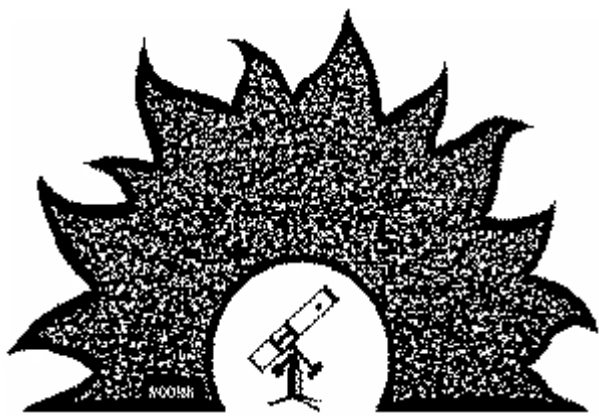




PAStimes

Newsletter of the
Phoenix Astronomical Society
www.pasaz.org

September 2006
Volume 59, Issue 1

PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948

September 7 Meeting Topic: Open Astronomy Forum

By Don Boyd

Dr. David Burstein Ph.D. will be the speaker at our September 7 meeting. He will be having an Open Forum on astronomy so, come prepared to ask questions.

His area of expertise is normal gal-

axies. Dr. Burstein says, on http://phy.asu.edu/faculty/david_burstein.php

“My goal as a scientist is to try to understand the structure and evolution of galaxies, as a means of understanding the structure and evolution of the universe. There are many things we still do not understand about galaxies and the uni-



verse at large, and much work still to do.”

This sounds like it should be an interesting night and I hope to see everyone there.



From Thunderstorms to Solar Storms...

by Patrick L. Barry

When severe weather occurs, there's a world of difference for people on the ground between a storm that's overhead and one that's several kilometers away. Yet current geostationary weather satellites can be as much as 3 km off in pinpointing the true locations of storms. A new generation of weather satellites will boost this accuracy by 2 to 4 times. The first in this new installment of NOAA's Geostationary Operational Environmental Satellites series, called GOES-N, was launched May 24 by NASA and Boeing for NOAA (National Oceanic and Atmospheric Administration). (A new polar-orbiting weather satellite, NOAA-18, was launched May 2005.)

Along with better accuracy at pinpointing storms, GOES-N sports a raft of improvements that will enhance our ability to monitor the weather—both normal, atmospheric weather and “space weather.”

“Satellites eventually wear out or get low on fuel, so we've got to launch new weather satellites every few years if we want to keep up the continuous eye on weather that NOAA has maintained for more than 30 years now,” says Thomas Wrublewski, liaison officer for NOAA at NASA's Goddard Space Flight Center. Currently, GOES-N is in a “parking” orbit at 90° west longitude over the equator. For the next 6 months it will remain there while NASA thoroughly tests all its systems. If all goes well, it will someday replace one of the two active GOES satellites—either the eastern satellite (75°W) or the western one (135°W), depending on the condition of those satellites at the time. Unlike all previous GOES satellites, GOES-N carries star trackers aboard to determine precisely its orientation in space. Also for the first time, the storm-tracking instruments have been mounted to an “optical bench,” which is a very stable platform that resists thermal warping. These two improvements will

let scientists say with 2 to 4 times greater accuracy exactly where storms are located. Also, X-ray images of the Sun taken by GOES-N will be about twice as sharp as before. The new Solar X-ray Imager (SXI) will also automatically identify solar flares as they happen, instead of waiting for a scientist on the ground to analyze the images. Flares affect space weather, triggering geomagnetic storms that can damage communications satellites and even knock out city power grids. The improved imaging and detection of solar flares by GOES-N will allow for earlier warnings. So for thunderstorms and solar storms alike, GOES-N will be an even sharper eye in the sky.

Find out more about GOES-N at goespoes.gsfc.nasa.gov/goes. Also, for young people, the SciJinks Weather Laboratory at scijinks.nasa.gov now includes a printable booklet titled “How Do You Make a Weather Satellite?” Just click on Technology.

