were “Magnetic Sun”, followed by “Exploring the Solar System”, “Our Galaxy, Our Universe”, “Supernova”, “Black Hole Survival”, “Life in the Universe”, and “Space Rocks”. Since 2004 when the TAAA became a charter member of the Night Sky Network and we received our first toolkit,



This young man really knew his galaxies; he was able to give the popular name of several galaxy disks which are part of the Our Galaxy, Our Universe Outreach Toolkit. Pictured is Cathy Anderson at our exhibit at the first Arizona Science and Astronomy Expo in November 2012.



Some of the materials from several Night Sky Network Toolkits. Toolkits typically include a poster with grommets for hanging, nearly all the materials necessary for the projects, plus a Resource CD with background information, and a Training DVD.

we’ve serviced 124 events, making over 22,800 contacts. Not bad for the small group of TAAA members trained as toolkit presenters.

The Starry Messenger Connection

The Starry Messenger Special Interest Group (SMSIG) was created in 2009 in part to increase the use of the Night Sky Network toolkits. The SMSIG leadership team provides direction to most of our major outreach events. We decide which events to support and which materials are suitable for the event. Take note of the increase in the number of events and number of contacts following the establishment of the SMSIG. We’ve made a difference!

Each year, toolkits are used at star parties held at area schools. However, most of our effort goes into large outreach events. This includes the Tucson Festival of Books (TFOB) where thousands of visitors are seen at our exhibit over this two-day event. This emphasis on the larger outreach events explains the recent increase in the number of

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Giving credit due to our volunteers is an important task of the SMSIG. It is our volunteers who help to fulfill the TAAA’s educational mandate. These are the volunteers who helped with our toolkit exhibits this year.

Cathy Anderson*

Al Anzaldua*

Bryce Burchett

Mary Caldwell

Scott Caldwell

Angela Cardot

Vern Dunlap

Bob Gilroy*

Ralph Jensen

Mary Helen Kaser

Jim Knoll

Terri Lappin*

Karen Liptak

Mike Magras

Loretta McKibben

Brian O’Connell

Susan O’Connor*

Jim O’Connor

Susan Ropp

Mae Smith

Joe Statkevics

Mike Thompson

Pati Wilcox

Rizwan Zaki

*These are our primary presenters.

There are many others who participated at community events.

To all who volunteered your time:

Thank You!

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contacts that have been made, especially evident in early 2010 when we participated in our first TFOB event. Our participation in the first Arizona Science and Astronomy Expo added a new outreach opportunity this year.

Toolkit Training and Borrowing

The SMSIG provides training in the use of toolkit materials. The most effective training method has been an orientation before a major event like the TFOB. During an orientation, we discuss logistics of the event (where to park, etc.) and we have toolkit materials on hand. Trainees get a chance to use the toolkit materials themselves, discovering concepts on their own, just like a member of the public would do. Questions are answered and

Next Outreach Event

**Summer Science Saturday
at UA Lunar & Planetary Lab
20 July (Sat)
10am to 4pm**

The Life in the Universe Outreach Toolkit will be featured. Details in the July Monthly Bulletin.

recommendations are made for how best to present concepts. Oh yea, we also eat pizza – an important element of our training sessions!

In addition to group training, the SMSIG offers individual training (sans the pizza). If you're the independent type, you can borrow a toolkit and learn it on your own.

Toolkits can be borrowed for any outreach event, whether it's a TAAA function or not. Want to teach your kids or grandkids something about astronomy? Borrow a toolkit for a family function and get everyone involved.

Toolkits are designed for about 4th grade through adults. Toolkits with small parts should be kept away from kids under 3 years. Each toolkit contains a guide with recommended age groups and venues. This makes it easy to decide which project is best suited for your targeted audience.

Toolkit Outreach Results Since 2004

Year	# of events*	# of contacts*
2004/2005	16	1709
2005/2006	6	483
2006/2007	4	197
2007/2008	6	443
2008/2009	12	568
2009/2010	12	1,608
2010/2011	19	8,807
2011/2012	29	4,396
2012/2013	20	4,598
Totals	121	22,109

* Toolkit training sessions are included. Contacts are not necessarily individual people but rather interactions between a visitor to an exhibit and a TAAA toolkit presenter. Some talk to more than one presenter or they may return for a second visit.

After deciding which toolkit interests you, contact the Starry Messenger SIG at smisig@tucsonastronomy.org to make arrangements to get the toolkit. They can be borrowed for a month at a time unless there's an event where they will be needed. You get to keep the Resource CD and the Training DVD so you can review the material whenever you want.

Outreach Resources Available for Borrowing

Our Magnetic Sun: sun model, solar magnetic storms and their impact on Earth

Life in the Universe—Are We Alone?: strange life on Earth, search for life beyond

Space Rocks – Asteroids, Comets, and Meteorites: asteroids, comets, meteorites, meteorite identification

Mirrors and Glass: how refractor and reflector telescopes work

Shadows and Silhouettes: lunar phases, eclipses, transits, search for Earth-like planets, Kepler Mission

Black Hole Survival Kit: gravity concepts and black holes

Our Galaxy, Our Universe: scale and distance model of the Milky Way galaxy and the Universe

Exploring the Solar System: size and distance model of solar system and our exploration of the planets

Supernova! lives of stars, role of supernovae in the universe, cosmic radiation and earth's protective atmosphere

Telescopes – Eyes on the Universe: basic principles of optics, the human eye, and observing techniques

PlanetQuest: demonstrate radial velocity and transit methods for detecting extra solar planets

Dark Skies Education Kit: light pollution principles, includes a Sky Quality Meter

SolarScope: provides a white light image of the sun suitable for small group viewing.

Comet Chef: an apron (with a comet on it) and chef's hat to wear when mixing up comets

Moon Globe: 12" diameter with stand

DVDs: A Private Universe; Cosmic Collisions

(Items in Italics are Night Sky Network Outreach Toolkits)

TAAA News

Moving Ahead at the Chiricahua Astronomy Complex

Text Contributed by Bill Lofquist, billlofquist@tucsonastronomy.org
CAC Strategic Planning Committee and Fund Raising Committee

In reading this article, it is important to recognize that CAC development to date has been funded totally by TAAA members and the TAAA Astronomy Services Program. It is a remarkable show of generous support and is the basis for our moving ahead in the coming months. The Astronomy Services Program, coordinated by John Kalas and delivered by TAAA volunteers, continues to provide the funds needed for operation and maintenance of CAC, in addition to contributing to other needs at CAC.

This article addresses three features in the Master Plan for the Chiricahua Astronomy Complex (CAC). They are the Outdoor Education/Activity Ramada, the Education/Activity Center (Building), and the Member Pads and Observatories. To move ahead with these features, we need help and involvement from interested TAAA members to further refine important plans and policies.

