

PSF NEWS

Planetary Studies Foundation

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Facelift for the Banwarth House and PSF Business!

The PSF would like to thank all of their end-of-year donors who contributed to help fund the painting of the Banwarth House and the renovation of the upstairs garage office. At the time this publication reaches you, the office project should be complete. The Planetary Studies Foundation is aware of the declining economy, but your hearts were open to see the task completed. Do not hesitate to call or stop by the facility for a tour, you will be very proud of what we have achieved. PSF would like to thank Klippert Painting for their expertise field of historic preservation and Randy Shaw Construction for the remodeling of the business facility.



An Extrasolar "Goldilocks"

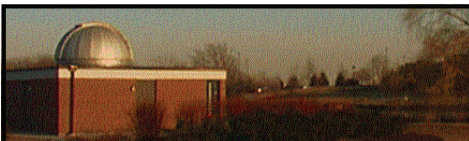
In September, a team of planet hunters from the University of California, Santa Cruz and the Carnegie Institution of Washington announced the discovery of an earth-sized extrasolar planet 20.5 light years from us and located in the constellation Libra.

Currently, there are 492 extrasolar planets on the astronomy world's radar, but the newest discovery of Gliese 581g is unlike anything they've found before because as many astronomers are learning, it appears to be more Earth-like than we could have imagined.

Gliese 851 is a red dwarf star located 20 light years (or 120 trillion miles) away which currently supports 6 known planets. These planets have sparked interest before with planet c and planet d both leading astronomers to believe that they may have been habitable due to their Earth-like characteristics.



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PSF and Harper College Celebrate the Karl G. Henize Observatory's 20th Anniversary

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Governor Visits Elizabeth, IL

On September 24th another surprise visitor, Illinois Governor Pat Quinn, came to our partner organization, the Apple River Fort. In the shadows of our 1876 Banwarth House headquarters he spoke before a group of 100 area residents and met PSF members **Dan Tindell**, **Helen Kilgore**, and **Diane M. Szipiera**. Hopefully the Governor's visit will inspire him to continue financial support for important Illinois Historic Sites like the Apple River Fort.

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PRESIDENT'S MESSAGE

This past quarter has been a very busy one for the Planetary Studies Foundation. The focus has been on our increasing involvement within the Jo Daviess County community. Our monthly astronomy programs at the Apple River Fort in Elizabeth, Illinois have been attracting a large number of enthusiastic people that come from far and near to enjoy our dark sky. Visitors from India, Ireland and the Netherlands as well as numerous individuals from all over Illinois and the Tri-State region have enjoyed our programs. Attendance has ranged from between 60 to 120 people per session. We have also encouraged people to bring their own telescopes and have provided instructional sessions on how to properly use their instruments. The viewing sessions for the 2011 season are already in the planning stage and we anticipate an increased attendance as more people become aware of what we have to offer. In addition to our public astronomy programs and lecture series, the PSF has become an active member of the Elizabeth Chamber of Commerce. In July, the PSF participated in the annual Elizabeth Community Fair parade with a decorative float promoting our Banwarth House. Public attendance at the Banwarth House continues to grow as more and more people become aware of it. Notable visitors to the Banwarth House included Banwarth family members from California and southern Illinois. They marveled at the way we have preserved their family heritage and how we present the lifestyle of a prominent 19th century Elizabeth family.

On August 21st PSF held its annual members meeting at our historic 1876 Banwarth House in Elizabeth, Illinois. I especially want to thank board members **Jennifer Schwartz** and **Herb Windolf** who flew in from California and Arizona respectively to attend this important meeting. Also in attendance were board members **Joseph Auer**, **Kathy Farlow**, **David Lauerman**, and myself. Among the many agenda items was the appointment of **Dan Tindell**, the Site Manager of the Apple River Fort, to fill one of the vacant board member positions. This brings our current board to seven members, which we feel is sufficient to conduct all PSF business. Annual members meetings are usually a time for a review of the past year's activities and financial status, and to provide an opportunity for board members to plan for the coming year. This year turned out to be quite the exception as PSF was presented with a unique opportunity to expand its educational mission. Based on the success of our public astronomy programs at the Apple River Fort the Elizabeth community encouraged us to increase our efforts by constructing a permanent astronomical observatory. Three important steps have to be taken in order to build an appropriate astronomical observatory: First, a good site has to be acquired to build on; second, a featured telescope that will serve both the needs of the public and the serious astronomer; and third, the funds necessary to make it all happen. The catalyst in this interesting venture was the availability of a unique 7 ½ acre property adjacent to the Apple River Fort where we hold our observing sessions. It was scheduled for auction sale on September 11th and was expected it to sell for a very reasonable price. Even at bargain prices, the cost was beyond PSF's means, but local Elizabeth residents **Jay and Debbie Graves** offered to purchase the property and then donate a portion of the land to the PSF for our observatory. What a wonderful offer, and our board **voted to accept it**. Step one was accomplished! Then came the need for finding a proper telescope to serve our needs. Board member **Herb Windolf** stepped forward with the suggestion of purchasing a telescope he knew was available back in Prescott, Arizona. The owner **Paul Comba**, a renowned astronomer who discovered over 1,000 asteroids with this instrument, was moving and needed to sell his 18" Dobsonian telescope. Herb made the necessary contact and offered to provide PSF with a personal financial donation to acquire the telescope. The deal was closed on September 29th and the telescope arrived in Elizabeth, Illinois on October 2nd. Special thanks goes out to **Ted Bunch**, **Herb Windolf** and **Alan Harrington** for their "Herculean" efforts in getting the 300+ pound telescope base down 29 steps on a spiral staircase from the observing deck to "terra-firma" without injury or damage to the telescope. Two down and one to go! As for the funding of the construction of the new observatory, that will take some time and dedicated effort to turn a dream into reality. We will initiate the project by making the observatory the focal point of our "End of the Year" donation program. Building an astronomical observatory is not something new for the PSF since we were deeply involved in the construction of the **Karl G. Henize Observatory** at Harper College in Palatine, Illinois. Our late board member **Meyer Rudoff** was the architect for that building and many of our members provided financial support. At one time our **James M. DuPont** antique telescope was the featured instrument. In 2000, at the rededication of the observatory, PSF contributed \$27,000 for the opportunity to name the building after one of its members the late astronomer / astronaut **Karl G. Henize**. In fact, this past August 28th PSF helped Harper College celebrate the 20th anniversary of

the *Henize Observatory*. For the last twenty years the *Henize Observatory* has served as an educational resource for the entire Harper College community and will hopefully continue in that role for many years to come.