THE STARS OF P.A.S. For Summer 2006

By Terri Finch, Prez

Each month we have a really cool collection of PAS members who go out of their way to enhance the life of children & adults with views of the night sky or information about it. Here's a few examples of how the PAS Telescope Team really made a difference this past month. These are the events YOU should have been involved in. We had quite a collection of really awesome events this past summer.

5/19 Wow Papago Park:

By Rod Sutter

WOW went off great, Chet, Sue and I had a great time. This group was a little older group, 14 -18, somewhere in that area.

6/2 Hopi elementary

By James Hopkins

I was most disappointed that it was cloudy and windy. I do feel the evening was a success though. We did get to see the moon, Saturn, and Jupiter. The children were quite excited about observing the sky and were very receptive to learning about telescopes. We may have motivated a few future astronomers last night.

The wind blew so hard you could see the dust flying in the air; and SRP flooded everything around the ball field. Unfortunately it only started to clear as we were leaving. All this aside, the children would wait eagerly in line and then run up to the telescopes when it was their turn. Everyone had an enjoyable time, myself included!

I find teaching astronomy most enjoy-

able and am always eager and ready to further the cause of education.

Everyone had a great time and the event was a huge success.

Hoping for dark, clear, non-windy nights in the future.

By Jeff DeSantis

The star party went well last night. Chet gave a long talk and demo after which I showed some deep sky images and Mike showed his meteorites. I set up an 80 mm refractor to show them a telescope. Then we moved to the field out back.

I was able to show the Moon and then Saturn fairly well through the clouds. The kids seemed to enjoy that. Rod showed the Moon, Saturn and Jupiter to the kids. I suggested a future star party in the fall when it gets dark earlier.

ASTRONOMY DAY MAY 2006

By Terri Finch, Prez

This was one large, fun, exciting event and if you missed it, I'm sorry. We started our day with the early morning shift of 7 am. Those of us with more to set up arrived early to do the setting up. It still wasn't enough time with all the delays that happened, and they let some public in early. So, we set up, inside the Arizona Science Center. We had our own little corner, in front of the I.P. Flynn Theater. 10 am rolled around and the show was on. The idea was that the people walking in would run into Ted, Ed, Steve and be directed into our little alcove where by the children would pick up a really cool Treasure Hunt page from the main table.

TREASURE HUNT TABLE: The main table consisted of Terri, Sue,

Matt, William. Terri & Sue directed them to take the page and a pencil and walk among the displays. Find the answers to the Treasure Hunt puzzles using clues from each area. Then, come back to the main table to claim the prize. Prize bags

were full of all sorts of hands outs: PAS handouts, NASA Space Place items, stuff from various other Sponsors for this event. A main Sponsor page was included in each prize bag. There were posters, games, lithographs, calendars, and it was very impressive.



Photo by Rod

Chet Schuler with his solar spectroscope during daytime viewing

SIGN IN TABLE: Matt and William, with Amanda's help, ran the PAS sign in table in which the volunteers came to get their name badges, their lunch schedule, and their assignments. Bruce was supposed to work this table but instead took my camera and came back after the day with over 150 photos of everything that went on that day. The things he photographed were amazing because most of us were in our own PAS world and didn't get to see the rest of the

displays in ASC that day, so Bruce did that for us in photos.

HANDS ON FUN: The displays



Photo by Barbara

The "universe in a different light display" was very popular

consisted of a table for coloring, for the younger participants, and they were given a prize right at that table by Disa. It also had an interactive display board, which Disa walked them through. Prizes here were bookmarks, Lithographs, coloring books, + more.

PAS TABLE: Then they continued around to the PAS info table. Bette was watching this table. We had T-shirts and dues sheets on this table plus info about the club.

TELESCOPES: The next display was run by Barbara, Scotty, and Don; the Telescope display.

First you came to a collection of telescopes set up for the viewing. Don would talk about the scopes, while Barbara walked folks through her huge display that included models of satellites we have in space, a TV running an astronomy DVD, a slew of handouts about other places to go to see astronomy related things, like Kitt Peak. This was a very awesome display.