The Outdoor Education/Activity Ramada

We are beginning to take steps that will require seeking funds from a broader array of sources. To provide some much needed shade from the desert sun, we are using an *engraved brick program* to raise funds for the Outdoor Education/Activity Ramada. This will be placed near the handicap parking spaces and restroom area.

These bricks will become our **Recognition Patio**, giving people an opportunity to remember a



Setting up for a night of viewing on the "public pads."

special person or persons, say thanks to those who have already made a contribution to CAC, or otherwise support the educational mission of TAAA.

At the time of this writing we have received contributions for just over 50 bricks. We need about 130 additional recognition bricks before we'll have enough to build the Ramada. Contributions have come from a mix of members and non-members. These non-members are friends of the TAAA, vendors who provide our astronomy

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How we got to where we are...

June 2007: the TAAA Board of Directors sets two goals to be achieved by May 2008.

- (1) secure land in a dark place
- (2) create a strategic plan to develop it for observing.

October 2007: Perseus Group (a group of 4 TAAA members/families) generously donates 16 acres of excellent land to the TAAA. The land is in a dark location. CAC begins to become a reality. A number of TAAA members begin deliberations on how to best use the land.

February 2008: With a Master Plan in hand, we earn a Special Use Permit from the Cochise County Planning and Zoning Commission. Development of infrastructure begins.

February 2010: Completion of infrastructure which includes the improvement and creation of roads to the land, the extension of electric service to the property, a well and water system to supply the five property owners, rest rooms with appropriate septic system, and adequate parking with graveled roads for our members and guests.

February 13, 2010: We hold our first star party at CAC

December 2010: Development of "Public" area of CAC begins: 30 vehicle parking area, 10 concrete observing pads with electricity, roll-off roof observatory that houses a 14" telescope, large circular observing pad serviced by an 18" DOB scope, two 8' x 20' containers for storage, and four sites for RVs and campers.

October 2012: "Public" areas completed

May 2013: CAC 3rd Anniversary is celebrated!



A portion of the RV/Camper area. The restrooms is in the distance on the left. Two storage containers are near the center, and the roll-off roof observatory is visible just left of the camper.

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equipment, or some of the many components of the large astronomy community of southern Arizona.

We invite all TAAA members to solicit brick orders from others. We have heard a number of our members say they plan to send in an order but who haven't gotten around to it yet. We encourage you to do this now to be sure you're included in the next engraving order.

Details for how to support the engraved brick program and recognize a someone special can be found on the Recognition Patio webpage on the TAAA website:

tucsonastronomy.org/CAC/bricks.html

The Education/Activity Center

The first major project for which we will be seeking outside funding is a large building – the Education/Activity Center. The plans for this call for a metal, multipurpose building that will be 30' by 60' in size.

It will include three sleeping rooms, a restroom, a large open area that will be a gathering place for educational purposes and informal activities, and a kitchen area where members can warm food for club potlucks or prepare their individual meals. See David Acklam's drawing to give you an idea of what the interior of this building will be like.

Sleeping rooms will be a very useful addition to our facility. It will be possible for members who do not have RVs or campers to spend several nights at CAC. If the three sleeping rooms are in use, there will be plenty of space in the large



David Acklam's drawing of the planned Education/Activity Center, showing a large multi-purpose area, 3 sleeping rooms, and a small kitchen area.

open area to accommodate others through the use of cots.

While we have a general plan for this building, *we need the help of members* to determine how to furnish and decorate it, determine what audio-visual equipment we should have, and otherwise prepare for its use.

The Strategic Planning Group determined that a multi-use building like this is the most cost-effective way to create useful indoor space. The CAC Master Plan has additional buildings with sleeping areas—these may be developed later. Should that happen, these three rooms in the Education/Activity Center could become a library, an office, and a secure storage room.

We are in the process of readying ourselves to reach outside of TAAA for potential funding sources for this building.

Member Pads and Member Observatories

We previously held a meeting to talk about Member's Pads and Observatories some months ago. That proved to be premature but it helped us identify several matters that

needed more forethought before we could move ahead. We are ready to address a number of these now.

There will be a Meeting to discuss Member Pads on Saturday, July 20, 2013. This meeting will specifically focus on Member Pads . Everyone interested in Member Pads should attend this meeting. A number of questions related to the design of the pads, the policies governing their development and use, and their cost can best be addressed by members who are interested in them. We will have some draft documents that will help us focus the discussion at that meeting.

“To move ahead with these features, we need help and involvement from interested TAAA members to further refine important plans and policies.”

A later meeting will focus specifically on Member Observatories. Some of the discussion about Member Pads will be relevant to Member Observatories as well.

The Cochise County Planning and Zoning Commission approved a total of 45 Member Pads and 15 Member Observatories, and these are in our Master Plan. We were required by the Planning Department to put in the first loop road for the Member Pads when we completed Phase 2, the “public area.” That loop includes the road and we have adequate electric service for the first nine Member Pads. While some members have expressed an interest in the Member Pads, it is probable that others would like to join them and participate in the further refinement of plans for them.

CAC Strategic Planning Group	
David Acklam	John Kalas
Paul Anderson	Bill Lofquist
Cathy Anderson	Ron Probst
Joe Jakoby	Wally Rogers

Member Pads Meeting
20 July 2013 (Sat) 10am—noon
1510 East Grant Road
City of Tucson, Ward 3 Office
Southeast corner of Grant and
Vine, a couple blocks west of
Campbell Avenue.

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The building of pads and observatories for Members is different than building the Education/Activity Center. That Center requires that we do our fundraising from outside the club. Member Pads and Member Observatories will be funded by the members who are interested in creating and using them.

The Present and Immediate Future of CAC

Having an outstanding place to observe in a very dark area has been a long-standing hope within TAAA. The Strategic Planning Group is putting forth these three new steps, adding to the solid foundation we've established at CAC. The new features will greatly enhance the usability and overall quality of our site.

As a club we have accomplished a lot. While this particular initiative began to take shape in June of 2007, the real thrust in this direction

began in the early days of TAAA. We have many people to recognize for their contributions to where we are today.

One thing we can be sure of -- CAC is located in a very dark area. Joe Jakoby has done some **measurement of the quality of the skies at CAC**. He says, "The device I use to measure sky brightness is the Sky Quality Meter (SQM) manufactured by Unihedron. A typical reading at CAC is between 21.67 and 21.75, with the best nights reading about 21.80. At last year's Grand Canyon Star Party, the average reading was 21.75 to 21.78 over three nights with the best reading at 21.80. As you can see there is not a significant difference in the dark sky between the South Rim of Grand Canyon and CAC."