As your president, and speaking for all the members of the Executive Board, we are proud of the accomplishments our organization has made since our move to the Jo Daviess County region of Illinois. This location has provided us with opportunities and levels of support that we never enjoyed in our past locations, and we have truly found a home. Our partnerships with the **Apple River Fort**, the **Jo Daviess Conservation Foundation**, the **Platteville, Wisconsin and Elizabeth, Illinois Chambers of Commerce** have been very successful and continue to grow. Our Executive Board invites and encourages all members to come out and visit your historic 1876 Banwarth House and enjoy our astronomy and other educational programs. Come see your investment in action.

Paul P. Szipiera

DONOR'S SPOTLIGHT

\$1,000 - \$5,000

Anonymous

Paul & Diane Szipiera

Herbert Windolf

The Planetary Studies Foundation also wishes to thank all its members and friends who recently participated in the *Great Wisconsin Fireball* t-shirt promotion. This program was a great success in promoting our organization and it even raised a few dollars to support our other programs. There are a few shirts left if anyone would like to purchase one.

NEW & RENEWING MEMBERS

New Life Membership

Randy Shaw

New Family Membership

Jennifer Robbins

Renewing Regular Membership

Cecilia Cooper

Bill Hack

Nancy Heggem

Carleton B. Moore

James T. Napolitan

James Paglin

Karen S. Sabatini

Randall Schietzelt

Carolyn Walmann

Renewing Family Membership

Leo and Karen Baran

Kathy and Jess Farlow

Gene Sittinger

Continued on next page

MEMBER'S CORNER

On behalf of the entire Planetary Studies Foundation, the Executive Board of Directors wishes to extend its condolences to our Board Chairman **Joseph A. Auer, Jr.** and his wife **Teresa** on the recent passing of Joseph's mother.

Executive Board member and Founder **David M. Lauer** had the pleasure of announcing the recent engagement of his daughter Jill. The PSF would like to extend its best wishes for a bright future to Jill and her fiancé Rich.

Congratulations also go out to **Captain James A. Lovell** who was awarded the 2010 Lincoln Leadership Award, an award presented by the Abraham Lincoln Presidential Library Foundation. The award consists of a monetary prize (which Captain Lovell donated to charity) and the commissioning of a portrait of Captain Lovell that will hang in the Abraham Lincoln Presidential Library in Springfield, Illinois. PSF president **Paul P. Sipiera** and his daughter **Paula Sipiera** were among the guests present at the September 23rd dedication event.

Congratulations to **James N. Pritzker** on the birth of his granddaughter Noga Pritzker Wald, and to her mother Tal Hava Pritzker Wald. Not to forget congratulating the great-grandparents **Audrey and Albert Ratner** and **Robert and Mayari Pritzker**, and the new uncles **Andrew and William Pritzker**. Incidentally, this little girl already has a planetary connection even at such an early age. In Hebrew, her name means Venus.

It was a wonderful surprise to see **Spike and Karen O'Dell** visit our historic 1876 Banwarth House. Together with Spike's mother **Dottie** they enjoyed a tour of the house and brought us family news with pictures of their grandchildren. Spike, a legendary retired WGN Radio personality, and Karen now live near Nashville, Tennessee but still have fond memories and friends here from their days in the Galena area.

September 5, 2010 - Doug Hicks Reporting from New Zealand on the Christchurch Earthquake – Auckland is unaffected - nobody felt the earthquake here - it was noticeable as far north as New Plymouth & as far south as Invercargill. Severe shaking was experienced throughout mid & north Canterbury. Magnitude 7.1, epicentre was Darfield 30 kilometres west of Christchurch, 10 km beneath the surface on a splinter fault (not the main Alpine Fault which is farther west). Fortunately most people were in their beds inside timber-framed houses, which stood up well. One death (from heart attack), two serious injuries (from falling bricks & glass). Damage was mostly to commercial buildings, particularly old brick structures that lacked concrete or steel frames. Power supply has already been restored to most areas. Water supply and sewer drainage are functioning after a fashion, but there are lots of breaks & leakages.

ASTRONOMY AT THE APPLE RIVER FORT

Now that fall has arrived and winter is around the corner, the final astronomy and story-telling came to a conclusion for the year on October 16th. The PSF board would like to thank **Dan Tindell** who is the Fort Director for the use of their facility, **Chris Zirtzman** for his expertise with telescopes, **Dan Wenny** and his family for their help with telescopes, the **Sipiera Family** for working hard to run the events and last but not least, all the PSF members who have attended these stargazing events. The fort stargazing programs will begin again in April 2011.

See you in 2011!
**For the full sky viewing
schedule,
please visit our website...**
www.planets.org

Member Spotlight (and new addition to our board!)... *Dan Tindell*

Dan Tindell is one of our Galena-based members and has become very involved with the PSF's Banwarth House and other sky viewing events we host on the weekends. Dan lives with his wife Pam, a preschool teacher, and daughter Grace. One special fact about Dan's daughter Grace is over the summer, she worked as a docent at the Banwarth House and how very well she did! Dan received his A.A. from the University of Maryland-in-Berlin, his B.A. in Communications from the Moody Bible Institute – Chicago and his B.S. in History Education from Illinois State University.