ASK MIKE: Next to Barbara was Mike's Meteorite display. He was all set up in a corner and loving the crowd.

KIDS CORNER: Then we come to Dennis's display. Dennis had a hands on, multi activity display. He had a scope set up to view indoors, he had many toys to play with and fun stuff to

do and a demo on how a star implodes. That was very interesting. Amanda was supposed to assist Dennis with this display but wasn't feeling well, so she entertained with some belly dance moves, and helping me run errands and send messages.

LASER LIGHT DISPLAY: Next to Dennis was Dan and Roger. Dan had his laser light display. This is always an awesome display and very interactive and the kids just love it.

SPACE ART: Then we come to Dawn who had her art work all set up. She always has a super display with her sister Cassandra.

METEORITES: Bob Holmes was next and did a splendid job of keeping the kids asking questions and working with them but not give them the answers to the questions.

How the Treasure Hunt worked is that the kids would read a question, and based on what was given in the question, they would figure out what display had to do with the topic of the question, and then go talk to that person in their display. So, if the question had to do with Lasers, they'd go see Dan and talk with him, learn a little, and then be lead to, but not given the answer to the question. Each display had 2 questions that were similar, and you fill in the blanks, match the numbers below the letters and come up with an end question to the Treasure Hunt.

The Treasure hunt prizes were divided into several areas. If they answered just one question, they got Bag A which had a few prizes. If they answered most of the page, or half of the page, they got Bag B, which had more

items in it, and may have had posters. If they did the whole page but didn't get the end question answered, the puzzle question, they got Bag C which had some really cool items, plus stuff from Bag B in it. And then if they accomplished the whole entire puzzle, they were awarded Bag D which had in it a Space Place Card Game or some other really cool item, plus all the other items from previous bags. And Bag E was extra special for the kids under 5 who tried any of the questions with their parents help, or just walked around with parental help looking at all the cool displays. It was a special bag with special kid related things, and all bags had a Lithograph. We had fun making the bags. The other thing everyone who tried the puzzle got was a certificate signed by the Prez ? that's me, to go with their puzzle page showing they accomplished a certain level. In the bags were also the answers to the puzzles, given on a page. So, when they left, they



Photo by Rod



Photo by Bruce

Bob Holmes chatting about meteorites



Photo by Barbara

not only took their puzzle page with them, but they also had a bag that had all the answers there for them to receive and check their answers.

OUTSIDE SOLAR VIEWING: We also have a group of very awesome folks who withstood the heat of the day doing solar viewing with the public. Rod, Chet, Steve were outside.

This was a super successful day. Some of us started the day as early as 6 in the morning loading vehicles and driving down to ASC, staying as late as 11:30 or so, closing up and doing the evening viewing that evening viewing for the public. Sam, both Steve's, Dennis, Rod, Frank, and a slew of others made the evening observing session a great success, and then all the displays we had took so many volunteers. We had a great time, and everyone was exhausted by day's end. I thank every one of my volunteers.

Remember, this year our Volunteers got rewarded. We took some of the more astronomy related items and put them aside so that every volunteer got a prize for helping out.

Some of these prizes included eyepieces, a subscription to Slooh.com, items from Sky & Telescope, items from Dark Sky Association, and more. We had a party and awarded the prizes. Many many many thanks goes to everyone who helped out. And many thanks goes to Leah for doing the printing, making the Treasure Hunt page, and being there for advice throughout the process. I have the BEST TEAM of astronomers/friends to work with and I'm proud they are there to help.

If you didn't get involved in this year's event, come to a MOM and find out what we will be doing for next year's event. It maybe be similar, or it might be totally different and just what you want to be involved in. Thank you TEAM! Please enjoy the many photos that were taking by Steve, Rod, Bruce, Dawn, John, Don & More. This event could not have been such a success without the help of all our Sponsors, ASC for hosting this event, and our Team of volunteers.



Photo by John

Pi are square...no pie are round...just ask these people



Photo by bruce

Dennis Young setting up an artificial star for his telescope.

Three articles By Dr. Laurice Dee PH.D.