Many people have commented on the quality of construction at CAC and the

foresight of the Master Plan that was developed by TAAA members. We can certainly thank John Kalas who serves as Director of CAC, and he is the coordinator for construction. An added bonus is that he has created an outstanding cottage/observatory on his property adjacent to CAC. He spends a lot of time at his place, and this provides a rather constant presence near our new facility.

As we take these important steps ahead, we hope more TAAA members will become involved in helping to refine the plans that we are pursuing. We want as many people as possible to feel a strong sense of ownership in what we are building. We are confident that participation at CAC will grow, and new members will be attracted to these outstanding facilities.

Bill Lofquist was TAAA President when the initial proposal was made to create what ultimately became CAC.

3rd Anniversary Celebration at CAC

Text and Photos Contributed by John Kalas, CAC Site Director
Email: cac-director@tucsonastronomy.org

After postponing the CAC 3rd Anniversary Celebration for three months, the festivities finally took place on May 11th. Twenty-five TAAA members enjoyed a nice evening and some delicious refreshments.



Bill Lofquist and John Kalas shared the emcee responsibilities. Three of the four Perseus Group members were present; Robert Crawford, Erich Karkoschka and John and Liz Kalas; Sam Rua, was unable to attend. One of the highlights of the day was that all four RV spaces were occupied for the first time since we

opened the RV Area in September of last year. As the skies darkened (and the cake was consumed), many members drifted to their telescopes for an evening of great observing.

On April 27th, five TAAA members attended a work party to help spruce up the site in preparation for the May 11th celebration. Anna Trittenbach and Lyle Kolze sprayed the weeds and Paul Trittenbach, Mike Magras and I worked on several other projects. One of those projects was to clear some large stones from a walkway running between the RV Area and the telescope pads. On May 23rd, our excavation contractor, Peter Ammon, applied gravel to the walkway. This improvement gives the RV'ers a convenient path from their vehicles



to the telescope area. Paul and Cathy Anderson, who had their new RV at the May 11th celebration, generously agreed to donate \$300. to cover the cost of graveling the walkway.

As the site gets more developed, maintenance becomes more challenging. Weed and grass control will become the biggest chore, especially as the monsoon rains arrive. I would like to **establish a maintenance supervisor** position again to help me with this challenge. If anyone would be interested in supporting the site in this capacity, please let me know.

John Kalas was recently reaffirmed as CAC Director.

★ Featured Article

Astronomy: State of the Art Gets Off To A Great Start

Text Contributed by Karen Liptak

It was Christmas in March for me when the massive open online course (MOOC) Astronomy: State of the Art (ASOTA) began. Spearheaded by UA Distinguished Professor Chris Impey, the 7-week course was free and open to anyone with an internet connection. Its site gave ASOTA's goal as "to help you learn the science behind the latest astronomy news headlines, to enrich your understanding of the universe, and to glimpse the future of this exciting area of research."

Sign me up! As a docent-in-training for Kitt Peak, this seemed perfect, both in concept and timing. Indeed, it proved to be a great experience, for which I'm indebted to Impey and his team.

From March 25 - May 10th, with a new topic highlighted each week, Astronomy: State of the Art explored the basics to cutting-edge research on Exploring Our Universe, Understanding Our Solar System, Discovering Extra Solar Planets, Probing Distant Stars, Inspecting Other Galaxies, Examining The Cosmos, and Uncovering Evidence For Life. Students received weekly videos, reading material, and podcasts with leading scientists in their fields. The course screen (to the right) gave an easy way to track one's progress, plus a sidebar for asking questions 24/7. These queries were quickly answered, with replies visible to all. The course also made use of social media, with access through Twitter, a blog, and Facebook (www.facebook.com/AstronomySOTA).

To further sweeten the cosmic pot, Impey held weekly live Q&A video sessions in real time.

The winner of 11 teaching awards, he brought world-class knowledge and skill to each session. Credit must also go to his dedicated team, (including undergraduate student Carmel Austin and teaching instructor Matthew Wenger), who obviously put an enormous amount of energy into this labor of love.

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UA Distinguished Professor Chris Impey giving a presentation during an online segment of "Astronomy—State of the Art". Below, the course screen for the ASOTA online program.

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And ASOTA isn't over yet. People can still log on because the course will continue, with live lectures every two weeks, at least through the summer.

Out of curiosity about Impey's own take on this, his first MOOC, I recently queried him. He says that in retrospect, he enjoyed the class immensely, especially the live lectures, the high caliber of students' questions, and the twenty 40-minute podcasts he did. These included lively interviews with fascinating scientists, such as Dr. Roger Angel, founder and director of the Steward Observatory's Mirror Lab, Dr. Peter Smith, Principal Investigator of the Mars Phoenix Mission, and Dr. Feryal Ozel, UA professor and astrophysicist researching gravitational lensing.

Impey also was impressed with how well students took to the ASOTA's social media, especially Facebook. They posted there, adding comments, responding to each other, and contributing links so that it had, "a life of its own." He noted that cosmology and exoplanets generated the most interest among attendees.

As for lessons learned, Impey felt that his team's biggest problem was underestimating the time required. Team members often scrambled to upload videos Sunday night for the coming week. The course's temperamental camera proved another hassle. And Impey found that the online platform used, Udemy, wasn't quite right for his needs. Its main limitation was a lack of data about attendees and what they'd learned. However, it is known that over 2,000 people have enrolled in the course, and that number continues to grow. Students came from around the globe, with most from the United States and second most from South Africa. Every state in our country was represented, except for North Dakota.

Impey hopes to try a MOOC again next year, but with greater planning. He also hopes to co-convene with a university class as a 3-credit unit. For now, transcripts of both the live sessions and the podcasts are in the works. And, as mentioned earlier, you can still join the class. You'll be able to proceed at your own pace and participate in live lectures every two weeks. If interested, go to www.teachastronomy.com (Impey's web site

Podcast interviews featured on ASOTA

- ◇ Dr. Roger Angel - founder and director of the Steward Observatory's Mirror Lab
- ◇ Dr. Peter Smith - Principal Investigator of the Mars Phoenix Mission
- ◇ Dr. Feryal Ozel - UA professor and astrophysicist researching gravitational lensing

for all things astronomical). Click on the upper right for the course. You also can find many of its videos available on YouTube at www.youtube.com/user/AstronomySOTA. Whichever gateway you choose, you're in for a treat. But the course may not continue past August, so check it out now.

Karen Liptak just recently completed training as a Kitt Peak Docent. She is also an author of several books for children and young adults.