PSF: What is your current profession and what inspired you into that career?

I manage the Apple River Fort in Elizabeth, and have been working for the Illinois Historic Preservation Agency since 1995. Prior to that I was a high school teacher in Springfield, IL. History has been relevant in all of my occupations.

PSF: Were there any other careers you considered? If so, why do you find it so interesting and what lead you to pursue a different path?

Broadcasting in radio was an early career, but didn't support my new family. When I was selecting a different career path, I was eager to find one that would allow me and my family to live in this beautiful part of Illinois.

PSF: What are your favorite areas of science and why?

An area of science that continues to fascinate me is astronomy. As a child, I remember the Apollo 8 mission and the

new perspective on the glories of the heavens. I specifically remember the astronauts reading of the scripture "In the Beginning God Created the Heavens and Earth..." and the scripture "the heavens declare the glory of God" points to me a creator God. So I like all the sciences as they reveal to us the glory of the creator. Basically, I have a National Geographic sort of armchair interest in the sciences and geography.

PSF: Do you have any hobbies or special interests?

I like to be outdoors and fortunately my current job allows me to get out of the office.

PSF: What is the best advice you ever received, or what is a motto you live by?

Promoting community in civic, cultural, and our churches takes effort. Try to do your part....

PSF: Where is your favorite place you have traveled and why?

My favorite place was Petra, Jordan. I stayed with a Bedouin family, and upon my arrival they said "you are welcome here" and it proved to be genuine!

PSF: How did you become involved with PSF and the Banwarth House?

Hey, we're neighbors! The people at the Banwarth House, the Sipiera's and all of us at the Apple River Fort like to chat and keep each other on our toes. One thing that I learned right from the beginning is the PSF has a sort of vortex that can capture you in!



PSF: What is your favorite thing about PSF the Banwarth House?

By far, the people. Yes, the house is very interesting and the history behind it is fascinating, but the PSF members and friends (and the Sipiera's et al) are great people to associate with and are a credit to the organization.

PSF: Do you have any exciting plans for the end of the year or 2011?

I want to make things happen in 2011 and not watch things happen.... or worse... ask what happened!! I hope to be able to adjust to the many changes on the horizon and yet move forward. We need to go beyond simply "holding down the fort!"

PSF: What advice would you give to our younger readers?

Read Three Cups of Tea by Greg Mortinson and try to experience another culture while you can. Also, watch the movie "Secretariat" and be inspired, and see how we old folks lived before cell phones & texting.

NEWS FROM THE 1867 BANWARTH HOUSE



Brad & Joann Banwarth

The Original Banwarth Family Visits the House

What an exciting summer for the Banwarth House! We were able to add another piece of the puzzle to the special history of the house with some visits from members of the actual Banwarth family. It was an honor to meet the family and to listen to the interesting stories they shared regarding their great uncle Karl Banwarth that they had heard of when they were children. Some of the Banwarth family was in town for their 50th class reunion, while others were attending the big Elizabeth Fair held in July. It was truly special to get additional insight into the people who once occupied this beautiful home. From all of us at the PSF, we would like to thank the Banwarth family for their time and reflections.

Illinois Governor Visits the Town of Elizabeth

The PSF finds itself in the most interesting situations! While most people would expect to shake the hand of their governor in a large city, the quaint town of Elizabeth had a special guest this late September. Illinois Governor Pat Quinn came to the Apple River Fort (located directly next door to the Banwarth House) on his way to do various campaign stops. He was there to support the state-owned historical site, along with praising the city on how they do a wonderful job preserving their environment and precious water sources.

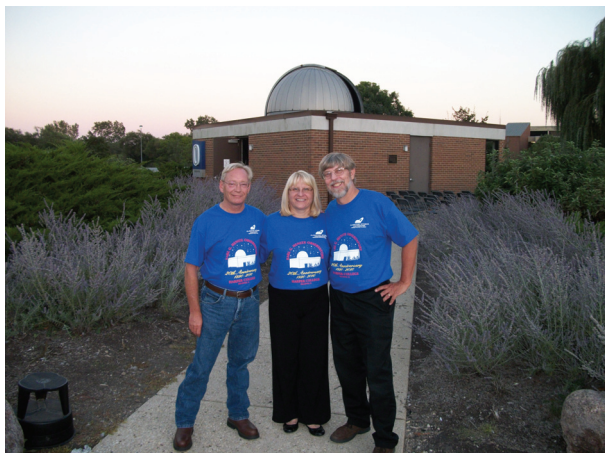
It was a quick 40 minute visit, but he left a huge impact on the River Ridge High School senior class. Elizabeth mayor Mike Dittmar welcomed the Governor along with a few questions asking the Governor about what his plans were about keeping this historical site opened for the future. The Governor assured the people that his intentions were to keep this historical site open as long as possible. Governor Quinn shook hands with various towns people and was gracious about giving out autographs. Since the 1876 Banwarth House is directly next to the Apple River Fort Interpretive Center, the veranda was used



Governor Pat Quinn with PSF Member, Helen Kilgore (Above) and River Ridge High School's senior class (below).



Harper College and the Planetary Studies Foundation Celebrate the 20th Anniversary of the Karl Henize Observatory



PSF President, Paul Sipiera (above right) with his wife Diane and PSF member Chris Zirtzman (above left). Below Paul Sipiera gives a talk about the history of the observatory and in attendance was long time PSF members, Paul Solarz (bottom left) and Jim Plaxco (middle).



On August 29 the Planetary Studies Foundation and the Harper College astronomy department celebrated their 20th year of the Karl G. Henize Observatory in Palatine, IL. The college wanted to recognize how important the observatory is to the campus and their astronomy classes.

It all began when Dr. Paul Sipiera created Harper's first astronomy class. He was hoping that these classes would be accepted by students, to his amazement, it led to various other astronomy classes. Every year there has been numerous day classes, honors astronomy classes, evening classes and summer school courses.