By Don Boyd

PAStimes has received 3 excellent articles by Dr. Dee, JPL Solar System Ambassador for Arizona. Unfortunately Space precludes putting them into the newsletter, however we are reviewing them and putting them onto our website www.pasaz.org on the downloads page.

The first is entitled EARTH'S NATURAL SATELLITE, and, as you might have guessed, is about the moon. The name of

the moon...or rather the lack thereof. As she points out in the article our moon is the only natural satellite that does not have a proper name

The Second article is entitled MESSENGER & NEW HORIZONS, and is about 2 new spacecraft exploring the Solar System. Messenger is headed to Mercury, and New Horizon is headed to Dwarf-Planet Pluto and the Kuiper belt.

The third article is entitled **PLUTO: PLANET OR NOT?** and is about the history of Pluto's discovery and why she thinks it should be kept as a planet. This should have been in your hands before the IAU meeting voted, but this newsletter did not come out in time for that. I still think it is worth reading as this argument does not look like it is over. The new definition raises more questions than it answers.

It is Time To Order Your Year In Space Calendar

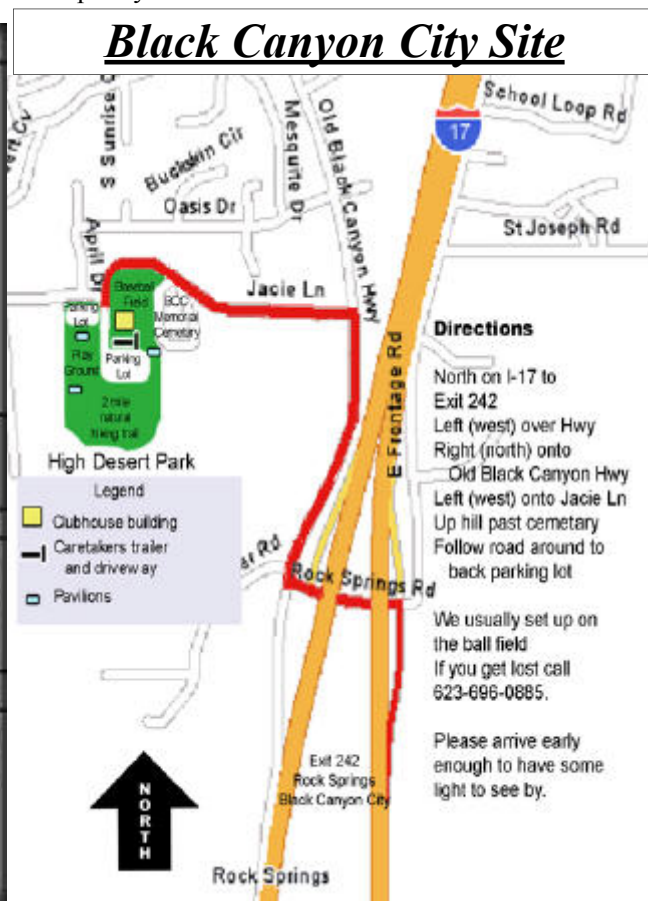
By Terri Finch, Prez

Every year I try to get a bunch of PAS members and non members to get together to purchase the YEAR IN SPACE calendar so that the end result saves each of us a couple dollars. This year is no different. Put your RSVP in with me today.

I will be collecting the money in September and October, then placing the order in November so we all receive our calendars before Christmas. Go to www.yearinspace.com and see the 2007

info. Here is the breakdown. With an order of 1 calendar, it is \$11.95, with 2-9 calendars it is \$10.95, and with 10-35 copies it is \$9.95. My goal is to get 10 copies. They have to be shipped to the same address, mine, in order to get this discount. So, be thinking about who to get a calendar for this Xmas, as well as one for yourself. These are awesome calendars with weekly photos of outer space with awesome explanation about each photo and plenty of

room to write in in each day of the week. You need to RSVP your calendar order with Terri ASAP. I'll be taking orders up to October 15th, and collecting money shortly after that. Go see the website. And if you want to see one in person, see mine at any PAS event, I usually bring it with me every time. Order your calendar today! The site isn't showing anything until Sept 1st, so visit it around that time to see what they have.