TAAA Ladies Night Out - Good Food and Conversation

Text and Photos Contributed by Terri Lappin, terrilappin@tucsonastronomy.org

The TAAA Ladies have met 4 times now at local restaurants for delicious food and great conversation. This is purely a social group - a chance for women in TAAA to get to know each other. We've had from 7 to a dozen women at these gatherings. Not all of us have a burning interest in astronomy. So, while there may be a mention of a celestial event or other astronomy topic, by far that's NOT what we talk about. We've been meeting the third Thursday of the month with each gathering announced in the monthly bulletin. We visit restaurants all over town making it convenient for everyone at some time. For our July gathering, we're considering

[San Carlos Grill](#) (Silverbell & Speedway) - check out the July monthly bulletin. We may visit a vegetarian restaurant soon. There's also talk of a fall potluck with a sharing of recipes. If you're a woman with a connection to the TAAA, come join us. To be included in the reservation count, contact Susan O'Connor at cyzeh@aol.com.

Restaurants Visited

Old Pueblo Grill
Native New Yorker
HiFalutin
Amber



★ Featured Article

Glorious Southern Hemisphere Skies: The Quest Continues

Text and Photos Contributed by John J Barr

Travelling to the southern hemisphere to experience the wonders of objects like the Eta Carina nebula, the Jewel Box, Omega Centauri, the Small and Large Magellanic Clouds and the Tarantula Nebula, is becoming increasingly popular with amateur astronomers in the US and Canada. Tucson's night skies, of course, are excellent. But at 30 degrees north latitude, most of the

spectacular parts of the Southern Milky Way are below the horizon or nearly so.

So, over the past five years I pursued the dream by visiting various southern hemisphere destinations with assorted telescopes. My results varied and included some frustration (sometimes due to instrument choice, sometimes due to

weather and other factors). This year, in February, I finally hit "paydirt" in Chile's Atacama Desert.

First a warning if you are contemplating astronomical tourism: research the weather and the sky configuration during the dates of your planned visit. In Patagonia, on the southern tip of Chile, we encountered a sky that was wonderfully dark... when it wasn't cloudy. Which was most of the time.

In a weeklong stay at the Hotel Explora in Torres del Paine National Park, we



Licancabur - a volcano in Chile located along the border with Bolivia. It reaches over 19,000 feet, dominating the surrounding area. The summit and crater includes Licancabur Lake, one of the highest lakes in the world.

had one clear night. That night the views from the boardwalk below the hotel were magnificent, marred only by apprehension about the rustling sounds coming from nearby bushes (a puma had been spotted nearby that day). In Botswana – a country we enjoyed hugely in other ways – the stargazing was a total dud, due to smoke from grass fires and a failure on my part to research when the beauties of the southern Milky Way would be well above the horizon. (December-January is good. November isn't).

This February we resolved to test the skies in the high (8,000 feet plus) Atacama Desert in northern Chile. A growing number of the world's best observatories are located there for a reason. The country is rarely cloudy (in our case, we had several cloudy days but each night it cleared

perfectly), and very thinly populated so light pollution is pretty well absent.

The skies were sensational. The "telescope scene"...was initially disappointing.

Our destination was The Hotel Explora Atacama, part of a very well run Chilean chain known for its excellent touring program. The hotel's day tours were excellent – the Atacama's scenery is spectacular, ice-topped 20,000' volcanoes, vistas everywhere you look and a kind of weird Mars-like beauty (parts of the Atacama haven't seen rain in twenty years; there is almost no vegetation). The problem was Explora's vaunted observatory.

Upon arrival we learned that the observatory – a major part of its

(Continued on page 11)



(Continued from page 10)

appeal for me – was “temporarily unavailable”. Something they neglected to mention during the reservation process! After much gentle probing I learned that the observatory’s 16” Meade SCT had been down for several months due to a mechanical problem and the non-availability of replacement parts.

I give the Explora high marks for building an observatory for a hotel in the Atacama. Not-so-high marks for planning to operate it.

Somebody in management forgot to ask what it would take to support reliable operation of a high-tech telescope in a very remote area.

Determined not to let the observatory problem spoil the trip, we pressed on. I discovered that the sky view from the Explora’s roof (once we turned off the lights) was first-class – the southern Milky Way poured down all the way to the horizon, and with an excellent pair of 8X43 binoculars (which, thank God, I brought along for



Takahashi Refractor

insurance), the views were excellent. Not telescopic views, to be sure. But superb wide-angle views.

A few days later we then discovered SPACE (short for “San Pedro de Atacama Celestial Explorations”), a hotel and telescope-farm operation founded by Alain Maury, a French professional astronomer and his Chilean wife. (Their website is www.spaceobs.com).

SPACE is based about ten miles out of San Pedro and rents visiting astronomers an array of first-class telescopes ranging from Takahashi refractors to

Dobsonian and Newtonian light buckets up to 30” in size. That kind of aperture, married to Atacama skies, gave us knee-buckling views.

Through the big dobs, especially, the views were unlike anything I have experienced. The Jewel Box lived up to its name – a rich cluster with deep red and yellow stars that literally glowed. Omega Centauri literally filled the eyepiece with stars; not as bright as M13, perhaps, but a “near-galaxy” for sure. I won’t soon forget Eta Carina: glowing yellow and tan gas “wings” with the primary star evident. The Tarantula Nebula in the Large Magellanic Cloud was fully formed and crystal-clear. You get the idea.

All of SPACE’s telescopes are on concrete pads; some are housed in their own small observatories. You can rent a cabin from SPACE, stay in its own hotel, or stay in any of the hotels in nearby San Pedro.

The opportunity to rent a first-class, large instrument (and even an astronomical CCD camera) is especially enticing for amateurs in North America since it eliminates the necessity to haul your own equipment there. It’s a 15 hour flight to Santiago from most of North America, and after you land in Santiago it’s another two hour flight to San Pedro. SPACE welcomes both visual astronomers and astrophotographers.

My quest for the perfect “southern sky” adventure was finally successful. If you want once-in-a-lifetime views of some of the best skies on earth – not to mention day tours of some spectacular scenery - check out the Atacama, and SPACE.

John J. Barr has been a TAAA member since 2005.



The telescope farm at San Pedro de Atacama Celestial Explorations (SPACE).

★ Featured Article

Daytime Polar Alignment

By Alex Woronow, alex@awkml.com,

Whether you have a polar scope, a polar-alignment laser, or nothing at all, did you ever want to get a head-start on your mount's alignment before Polaris becomes visible? Well, you can! A traditional magnetic compass can provide useful indication of the direction to geographic north, and an estimate of the altitude of the polar axis could come from a protractor or similar mechanical device. However, a better, more modern, approach might utilize your iPad, iPhone, or other pad/smart-phone device—and free apps. I have an iPad2 and have used several different free apps to execute a reasonably accurate pre-dark polar alignment. With care (and luck?), I get within 1° of polar alignment and, with a sync trick described near the bottom of this article, do reliable goto's before twilight.