In 1990, Sipiera knew he needed a permanent facility for astronomy classes to have an actual hands-on experience. It was not in the college budget to build such a facility. With various college instructors, community donors and the newly organized Planetary Studies Foundation the observatory was created.

Paul Sipiera gave the history and naming of the observatory, along with the toasting to the late Karl G. Henize and his family. Also present during the celebration were former PSF board members **Jim Plaxco** and **Paul Solarz**. Both of these individuals made short statements about what the observatory meant to them and the community. Present board member and founder of PSF, **Dave Lauer**, gave the history of PSF and the ambitious goals we have set for the future. The evening followed with telescope viewing for the public.



UPCOMING EVENTS

The Chemistry of Soap

November 6 - (1-3 PM)

Banwarth House

Elizabeth, IL

Admission: Free

Forestry Walk and Discussion

November 13 - (1-4 PM)

Schurmeier Teaching Forest

Elizabeth, IL

Admission: Free

Creatures of the Night

November 20 - (10 AM)

Apple River Fort

Elizabeth, IL

Admission: Free

Telescope Workshop: A Huge Success

On a warm September Saturday afternoon, the Planetary Studies Foundation hosted a telescope workshop at the Banwarth House in Elizabeth, IL. This workshop was for individuals who owned telescopes but were not sure how to use them to their best ability. Workshop instructor and PSF member, **Chris Zirtzman** spent the entire afternoon explaining the components of a telescope, how to properly use each telescope and he was able to give each participant individual time to show them how exactly to use their specific telescope, along with answering their questions. The large backyard patio of the Banwarth House was filled with people who were excited to have Chris' special expertise and instruction. Some of the participants were even laughing about their telescope being used more as home decoration than an actual night observation tool! Everyone commented how nice it was to have the instruction in daylight so that it would be easier to do in the dark. Later that evening during the Fort Stargazing Event, workshop attendees returned to see the wonders of the heavens through their very own telescopes and for some of them, it was their first time!



Chris Zirtzman helping the workshop participants understand the different components of a telescope and how to use their specific telescope to its' best ability.

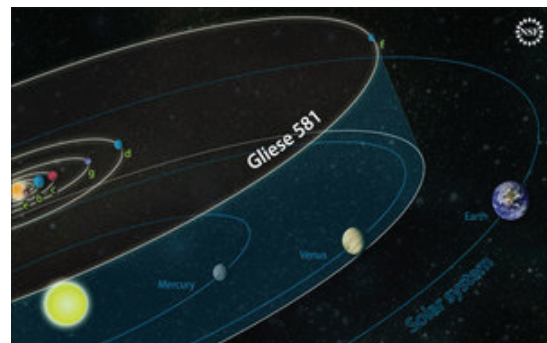
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Extrasolar “Goldilocks”

After further observations, it was ruled that planet c was too hot and planet d was too cold. Enter Goldilocks. The discovery of planet g using 11 years of observations from a Hawaii-based telescope, has shown light on a planet located between c and d. It took more than 200 observations to detect Gliese 581g. This planet is special because it falls into an area that astronomers would consider to be in a habitable zone.

One misconception with the idea of an extrasolar planet being habitable, is that although the temperatures and conditions may be “potentially habitable” to astronomers, this environment would not necessarily be one that humans would consider a nice place to live. Currently, researchers estimate that the average surface temperature of planet g is between -24 and 10 degrees Fahrenheit (or -31 to -12 degrees Celsius). The other dilemma is the planet is tidally locked to its star, meaning one side is always facing the star and thus, is blazing hot and in constant daylight while the other side is freezing cold and exists in perpetual darkness.

According to Steven Vogt, professor of astronomy and astrophysics at University of California at Santa Cruz, “the most habitable zone on the planet’s surface would be the line between shadow and light known as the “terminator”, with surface temperatures decreasing toward the dark side and increasing toward the light side. Any emerging life forms would have a wide range of stable climates to choose from and to evolve around, depending on their longitude. If Gliese 581g has a rocky composition like we believe, its diameter would be about 1.2 to 1.4 times that of the Earth. The surface gravity would about the same or slightly higher than Earth’s, so that a person could easily walk upright on the planet.”



Moroccan Impressions Part II

By Herb Windolf

The next day saw us on the road once more, now heading west, when we passed a group of semi-monads with their donkeys loaded to the hilt with the family's entire belongings, including some chickens. Everyone had to get out of the cars and take pictures. The people were happy to accept some dirhams, the local currency, in compensation.

We were now on the way to the Todra Gorge, a potentially scenic setting. Unfortunately, the road leading through it is under construction and tourist travel is overwhelming. It was a mess. A large hotel complex in the gorge dates its beginnings to its owner once living in a cave behind today's structures and serving tea to tourists. He, supposedly, saved diligently and eventually was able to gradually build this fancy hotel. Today, in his nineties, he is supposed to live in Tinerhir.

In Tinerhir we stayed at the nice hotel Kenzi Saghro on top of a hill, from where we overlooked the town and the community's rich fields, watered by the river rushing from the gorge. On the afternoon of our arrival, some of our ladies and a couple of gents decided to try the *Hammam*, the baths, where the sexes, of course are separated. This is also where Muslims perform their major ablutions.

We walked the narrow lanes through the fields, observing how the people lived and worked. Quietly – it was difficult to get our chattering group to fall silent – we passed through overgrown fruit and olive orchards, listening to the birds and the gurgle of the water in the small irrigation channels. From there, we walked up to a *Duar*, a community settlement of adobe

structures. Next to it stood the ruins of an older *Duar*, abandoned years ago, when it became too cumbersome to maintain. Thus, its occupants simply built a new, extensive settlement next to it.

Back in town, we first visited a girls vocational center, then ambled through a *Souk* and, lo and behold – a small red-light district. Continuing, we arrived at a school where boys from poor backgrounds are broadly educated. We were served lunch in their refectory, with two boys joining us at each of our tables. These boys, from 12 to 18 years of age, were very well-mannered, the older ones able to converse with us in French or English. I talked at some length with the school's director and complimented him on his accomplishments.