Special Star Party for the Folks from Brooklyn

By Barbara Hartman with help from Rod Sutter

I got there slightly after 7 PM, it was hot, but cooling nicely since the sun



Rod is all setup and ready to observe

was down. Steve was already there and setting up on the ball field. So I went down and got him to set up in the parking lot, explaining that we set up there now instead because it's easier than schlepping everything down the hill and the bugs aren't as bad as in the grass.

Then Rod and Sue arrived; Jim came shortly after. We all got set up and helped each other with small glitches in our equipment (mostly Rod did because electronics are pretty much beyond me).

As you know, length of twilight during the summer months is agonizingly long and so we waited for dark. Calling out "There's Vega in Lyra, there's Arcturus. Oh and there's Jupiter and Saturn and Mars". Sometime in there Joanne and Mark, the New Yorkers, arrived ready to observe.

As the sky darkened we began to view, starting with the planets Mercury, Saturn, Mars and then Jupiter. The band of the Milky Way hugged the eastern horizon and became quite evident as the night darkened. Scorpius and Sagittarius were irresistible to Rod and he

showed us many beauties through the sky glow of Phoenix with, Cyclopes, his 16" truss tube Dobsonian.

Joanne and Mark wanted to see some galaxies and Rod obliged, showing them M104, the Sombrero Galaxy in Virgo; M81 and 82 in Ursa Major and I showed them M51 in Canes Venatici. But I cannot forget the amazing view of M17, the Swan Nebula that Rod showed us using the narrow band nebula filter. It was amazing! I was busy seeing the barely visible, finding an 11th magnitude comet Tuttle-Giacobini-Kresak 41P and about a half dozen faint galaxies.

Thanks to Jim mentioning that Gamma Leonis was a double star, I used its lovely golden twin suns as my jumping off point to galaxy hop to the comet. I also found a couple of cool asterisms mentioned in Sue French's "Celestial Sampler" book (a very nice book, I got for volunteering on Astronomy Day at the AZ Science Center this year). They were the Mini Coat Hanger in Ursa Minor and Napoleons's Hat (Picot 1), near Arcturus in Bootes.

Jim showed us NGC 457, the Owl Cluster and the Perseus Double Cluster among other things in his 8 inch Dobsonian. Steve's 10" Schmidt-Newtonian, Franken-scope, was misbehaving and so I think he did most of his viewing through the other scopes there.

Dave and his wife, Karen showed up sometime after full

darkness set in. They came strictly as spectators, as Dave did not bring his scope. We saw quite a few meteors streak across the sky and one very bright yellow-white bolide that came out of the south and disappeared to the northwest. We also saw an incredible amount of satellites some that flashed the sunlight back at us as they spun. That was a little trippy, till we figured it out.

We all had some great views and good company through a night of happy skies. It was wonderful, until the third quarter moon blazed onto the scene. Rod and I decided to call it a night by then and started packing up, that was about 2:30 am. We all had a very wonderful time, and we sure showed those New Yorkers a thing or two.



Barbara standing by her "baby"



Steve Snyder is slightly out of phase in this picture

Here's what Joanne and Mark sent me in an email once they got back home:

Hi Barbara! I just want to thank you for having us join you guys last Saturday night. My wife and I really enjoyed it and we got to see a lot of great stuff,

including the Milky Way. It was a pleasure to meet all of you as well. I plan to keep in touch for the next time we head out to Arizona or, even better, if we move there. If you head out to New York

please send me an email. Thanks again, Mark and Joanne Baratta

Jupiter's 'Big Brother' Has Moon-Forming Dust Disk

Submitted by Matt Kohl

Astronomers have discovered a dusty disk around the 8-Jupiter-mass object called 2M1207B. That disk eventually may form one or more moons like those orbiting the giant planets of our solar system. As seen from Earth, 2M1207B lies in the constellation Centaurus, which is also home to the peculiar galaxy NGC 5128 shown in the upper left of this image. Credit: David A. Aguilar (CfA)

Earth's Moon was created by an early collision with another large planetary body. It was a "chip off the old block." Mars captured its asteroidal moons as they passed by. But Jupiter made its own moons out of dust and gas remaining from its formation. Now, observations by astronomer Subhanjoy Mohanty of the Harvard-Smithsonian Center for Astrophysics (CfA) and his colleagues provide the first direct evidence for a dusty disk around a distant planet that in mass would be Jupiter's "big brother."