First, the **compass apps**. iPads use a gyrocompass; namely, a fast-spinning disk, and not a magnetic sensor. Of course, that is good for us. Telescope mounts have plenty of metal around them that may adversely affect a magnetic compass. (Chrome-steel, aluminum, and many other metals are not ferromagnetic and do not affect magnetic compasses. Some upper-end mounts, in fact, have very little ferromagnetic material, but many more modest mounts may have a considerable amount. So, one must avoid measuring azimuths by placing a standard magnetic compass close to a telescope mount.) Notwithstanding a gyrocompass's insensitivity to ferromagnetic parts, I have caused deflection of the gyrocompasses with a very strong magnet or a large steel counterweight placed within a few inches of my iPad. Fortunately, I have not seen significant effect of my mount's metallic components on the gyrocompass. So, to adjust

the polar-axis azimuth, I simply press the iPad to the side of the polar axis and make the necessary adjustment. (Note: The compass must identify geographic North or you must know your magnetic declination. (See here: <http://magnetic-declination.com/>).

A screen shot of *Commander Compass Lite*,

one of the free apps I use is shown at right. This app has a clinometer as well as a compass and also reports GPS readings for latitude, longitude



and altitude. Although its clinometer reads only to the nearest degree, interpolation poses little problem, and the precision (and hopefully accuracy) of this app may suffice. That being said, I like the compass in *GyroCompass* better. It seems to settle to a more accurate reading more often.

Now, the **clinometer apps**. These apps go by descriptive names that usually include one of the words "clinometer," "inclinometer," or "tilt meter." Our use for such apps, of course, involves setting the correct elevation or altitude of the polar axis. Angle measurements produced by these apps rely on a "tilt sensor." I believe it, like the compass, is a gyroscopic sensor, although some apps may incorporate accelerometer readings, I suppose. The clinometer in the app shown with this article will work just fine, but *Angle Meter HD Lite* and *Angle Meter (Free)* make good alternatives. In practice, I rest my iPad along the top of the polar axis, splitting it down the axis center as

nearly as possible, and adjust the elevation of the axis as needed.

Finally, the **broad-Daylight Sync**. Many of us have a German Equatorial Mount. Using the clinometer app, level the mount's declination axis then point the optical tube assembly vertically upward, again using the clinometer. Your OTA now points toward your zenith. The declination of the zenith is 90° minus your latitude and the Right Ascension can be read from the value for the meridian or zenith in a planetarium program or, better yet, calculated at an internet site such as <http://tycho.usno.navy.mil/sidereal.html>. If you can sync your mount to those coordinates, you should be good-to-go with reasonable goto accuracy, even in the daylight.



Some **final thoughts**.

Just to be safe, if you use a device such as an iPad that has a magnetic cover, remove it. The compasses work best if the device is rotated around a bit before taking a reading. And, look at the instructions

for the apps. Make sure you set the compass options correctly and do any calibrations that may be required.

I hope this has been interesting and helpful. If you have additions, corrections, or improvements, please feel free to voice them through our club's Yahoo site or contact me directly through my web site (www.awkml.com).

Alex operates the Black Range Observatory located in Silver City, NM.

Astronomy Education Help Sheet

Explaining Astronomical Distances, Sizes, and Scales in Miles

Contributed by Loretta McKibben, tucsonastronomer@gmail.com

Tossing out numbers like million, billion, trillion, etc., can be confusing to new stargazers as well as attendees at star parties. It's easiest to approximate — and express — numbers as they compare to familiar distances. As you become familiar with distances you will be able to estimate and point out the number of zeroes that each distance or range of numbers typically has.

A “Mental Yardstick” - Use Something Familiar to Relate To

When a K-12 student or star party attendee asks a question about distance, most of the time it is okay to give an estimated distance that is easy to remember. We want them to visualize the distance in a way that is meaningful to them, that relates to distances that they are familiar with, a “mental yardstick.”

For example, to explain how far a planet is away from the Sun, the average distance from the Earth to the Sun is a good mental yardstick, 93 million miles.

Visualize the Number: How Many Zeroes?

To give an idea how large a number is, say 93 million miles, most people don't remember off-hand that a million has six zeroes in it. So start with the base number from 1 to 999, and emphasize the number of zeroes that follows: 93 million is 93 followed by six zeroes.

Numbers in the *Millions* - have 6 (to 8) zeroes after the main number. Important in our Solar System, the distances between planets is expressed in millions of miles. Some Solar System distances in the millions of miles that are useful:

- The Earth is an average of about 93 million miles from the Sun. This distance is called an *astronomical unit*.
- Jupiter is about 500 million miles from the Sun, or five astronomical units. So Jupiter is about five times further from the Sun than Earth.
- Saturn is about twice as far from the Sun as Jupiter, and about ten times further than the Earth at over 9 astronomical units.

Numbers in the *Billions* - have 9 (to 11) zeroes after the main number. There are hundreds of billions of stars in our galaxy, the Milky Way.

Numbers in the *Trillions* - 12 (to 14) zeroes after the main number. The most important number in trillions of miles is the light-year:

A **light-year** is about **6 trillion miles**, or a 6 with 12 zeroes after it, such as:

6,000,000,000,000 miles

A light-year is a unit of **distance** (not time), and is the distance that a light wave travels in one Earth year at 186,000 miles per second.

A Good Example for Astronomical Distance Explanations in Miles:

So when explaining the distance scales in astronomy:

First, explain that scales of **Millions of Miles** are useful within our **Solar System**. Give a few examples, and explain the astronomical unit. These have six (to eight) zeroes after the number.

Then if you want to travel **interstellar distances**, from the Sun to another star, or to talk about the size of our galaxy, you need twice as many zeroes! You jump to **Trillions of Miles!** That is 12 (to 14) zeroes after the number.

Handling Those Zeroes

Numbers with a lot of zeroes may be shown in mathematical exponential notation by astronomers, so you need to be familiar with that. Expressed in powers of ten, you can easily see how many zeroes are indicated (the exponent). Examples:

6 trillion miles (6,000,000,000,000), a light-year, can also be shown as approximately 6×10^{12} miles.

93 million miles (93,000,000) can be shown as 93×10^6 miles.

Loretta McKibben has contributed a series of Astronomy Education Help Sheets which will appear in future issues of Desert Skies.