Later, we visited a Berber carpet store, run by a Tuareg family. Their spokesman, dressed in native garb and fluent in English, could be called a ham – jest intended – and came across as quite sophisticated. After his introductions, we were taken to a showroom – and now one beautiful rug after another was placed before our eyes, while we were served the customary mint tea, either with or without sugar. Walking into the room, I spotted a rug on a wall and, despite us having enough – I had purchased already two Berber rugs in Morocco nine years ago – I immediately fell in love with it. When I mentioned it to Ute, she had also already succumbed to its appeal. Well, what do you expect after being married for 49 years? I asked for its price and was given the equivalent of approximately \$ 2,000. Knowing that, I walked over to

Aziz and asked him for how much he thought I could get it for. He had earlier told us that, in most places, we could usually dicker down prices to one-third of the initially quoted price. He gave \$ 800 as a target price. Well, I got it for \$ 775. We had it rolled up and it later went into one of our duffles. Some other members of our group could not resist either, and we must have left the store a few thousand dollars poorer, but richer in beauty, and having enriched some Moroccan people.

In the evening, some of us ventured to a woman's place, an expert in Henna painting. Precocious Ute went first and had the inside of her right hand decorated. Being a lefty, she was able to continue feeding and washing herself the first two days, until the application had properly set. Now, two weeks later, her Henna application is slowly fading.

Leaving Tinerhir the next day, we stopped at a large house one could almost call a *Kasbah*, a citadel. Its owner had several wives and numerous children. There we were shown the baking of a 'Berber pizza.' This is a hand-flattened wheat dough upon which a small amount of various diced vegetables is piled, then wrapped in like a calcione. Then the 'pizza' was baked in a small, wood-fired oven in a very smoky room. It was delicious.

Heading now towards the Dada Gorge we left almost all tourists behind. Eventually, we had to switch to two smaller local buses to maneuver the winding road through this picturesque canyon.

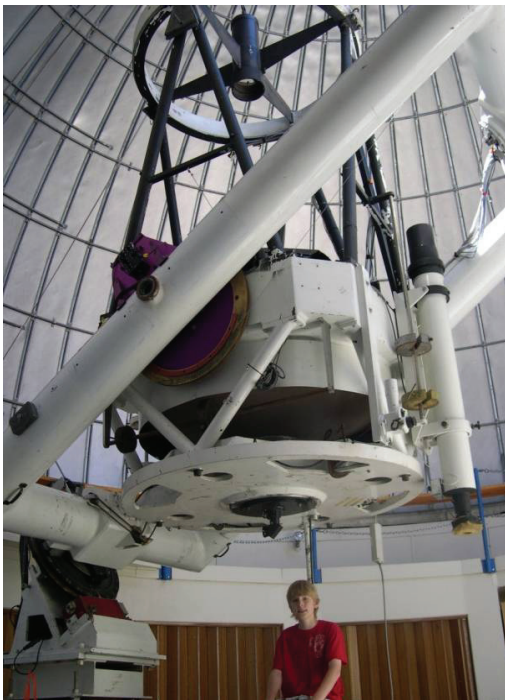
On the return, we stopped at a large house, the home of an *Imam*...

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University of Arizona Astronomy Camp

By Jack Gibbons

In June, I had the opportunity to go to Astronomy camp in Tucson. We took the train from Princeton, IL, to Flagstaff, AZ, and back but that is a story for another time. Astronomy Camp is a week of fun, especially for one interested in astronomy and astrophysics, such as me. Over the course of that week, the other campers and I enjoyed the use of several large telescopes under unimaginably dark skies, as well as participating in many interesting experiments and projects. Dr. Don McCarthy, a professor of astronomy at the University of Arizona,



The 60" telescope is shown here with me sitting on the stepstool that you would use to reach the eyepiece.

was our head counselor, with several other counselors assisting him. We also took a trip down to Tucson to, among other things, take a tour of the Mirror

Lab, a part of the University of Arizona that makes mirrors for use in the largest reflecting telescopes on Earth.

The most obvious attractions at Astronomy Camp were the extremely good viewing conditions of the night sky and the large telescopes that we would be allowed to operate. The largest telescope up on the summit of Mt. Lemmon was the 60" telescope. This scope, as well as all of the other scopes, is moved by typing coordinates into a computer near the scope or by selecting a celestial object from several catalogs

on that computer. Also, on this scope and the 61", as the computer moved the scope and dome to point at that point in the sky, it also moved a large section of the floor under the telescope up to match the level of the eyepiece, creating a platform for you to stand on so that you only needed a stepstool, rather than a ladder, to reach the eyepiece. So, if you were looking at something near the horizon, the platform would be raised pretty high up. However, if you were looking at something near the zenith, then the floor would be close to the level of the surrounding floor. Through this scope, we got many great looks at amazing objects. From galaxies to nebula to stars to planets, we saw it all. Among my favorites was the Ring Nebula. I had seen this object before, through much smaller scopes, and could hardly believe the change it undertook. When I saw it first, it was little more than a miniscule spot of color. When seen

through the 60", it morphed into a huge nebula, almost filling the whole field of view, with details clearly defined and a white dwarf, the remnant of the huge star that created that nebula with its death, visible in the center. Although

"I enjoyed the use of several large telescopes under unimaginably dark skies"

this was the biggest scope that we got to use every night, it was not my favorite. That honor has to go to the smallest scope, the 12". Now, I'm almost positive that you think that I've gone crazy, saying that the smallest scope is my favorite. However, there is a perfectly logical reason for this: this scope has a CCD imaging system attached. A CCD system is the modern way to take pictures through a telescope. It is a part of your average digital camera, except that when used in astrophotography, it usually takes long exposures, in order to see faint objects. Being able to create a picture of a deep sky object is very rewarding when it turns out well. For example, the favorite picture that I took was of the Sombrero Galaxy. In the picture it looked very similar to the pictures of it that had been taken by the Hubble. Now, of course it didn't have the all of the details that the Hubble reveals, but it was still a very nice picture. There was a third telescope that

we were able to use. This was a 20" telescope, and there was little to be said about it, for although it was an amazing telescope, it had few unique features. It had no CCD, and was not the largest scope there. The final telescope that we were allowed to use while at camp was the 61" Kuiper telescope. This relatively well-known telescope was available to us for one day during our week-long stay. This was mainly because it was not on the same peak with the other scopes. Instead, it was located about 15 minutes down the slope from the peak of Mt. Lemmon.