"It is quite possible that moons or moonlets could form out of this disk, just as they have around the giant planets in our own solar system," said Mohanty.

Mohanty presented the discovery today in a press conference at the 208th meeting of the American Astronomical Society. Other members of the team are Ray Jayawardhana (University of Toronto), Nuria Huélamo (ESO) and Eric Mamajek (CfA).

The team studied a planetary mass object known as 2MASS1207-3932B, which is located about 170 light-years from Earth in the direction of the constellation Centaurus. 2M1207B, as it is abbreviated, orbits a tiny brown dwarf star at a separation of about 40 astronomical units, or 3.7 billion miles - comparable to the size of Pluto's orbit. That separation is much larger than typical for binary brown dwarf systems. The wide separation may indicate that the duo formed in relative isolation, far from passing stars that could have pulled them apart.

"This system probably won't survive for long. It won't last 5 billion years like our solar system has," said Mamajek. "All it would take is for a more massive interloper star to come along and yank the planet away from the brown dwarf."

Observations by Mohanty's team showed that the brown dwarf has a mass of about 25 Jupiters and a temperature of 4100 degrees Fahrenheit (2600 K). Its companion 2M1207B weighs about 8 times Jupiter and has a temperature of 2400 degrees F (1600 K). Both objects are warm due to their young age of 5-10 million years, having retained the heat of formation.

Given those temperatures, the team then calculated the expected brightness of both objects. The brown dwarf matched predictions but its companion was about 8 times fainter than expected. After examining several potential causes, the team concluded that the only plausible explanation was the presence

of an edge-on dusty disk that blocked most of the planet's light. The planet is seen only in light scattered from the disk.

Spectral analysis shows that 2M1207B is a gas giant like Jupiter with no solid surface. As a result, it would be a poor abode for life. Any moons that might form around it, however, could prove more hospitable.

The large mass of 2M1207B relative to the brown dwarf star poses a puzzle for planetary formation theories. Typical planets like those in our solar system are less than one-hundredth the size of the central star. In contrast, 2M1207B holds one-third as much mass as the brown dwarf.

"Mass ratios of that size are more typical for binary stars than for planetary systems," said Mohanty. "2M1207B probably formed like a star, together with the brown dwarf, rather than from core accretion like giant planets around other stars."

Mohanty and his colleagues plan to study the polarization of light from 2M1207B in order to investigate the inclination of its disk as well as the size of dust grains within the disk. Further studies await the next generation of large telescopes, such as the Giant Magellan Telescope and the Atacama Large Millimeter Array, which may be able to detect directly the disk around the planetary mass companion.

Source: Harvard-Smithsonian Center for Astrophysics

CAPTAIN'S LOG

By Terri, Prez

Welcome back to another year with PAS. This year promises some really awesome speakers at our general meetings. Bring everyone you know & see what we have planned! We

have several new ideas we are trying out this year. You'll have to visit our website for planned event info, or come to the next Meeting of the Minds & discover the new stuff that way. Input is always welcome, & so are you! We'd like to see more of

you at more of the events throughout the year. The more the merrier, & we all love to good party. Bring your scope, your family, your friends, & your neighbors. We will see you there! ***

Under New Editorship

By Don Boyd

Don't you just hate to see this sign "Under New Management?" Whether it is your favorite restaurant or a store, or even a newspaper, you know that things will change. That being the case this publication will not be the exception. I have listened to comments from readers and the past two editors (Terri Finch (from 1993 to 2005), and Dan Heim (2006)) and incorporated the best of all of them along with my own style. I am open to suggestions, and would love to hear from you on the layout and content of the newsletter.