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Astronomy Humor

They're Made out of Meat

Written by Terry Bisson, Science Fiction Writer, Oakland, CA

Submitted by Pete Lemieux



"They're made out of meat." electron plasma brain inside." message they're sending out by radio. 'Hello. Anyone out there. Anybody home.' That sort of thing."

"Meat?" "Nope. We thought of that, since they do have meat heads, like the weddilei. But I told you, we probed them. They're meat all the way through."

"Meat. They're made out of meat."

"Meat?" "They actually do talk, then. They use words, ideas, concepts?"

"There's no doubt about it. We picked up several from different parts of the planet, took them aboard our recon vessels, and probed them all the way through. They're completely meat." "No brain?" "Oh, yes. Except they do it with meat."

"That's impossible. What about the radio signals? The messages to the stars?" "Oh, there's a brain all right. It's just that the brain is made out of meat! That's what I've been trying to tell you." "I thought you just told me they used radio."

"They use the radio waves to talk, but the signals don't come from them. The signals come from machines." "So ... what does the thinking?" "They do, but what do you think is on the radio? Meat sounds. You know how when you slap or flap meat, it makes a noise? They talk by flapping their meat at each other. They can even sing by squirting air through their meat."

"So who made the machines? That's who we want to contact." "You're not understanding, are you? You're refusing to deal with what I'm telling you. The brain does the thinking. The meat." "Omigod. Singing meat. This is altogether too much. So what do you advise?"

"They made the machines. That's what I'm trying to tell you. Meat made the machines." "Thinking meat! You're asking me to believe in thinking meat!" "Officially or unofficially?"

"That's ridiculous. How can meat make a machine? You're asking me to believe in sentient meat." "Yes, thinking meat! Conscious meat! Loving meat. Dreaming meat. The meat is the whole deal! Are you beginning to get the picture or do I have to start all over?" "Both."

"I'm not asking you, I'm telling you. These creatures are the only sentient race in that sector and they're made out of meat." "Omigod. You're serious then. They're made out of meat." "Officially, we are required to contact, welcome and log in any and all sentient races or multibeings in this quadrant of the Universe, without prejudice, fear or favor. Unofficially, I advise that we erase the records and forget the whole thing."

"Maybe they're like the orfolei. You know, a carbon-based intelligence that goes through a meat stage." "Thank you. Finally. Yes. They are indeed made out of meat. And they've been trying to get in touch with us for almost a hundred of their years." "I was hoping you would say that."

"Nope. They're born meat and they die meat. We studied them for several of their life spans, which didn't take long. Do you have any idea what's the life span of meat?" "Omigod. So what does this meat have in mind?" "It seems harsh, but there is a limit. Do we really want to make contact with meat?"

"Spare me. Okay, maybe they're only part meat. You know, like the weddilei. A meat head with an

containers, but they can't live on them. And being meat, they can only travel through C space. Which limits them to the speed of light and makes the possibility of their ever making contact pretty slim. Infinitesimal, in fact."

"So we just pretend there's no one home in the Universe."

"That's it."

"Cruel. But you said it yourself, who wants to meet meat? And the ones who have been aboard our vessels, the ones you probed? You're sure they won't remember?"

"They'll be considered crackpots if they do. We went into their heads and smoothed out their meat so that we're just a dream to them."

"A dream to meat! How strangely appropriate, that we should be meat's dream."

"And we marked the entire sector unoccupied."

"Good. Agreed, officially and unofficially. Case closed. Any others? Anyone interesting on that side of the galaxy?"

"Yes, a rather shy but sweet hydrogen core cluster intelligence in a class nine star in G445 zone. Was in contact two galactic rotations ago, wants to be friendly again."

"They always come around."

"And why not? Imagine how unbearably, how unutterably cold the Universe would be if one were all alone ..."

Used by Permission. Visit Terry Bisson's website to learn more about his work. <http://www.terrybisson.com/>

"We're supposed to talk to meat."

"That's the idea. That's the

other planets in special meat

Observing

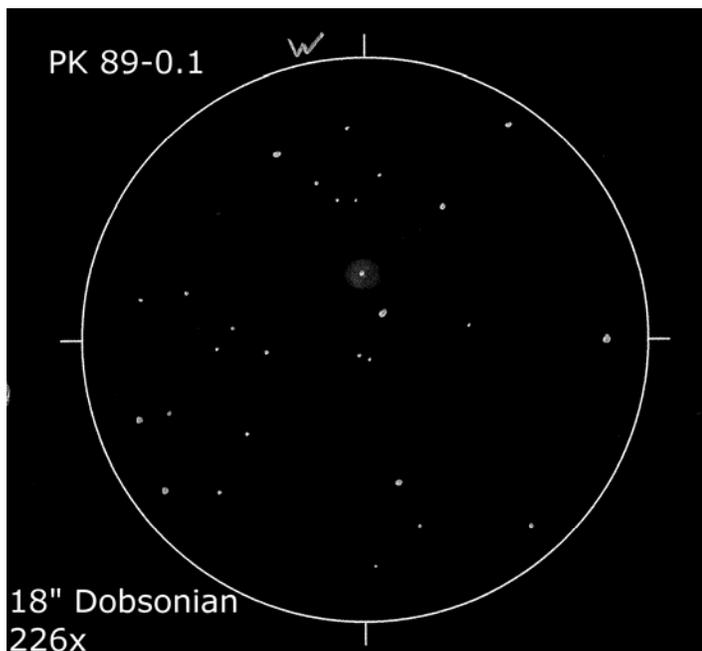
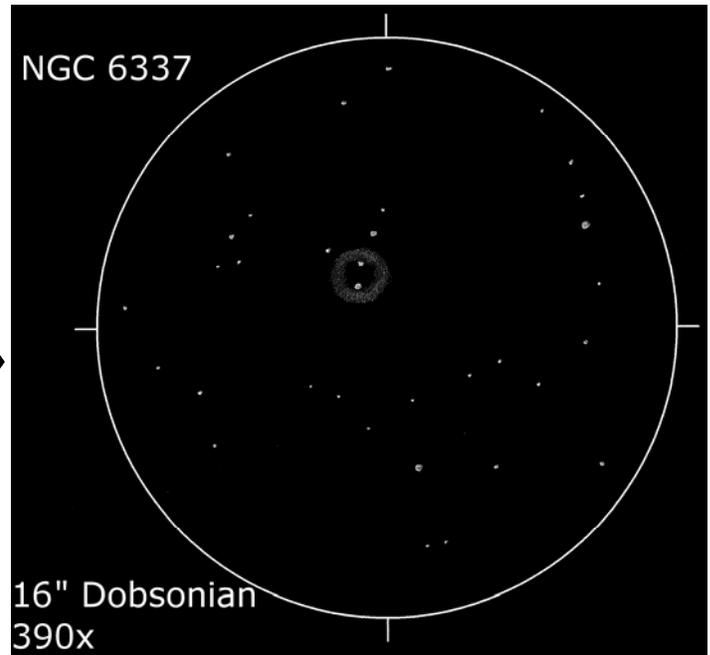
Planetary nebulae of the quarter – Summer 2013