With this camp being run by the University of Arizona, we were privileged to be able to tour the Mirror Lab. At the Mirror Lab, some of the largest mirrors on earth are created. The Mirror Lab technicians have built the Large Binocular Telescope (LBT), in which the primary mirror is made of two 8.4 meter mirrors. Currently, the Mirror Lab is working on creating the Giant



We took pictures like this one with the CCD-equipped 12" scope. This picture of the Crescent Nebula, however, was taken by the 2009 campers through the same scope.

Magellan Telescope (GMT). This new telescope, when completed in 2018, will by far have more light gathering power than any telescope on earth today. With its primary mirror made out of 7

separate 8.4 meter mirrors, it essentially will be equivalent to a 24.5 meter telescope. The largest telescope on Earth today is only 10.4 meters across. When we were there, we were able to witness a mirror for the GMT in the making. The Mirror Lab uses a new way of creating mirrors. Rather than grinding down a solid chunk of glass into the right size, the small chunks of glass are set into a mold and then heated while the mold is spun around a point in its center. This gives the glass a shape closer to its final form, saving time and money.

We also got to watch, and sometimes participate in, many experiments and presentations. The most spectacular of these were the Liquid Nitrogen experiments. Liquid Nitrogen is extremely cold. Nitrogen boils at -321° F, as opposed to water which boils at around 212° F. This means that if Liquid Nitrogen touches or gets near to something hotter than -321° , it will boil, and turn into gas. Now, when it turns into gas, it also expands rapidly. Every square inch of Liquid Nitrogen will expand to 694 square inches of Nitrogen gas when it boils. We used these properties to do some very fun experiments with it. The first experiment was the Liquid Nitrogen cannon. In this experiment, we took two 2-liter bottles and filled one with water and filled the other partway with Liquid Nitrogen. Then we put both bottles in a tube just wide enough for them to fit, with the water bottle on top. We then backed away from the tube, which was pointing straight up, while we waited for the pressure of the expanding gas to get high enough to burst the bottle. BOOM! Suddenly we saw a water-filled Mountain Dew bottle go careening over

400 feet in the air, with many 'oohs' and 'aahs' following it. Another experiment was the Liquid Nitrogen ice cream. However, it was not ice cream made out of Liquid Nitrogen, as you might expect. Instead, we combined all of the normal ingredients to make ice cream in a large bowl, with one exception: ice. As we stirred the mixture, we poured Liquid Nitrogen over it, which rapidly cooled the cream into crystals, and then evaporated off. We repeated this process quite a few times, but I lost track of exactly how many, because it was very late at night after using the Kuiper telescope. The result was delicious vanilla ice cream! The final experiment that I have room for is the spectrometer. Spectrometers are used in astronomy to look at stars and tell what elements they are made of by looking at lines of color that are separated by the spectrometer. Our spectrometer was basically a film canister with a slit cut in one end and a hole on the other covered by a sheet of special plastic designed to spit the light coming through into emission spectra, much as a prism splits light to make a rainbow. When you look through the slit end at an object emitting light, you will see lines of color, which can indicate what element is in the light-emitting source.

Now you can surely see why I had such a great time at Astronomy Camp. With all of the awesome projects, fun places, and huge telescopes, how could you not? Then, when combined with dark skies and friends interested in the same things as me, it seemed almost unreal. ♦

Bird Banding with Galena Middle School

By Dan Wenny

Galena Middle School has several programs for advanced students (called GATE – Gifted and Talented Education). Some of the programs have enough students to have an entire class all year but others, such as science, do not. For these smaller groups the school tries to arrange activities to challenge the students. One year the GATE science group went to observe a local veterinarian at work. This spring they helped me capture and band birds along the Galena River Trail.

Banding birds involves placing a small aluminum band on the lower leg (technically the tarsometatarsus, also called the tarsus). Each band has a unique number so if a bird is recaptured data from the previous capture can be retrieved. Over the course of several years or throughout one year in a given location banding can yield much information on habitat use, territoriality, migration patterns, and other aspects of bird ecology. To band birds one must have a federal permit from the USGS Bird Banding Lab at the Patuxent Wildlife Research Center in Maryland (<http://www.pwrc.usgs.gov/birds/>). I have been banding birds and training new banders for over 15 years.

Many techniques can be used to capture birds but the most common method involves nylon nets called mist-nets. These nets come in a variety of heights, lengths, and mesh sizes to capture different kinds of birds and for use in different habitats. The nets I use most often are 2.5 m tall, 12 m long, and either 30mm or 38mm mesh. These nets

will capture most songbirds and other smaller species such as woodpeckers and cuckoos.

The Galena bike trail is an ideal location for capturing birds in mist-nets because it has a section that is level, straight, and with relatively dense vegetation on both sides. We set up several nets parallel to the trail so they were easy to access but not blocking the trail for runners, bicyclists, and dog-walkers.

Also, the site we chose was close to the parking area so the students could spend most of their time with the nets and birds rather than walking to and from. The students really enjoyed this activity because, not only do they get out of regular classes for the morning but, for most of them it is the first time they have seen a bird up close. Certainly it was the first time they have seen a wild live bird up close.