The first thing most people will notice is the change to the masthead (the first headline that has the name and edition of the paper). I changed the font of the Letters PAS to the font used on the letterhead the club uses for official letters and I added some color to the fonts. The second big change is the margins. I narrowed all of them and added a gutter to make the inside margin larger than the outside margin. White space is good but too much is just as bad as too little. On that subject, I have also put a slight indent on all paragraphs, as this is standard practice in English writing. I am going to use three columns for the most part, as I think it is easier to read.

I asked Terri to keep her column, The Captains Log, and she will also be doing the review of the last

month's meeting. I will usually do the preview of the upcoming speaker. And this will probably be the only article by me in the newsletter.

Please be patient with me as this is the first newsletter I have edited and I know I will make mistakes.

A limerick about Edmund Halley

From the public, his discovery
brought cheers.

From his wife, it drew nothing but
torrents of tears.

"For you see," said Ms. Halley,

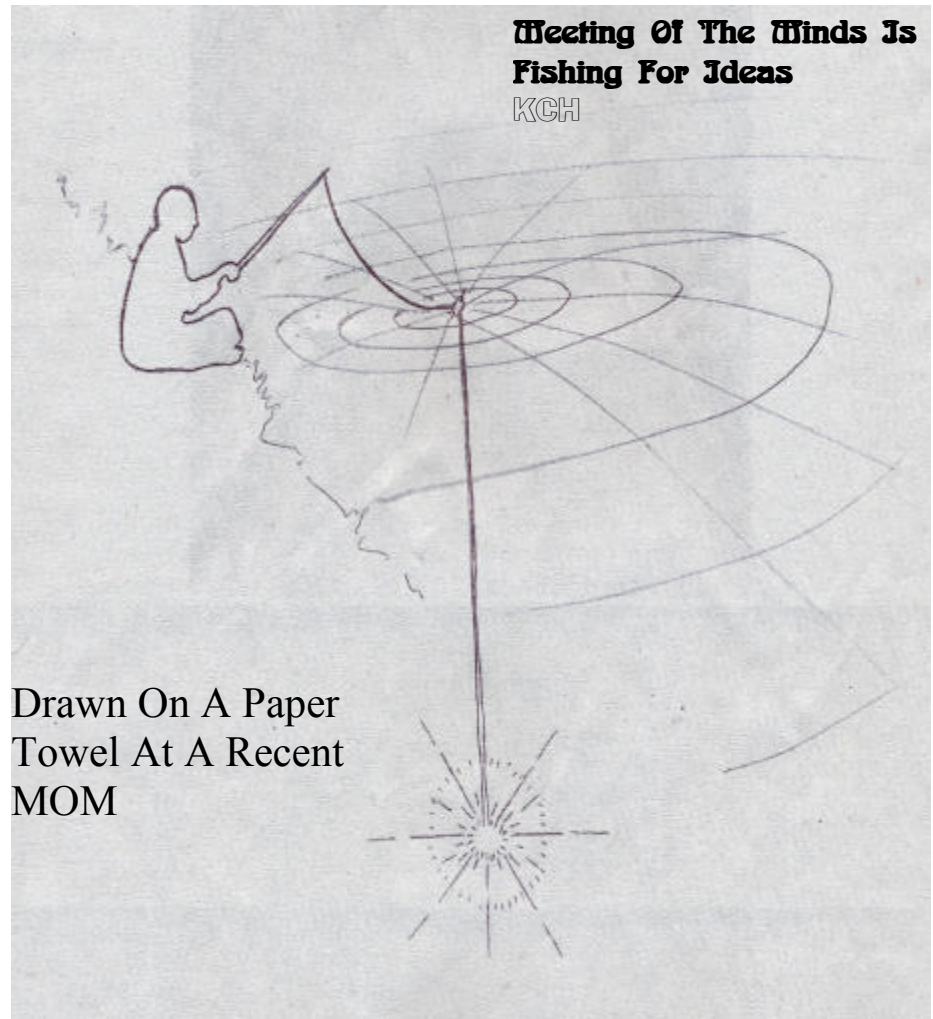
"He used to come daily;

Now he comes once every 70
years!"