By Christian Weis, weis@astroweis.de

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

Being located at a very southern declination of -38.5° , NGC 6337 barely rises above my home horizon in southern Germany. However, it stands conveniently high in the Arizonan sky – and it really is worth taking a look at it! This PN which is also called the Cheerio nebula was discovered in 1834 by John Herschel and is described as a magnificent annular but faint and small nebula in the NGC. Its annular shape together with two foreground stars makes it a really beautiful appearance. You should be able to see this nebula which lies a little west of Scorpio's "sting star" lambda Sco with a 6" telescope. Of course, the bigger the better. I observed NGC 6337 on May 12th, 2012 at the Kitt Peak Star-B-Cue with a 16" Dobsonian and noted: Very beautiful perfect ring, center is as dark as the background, nice field of stars, two embedded stars, no central star seen, [OIII] helps a lot, UHC helps a little; 390x, fst 6m8 (Vir)

NGC 6337
 RA: 17h 22.3min
 Dec: $-38^\circ 29'$
 Constellation: Scorpius
 Brightness: 12m3
 Central star: 14m9
 Size: 38 x 28 arcsec
 Distance: 3900 ly



PK 89-0.1 is the so-called Moth nebula. Interestingly, this object also carries a Sharpless number, indicating that it mainly emits the red light of ionized hydrogen (the Sharpless catalog lists hydrogen nebulae). As the human eye's main sensitivity lies in the green, one can understand why this object is rather hard to detect. Depending on the sky conditions you will need an aperture of at least 16". The moth shape did not show up when I observed this PN on a mountain in Austria. However, having good conditions and an 18" telescope equipped with a filter, the object was easier than expected. My notes read:

PK 89-0.1
 RA: 21h 14.0min
 Dec: $47^\circ 45'$
 Constellation: Cygnus
 Brightness: 14m8
 Central star: 19m1
 Size: 44 x 29 arcsec
 Distance: no data

Found at 94x using a UHC filter, rather faint but can be constantly seen when a filter is used, central star can be seen easily [as the central star's "brightness" is only 19m1 I must have seen something else], no structures, nice field of stars; 226x, fst 6m5 (And)

Observing

Constellation of the Season Ophiuchus - The Serpent Bearer

By Chris Lancaster

This constellation, rich in history, is formed by stars of medium brightness. It lies north of Scorpius and reaches highest elevation between 11pm and midnight during the middle of June. Its name comes from a Greek word meaning "serpent bearer," and goes back about 4,000 years. Traditionally, Ophiuchus (pronounced: oh fee u' kus) represents Asclepius, considered to be the god of medicine and son of Apollo and Coronis. When Asclepius happened to kill a snake, another snake came along and brought the first one back to life with herbs, and that is how Asclepius first learned about medicine. He became a physician and eventually honed his trade so well that he began to adopt the serpent's talent for bringing the dead back to life. Hades, ruler of the underworld, was worried by this since it threatened the arrival of new souls into his domain, so he struck a deal with Zeus to kill Asclepius. Since the physician was so accomplished in the science of medicine, Zeus honored him by placing him in the sky with a snake stretched across his body. Thus we see Ophiuchus standing between the two halves of the snake, *Serpens Cauda* (on his east side) and *Serpens Caput* (toward the west.) It's interesting to note that the sun spends more time in Ophiuchus than it does in Scorpius, so instead of the scorpion, the serpent bearer could easily have been the next sign of the zodiac after Libra.

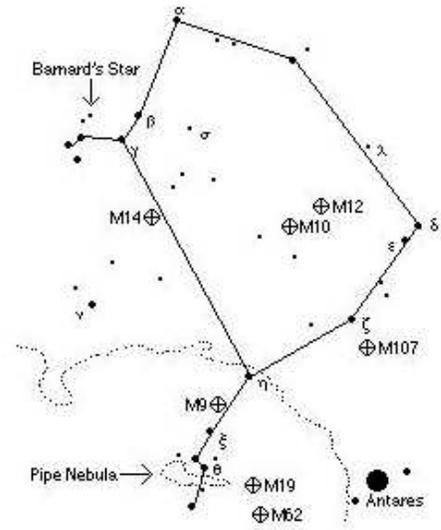
Ophiuchus stands on the western edge of the summer Milky Way, so you may choose to start your observations with binoculars. His eastern leg is immersed in the rich star fields next to Sagittarius with his torso stretching northward.

A dark nebula worth trying to spot (most easily on film with a wide angle lens) is the Pipe Nebula. It stretches 7 degrees from one end to the other in the area southeast of Theta Ophiuchi.

Like Sagittarius, Ophiuchus is dotted with globular clusters which are the main draw to the constellation. (See table at right.) M12 is an easy target to find toward the west side of the constellation. It is a fairly large (12' diameter) globular lacking a well defined core and showing a clumpy appearance. M10 is a short distance southeast of M12, is of similar size, and its well defined stars are easily resolved in medium sized scopes. Another rich cluster is M14, a pleasing sight through a telescope of any size. Larger instruments will begin to resolve hundreds of individual stars.

Going down the size scale are other clusters of a more difficult nature to find. M9 and M19 are embedded in the Milky Way star clouds. Both are rather small (about 6' diameter) but possess their own unique characteristics. M9 shows a dense core glowing with a soft intensity, and M19, the smallest of the group, has an odd oval appearance.

M62 and M107, near the south and west edges of the constellation respectively, are also small and shining with a subtle light. M62 is a little more interesting due to its brighter



Object	Coordinates (Epoch 2000)				Mag.
	RA		Dec		
M12	16h	47.2m	-1d	57'	8.0
M10	16h	57.2m	-4d	06'	7.6
M14	17h	37.6m	-3d	15'	9.4
M9	17h	19.2m	-18d	31'	8.9
M19	17h	02.6m	-26d	16'	8.3
M62	17h	01.2m	-30d	07'	8.2
M107	16h	32.5m	-13d	03'	10.1

core. M107 shows little more than a very small, soft glow.