Each of the GMS GATE Science sections from 5th to 8th grade came out on a different day in mid-May so each student had an opportunity to measure and release a bird. Over the four days we caught 39 birds. We caught fifteen gray catbirds, seven American redstarts, and one or two individuals of 10 other species. Two of the birds, one catbird and one redstart, were originally captured and banded at the same site in 2009. The students were very enthusiastic about this project and gave creative names to each of the birds. Although the few



Dan with Galena 7th grade GATE science students extracting a bird from the mist-net.



Galena 5th graders help weigh a bird.



Female American Redstart after being measured and banded (band is on bird's right leg, partially obscured by my index finger).

hours spent on this project may be the only exposure some of the students get to field biology, I certainly hope it piqued some interest in science among them. ♦

Hubble Captures First Images of Aftermath of Possible Asteroid Collision

NASA's Hubble Space Telescope has captured the first snapshots of a suspected asteroid collision. The images show a bizarre X-shaped object at the head of a comet-like trail of material.

In January, astronomers began using Hubble to track the object for five months. They thought they had witnessed a fresh asteroid collision, but were surprised to learn the collision occurred in early 2009.

"We expected the debris field to expand dramatically, like shrapnel flying from a hand grenade," said astronomer David Jewitt of the University of California in Los Angeles, who is a leader of the Hubble observations. "But what happened was quite the opposite. We found that the object is expanding very, very slowly."

The peculiar object, dubbed P/2010 A2, was found cruising around the asteroid belt, a reservoir of millions of rocky bodies between the orbits of Mars and Jupiter. It is estimated modest-sized asteroids smash into each other about once a year. When the objects collide, they inject dust into interplanetary space. But until now, astronomers have relied on models to make predictions about the frequency of these collisions and the amount of dust produced.

Catching colliding asteroids is difficult because large impacts are rare while small ones, such as the one that produced P/2010 A2, are exceedingly faint. The two asteroids that make up P/2010 A2 were unknown before the collision because they were too faint to be noticed. The collision itself was unobservable because of the asteroids' position in relation to the sun. About 10 or 11 months later, in January 2010, the Lincoln Near-Earth Research (LINEAR)

Program Sky Survey spotted the comet-like tail produced by the collision. But only Hubble discerned the X pattern, offering unequivocal evidence that something stranger than a comet outgassing had occurred.

Although the Hubble images give compelling evidence for an asteroid collision, Jewitt says he still does not have enough information to rule out other explanations for the peculiar object. In one such scenario, a small asteroid's rotation increases from solar radiation and loses mass, forming the comet-like tail.

"These observations are important because we need to know where the dust in the solar system comes from, and how much of it comes from colliding asteroids as opposed to 'outgassing' comets," Jewitt said. "We also can apply this knowledge to the dusty debris disks around other stars, because these are thought to be produced by collisions between unseen bodies in the disks. Knowing how the dust was produced will yield clues about those invisible bodies."

The Hubble images, taken from January to May 2010 with the telescope's Wide Field Camera 3, reveal a point-like object about 400 feet wide, with a long, flowing dust tail behind a never-before-seen X pattern. Particle sizes in the tail are estimated to vary from about 1/25th of an inch to an inch in diameter.

The 400-foot-wide object in the Hubble image is the remnant of a slightly larger precursor body. Astronomers think a smaller rock, perhaps 10 to 15 feet wide, slammed into the larger one. The pair probably collided at high speed, about 11,000 mph, which smashed and vaporized the small asteroid and stripped

material from the larger one. Jewitt estimates that the violent encounter happened in February or March 2009 and was as powerful as the detonation of a small atomic bomb.

Sunlight radiation then swept the debris behind the remnant asteroid, forming a comet-like tail. The tail contains enough dust to make a ball 65 feet wide, most of it blown out of the bigger body by the impact-caused explosion. The science journal *Nature* will publish the findings in the Oct. 14 issue.

"Once again, Hubble has revealed unexpected phenomena occurring in our celestial 'back yard,'" said Eric Smith, Hubble Program scientist at NASA Headquarters in Washington. "Though it's often Hubble's deep observations of the universe or beautiful images of glowing nebulae in our galaxy that make headlines, observations like this of objects in our own solar system remind us how much exploration we still have to do locally."

Astronomers do not have a good explanation for the X shape. The crisscrossed filaments at the head of the tail suggest that the colliding asteroids were not perfectly symmetrical. Material ejected from the impact, therefore, did not make a symmetrical pattern, a bit like the ragged splash made by throwing a rock into a lake. Larger particles in the X disperse very slowly and give this structure its longevity.

Astronomers plan to use Hubble again next year to view the object and to see how the mysterious X-shaped structure has evolved.

Courtesy of NASA: - for images of the asteroid collision, visit: <http://www.nasa.gov/hubble>

Continued from page 9

leader of prayers in the mosque. The building, with its very pleasing large room for social gatherings of the



Moroccan mosque

community, had been for generations in the *Imam's* family. Many rugs were spread on the floor, with seating, as usual, around its walls. A substantial audio system in one corner and an overhead projector in another, indicated the technological facilities. At a few tables at one corner, the *Imam's* brother, an *Imam-in-training*, served us lunch. An *Imam*, studying in a *Madrassa*, a school, must memorize the entire Qur'an, before he can be an *Imam*, a project of years.

After lunch we were given the opportunity to ask the *Imam* questions of whatever nature. He described also that his function was elective and as much social as religious, and that he could be voted out by the community if his performance was found wanting.

Neither of the two men spoke English, so that Aziz had to translate back and forth. The exchange, despite the sometimes incisive and not-so-incisive questions, was often interrupted by the two men's and Aziz's laughter. I could not help asking the question about the Qur'an's position on atheism, citing what Salman Rushdie, an avowed Muslim atheist, had experienced. The

response of this man was, that the Qur'an frowns seriously on two 'sins:' atheism and neglecting charity to the poor. Well, depending on how one defines 'poor' these days, I might squeak through and, since an astronomer-friend has named an asteroid after me – I am already in the heavens. Among many other things, the *Imam* stated was, that Islam is a peaceful religion – that may be so – but all human enterprises – and religions are part of them – have failings. Contemporary Islam is convulsed by some of its failings, intolerant and not-so-peaceful expressions, which take more lives from among its believers than of Westerners.