Edmund Halley determined that stars exhibit proper motion by comparing his observations to those made in ancient times. Ophiuchus contains Barnard's Star, the second nearest star to Earth and the one with the largest proper motion in the sky. It is now located at RA: 17h 57.8m Dec: 4d 41.5', or 14 minutes in RA directly east of Beta Ophiuchi. (*Editor's Note: this information is a few years old; best to look up current coordinates.*) It's a magnitude 9.53 star of spectral type M5, and each year this runaway star moves 10.29" practically due north. Careful observations could reveal its motion after only a few years.

Chris Lancaster's book "Under Dark Skies - A Guide to the Constellations" is available online.

★ Community Involvement & Outreach

SARSEF 2013

Text and Photos Contributed by Brian O'Connell

On March 12, TAAA members Molly Hancock, MaryHelen Kaser, and Brian O'Connell served as sponsored award judges at this year's Southern Arizona Regional Science and Engineering Fair (SARSEF). Each spring the TAAA contributes certificates and prizes for K-5, middle school, and high school students awarded first-place in the content category of astronomy. This year there were an estimated 1600 - 1800 projects on display, and perhaps a dozen featuring an astronomy topic. Many more dealt with light pollution, light, or optics but we try not to overlap areas reviewed by other sponsoring organizations such as the International Dark Sky Association.

We enjoyed working as a team to select and score these projects, interview the students if present, and decide on the first-place entries. It's not only fun, but rather uplifting to see the efforts of students engaged in learning how to "do" science with the support of their teachers.

Our high school award went to "Tucson Sky Glow" by 12th

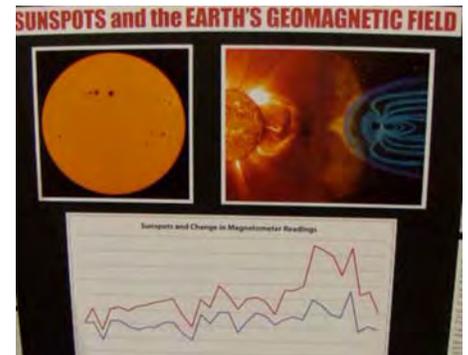


grader Moria Bingham of Cienega High School (also considered by the IDA). Moria took photographs of the constellation Orion over a two-week period from three locations: "City", "Desert", and "Home" (Vail, AZ.). She compared the average pixel intensity of photos (which were displayed on her poster) giving evidence for progressively darker skies farther from city lights. The high school award was quite fitting--special admission to the Multiple Mirror Telescope on Mount Hopkins. In addition to providing our club's business card directing her to our website, I noted that several club members built private observatories in the Vail area to enjoy the hobby.

The middle school award went to "Sunspots and the Earth's Geomagnetic Field" by 8th grader Forrest Green from St Michael's Parish Day School. Forrest built a simple magnetometer suspended from the ceiling carrying a pen laser operated by light switch. He tracked the laser's light dot cast upon the wall each day for over a month. His objective was to measure the change in the light dot's position for comparison with daily sunspot counts obtained from a NASA website.

The resulting correlation shown on his poster attracted interest from scientists representing their own sponsoring organizations--Mark Sykes of the Planetary Science

Institute and Larry Lebofsky with the UA Lunar and Planetary Laboratory. It seems that this correlation had not been shown before, and his data appears to be valid. Forrest received our middle school prize, a set of tickets to the UA SkyCenter on Mt Lemmon. We also provided TAAA's business card and mentioned our new Family Astronomy Program that meets at Flandreau Planetarium, should he be interested in further observing the sun and other celestial objects. Perhaps in the future Forrest can be questioned by scientists as a Ph.D. candidate.



In the K-5 category, 4th grader Adam Masciola earned first place for "Using the North Star to Find Your Latitude". He constructed a portable sighting



device using a protractor and level attached to a post, patterned after the sextant concept. At night he measured the altitude of the north star from three Tucson locations, obtaining the latitude of Tucson with good accuracy. Adam will always be able to point out Polaris! Adam received a gift certificate for Starizona.

Thanks to Terri Lappin for registering TAAA as a sponsoring organization and arranging the prizes and certificates awarded. We like to encourage young people to observe the night sky and experience the enjoyment we all share.

SARSEF 2014 takes place March 10 - 14. We'll again provide sponsored awards for astronomy projects. Think about being a judge! It's very rewarding.

Community Involvement & Outreach

Sharing the Sky Star Night 2013

Text Contributed by Wendee Levy

As this year's Astronomy Day outreach and fundraiser drew to a close, Liz Kalas commented, "after all this preparation, I can't believe the event is over." David and I like to think of astronomy outreach as the hardest job you will ever love. From some of the conversations I had with the astronomers at our event, that sentiment was echoed numerous times.

David and I really appreciate the continuing efforts of the club to help make this event such a success each year. We boast to our friends about how impressive the event is because the club backs it with so much enthusiasm. I don't think any other astronomical outreach event has the number of telescopes that we have. Your time, talent and abilities are priceless.

We topped last year's total of \$1900 at the event. This year we raised over \$2800.

A special thanks to:

1. All the telescope operators
2. Bill Plant, Director of Flandrau for covering the parking fees
3. Michael Magee, Technical Director, Flandrau Planetarium for securing the site and the parking passes
4. John Kalas for organizing the telescope operators
5. Liz Kalas for publicity and working the welcome table
6. Terri Lappin for the hands-on Night Sky Network activities
7. Dave Acklam for the extra door prizes
8. Mae Smith for working the welcome table
9. Twila Peck, STS Editorial Staff, for the brochure & graphics

We thank-you for a job well done.

TAAA has supported David and Wendee's Sharing the Sky Foundation Star Night since it's inception in 2007. Before that, we supported David's MDA Telescopes for Telethon star parties.



Support Our Local Vendors



Classifieds

For Sale	Meade LX200 GPS Schmidt Cassegrain 10" Alt-AZ telescope with HTMC coatings. Includes standard accessories (heavy duty tripod, 8x50 finder scope, 26 mm Meade Plossl eyepiece, Autostar controller, Smart Drive, DC power cable, original Meade shipping box) (\$3400 new), JMI carrying case (\$569 new), JMI wheeley bars (\$249 new), 4 dry cell batteries, Peterson tripod mounting guide, AstroZap hard due shield. In very good condition. Used very little. Additional eyepieces available separately. Will deliver within 100 mile radius of Green Valley. Price only \$1500. Contact Larry Phillips at 520-777-8027 or email llp41astro@cox.net .
For Sale	1986 10" Meade LX5 telescope, wedge mount tripod and accessories. Looking at ebay for an estimate of cost shows that they run about \$500. Call Paul Ross at 520-882-8552 with your offer or to see it in action.

Ads will appear in a single quarterly issue of *Desert Skies*. Submitters may request that their ad be repeated in the following issue of *Desert Skies* provided the request is made by the issue deadline.

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