After another night at the hotel, we transferred back to a bus that took us to Quarzazate to a very Western-ambiance hotel, another Riad Salam, where rock music played in the central garden around the swimming pool, next to which we had our meals buffet-style. In the afternoon, our group, minus myself, were taken to a Berber museum and a *Duar*, whose tight-knit community, marrying only within, showed effects of inbreeding.

In the morning, off again, we stopped at a substantial ancient *Kasbah*, named Kar of Aitbenhadou, the site where many movies were shot, among them 'Lawrence of Arabia.' Driving through the High Atlas, we saw its highest peak, Mount Toubkal, rising to 13,671 ft. It was a very scenic, also very winding drive. Marrakech now lay just ahead, which we reached that afternoon.

Ah, Marrakech! Its history, its allure, its lively life! Once, it was the end point of the salt caravans, bringing rock salt from south of the Sahara, then worth its weight in gold. We were accommodated

at the Hotel el-Andalous, the best of all the hotels we had stayed in, except that its buffet-style food was geared to the taste of the many French visitors, with few, if any, Moroccan items. It is just too much to describe all of Marrakech's sites in detail. An early morning buggy ride took us into town, where we viewed the Koutoubia minaret, the Saadian tombs, the Bahia palace, then entered the Moorish spice market and a Berber pharmacy. A beautiful garden, Jardin Majorelle, with a profusion of subtropical plants and trees, and gorgeous bougainvillea, was restored and is now maintained by the Yves Saint Laurent estate. The garden also holds the dispersed ashes of the fashion designer. We also visited the well-adorned premises of an old *Madrassa*, where young boys once spent years of their lives memorizing the Qur'an, an arduous task that, if and when it had been accomplished, opened up various 'careers' in public life. Their cells looked down onto the central court, where a large running-water basin was available for their minor ablutions prior to prayer: the washing of face, hands and feet.

And then there was the *Medina* with its central open plaza, the Djemma el-Fna Square, where, during the day, some merchants and snake charmers, shaded by umbrellas, ply their trade. At night, this plaza turns into a magical place and, with its packed food stalls, becomes a meeting place of the world, where one can eat cheaply some exotic dishes, like sheep's heads, escargot, and whatnot. The food smells can be overwhelming, just as are the crowds of people. We did not dine there, but retired to the Dar Essalam restaurant, the Abode of Peace, as part of our 'Mysterious Morocco' tour. Its splendid Salon Marjane became

fully occupied and we enjoyed, along with red and white Moroccan wines, some delicious local foods. A female dancer, balancing a tablet with several burning candles on her head, made her way from a central dance area along the tables. She was followed by an attractive belly dancer, who did likewise, also to collect the guests contributions for her performance. Jerry, one of our tour participants, performed some gyrations with her.

The evening concluded our common tour and ten participants left for home. Now, three couples, Matt & Roseann, Paul & Barbara, and Ute & I, were ready for our post-trip. A small bus, and, of course Aziz, took us to the Cascades d'Ouzoud, a most beautiful, high waterfall some distance outside Marrakech, where we had our open-air lunch in full sight of the falls. The path down to the restaurant and falls was lined with the stalls of merchants, hawking their wares. Ute was 'hawked' by a couple of items.

On the way to the falls, Aziz spotted a market taking place in a small village and had our driver stop to visit this *Souk*, where farmers sold their produce and where just about everything else could be bought. Following his advice, we left all valuables in our bus, then walked the crowded lanes between the stalls. At one point, when Aziz talked with two of the merchants standing before us, Ute asked whether she could take their picture. They readily agreed, and Ute, thinking that she owed them a couple of dirhams, offered them to the two men. But they smiled, one waved his hand, reached into his pocket, and handed Ute two dirhams. It so happened that to the left of the two men stood a young woman, her palm outstretched for a handout, which now was quick in coming – the

same two dirhams passing into her hand!

Instead of being on our own the following day, we made special arrangements with Aziz for a ride to the Atlantic coast town of Essaouira, in the 1960s a hippie hangout. We stopped at a Women's Cooperative along the road where they produce Argan oil from a tree nut. This very fine oil is used for cosmetic, medical, and cooking purposes. The establishments' facilities ranged from very modern, the acceptance of credit cards, to primitive, where five women were cracking the nuts with stone tools, then one grinding the mush to oil on a hand-turned stone mill – but it kept them in work.

Aziz had told us earlier that in the traditional Berber communities, women, once married, were expected to bear children as soon as possible. If, after two years no offspring was produced, they were often divorced. They were then without support and could find it only by marrying an older, widowed man.

It became a long drive, and when we arrived in Essaouira, a very strong wind was blowing in from the ocean, making walking along the shore and ancient fortifications not very pleasant. We took refuge in its *Medina*, where, among other stores, we visited one specializing in wood inlays using the root of a special tree. The work shown was exquisite in its detail and fit. It was much better than the ceramic and filigree work we had seen everywhere, which, at close distance can look rough, gaining its ornamental magnificence only from a distance.

There was one more day left. Another bus ride took us into the mountain villages of Ouirgane and Asni. Before we had lunch at our host's home, Ali, a guard at a nearby resort owned by a Frenchman, we rode off on a 45-

minute mule ride, uphill along a narrow, winding, and very much overgrown trail which, for some distance, was also the bed of a small brook. It was fun, though, and our steeds were well-behaved.

It was a 'packed' trip with memorable experiences, especially those where we were able to meet the always friendly people. The next morning Royal Air Maroc took us from Marrakech to Casablanca and from there back to New York.♦

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