**Meeting Of The Minds Is
Fishing For Ideas**

KCH

**Drawn On A Paper
Towel At A Recent
MOM**



KCH Cartoon is © Kevin Harcey and may not
be reprinted without permission of the artist.

September 2006

Mon	Tue	Wed	Thu	Fri	Sat
August	29	30	31 <u>PAS/PVCC Public Star Party</u> Paradise Valley Comm. College 6:00 to 10:00	1 <u>PAS Adult Night Out</u> Shallow Sky Public Star Party 6:00 to 10:00 PM	2 <u>Moon Crash Party</u> At Mike's. Mem- bers only. RSVP with Mike for map
4	5	6	7 <u>PAS General Meeting</u> Speaker: David Burnstein, ASU: Topic: A Forum: Astronomy and As- trophysics "Open Astronomy Forum" 700PM	8	9
11	12	13	14 Deadline for submis- sions to October newsletter	15	16 <u>3rd Quarter Moon Star Party</u> High Desert Park Black Canyon City. Sunset to whenever. Weather permitting! RSVP with Barbara
18	19	20 <u>PAS School Star Party</u> Amberlea Elemen- tary School. RSVP with Terri 7:00 to 8:00 PM	21 <u>PAS Meeting of the Minds</u> Paradise Valley Comm. College 7:30 PM	22	23 <u>PAS Deep Sky Star Party</u> High Desert Park Black Canyon City. Sundown til ? All are Welcome! RSVP with Barbara
25	26	27	28 <u>PAS/PVCC Public Star Party</u> Paradise Valley Comm. College 6:00 to 10:00 PM	29	30

For more details and the latest information please visit the events page of our website

www.pasaz.org

Ads in PASTimes

Ads in PASTimes run for a month and may be renewed on a month by month basis, if submitted by deadline, space permitting. Ads in PASTimes are FREE to members all others are asked to make a small donation. Donations are to be sent to the Editor who will forward them to the Treasurer.

For sale: 15" f4.5 Obsession Telescope, 5 years old, by original owner. 10 hours viewing time and has been stored indoors. The mirror is a Nova and has the enhanced coating. Included is the light shroud, wheel barrow handles, 12 volt cooling fan with self contained power source, aperture mask for lunar/planetary viewing and a kevlar sling.

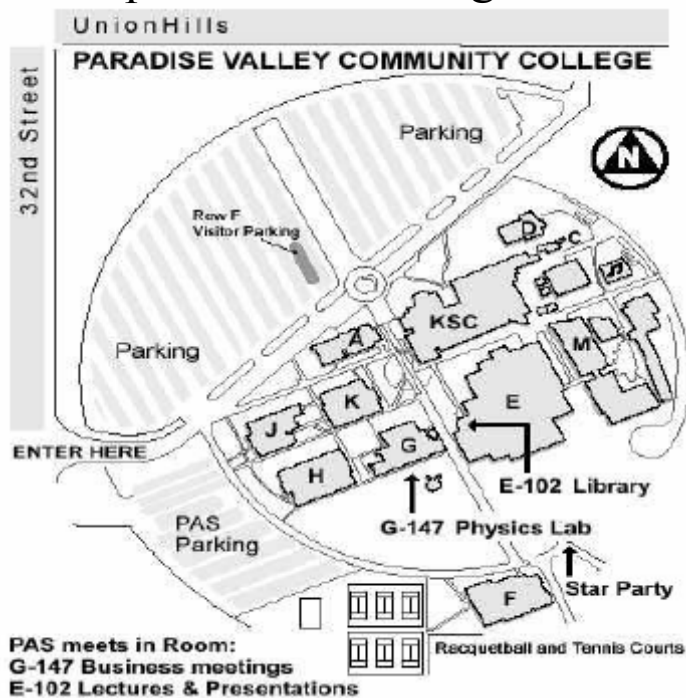
This scope is very easy to setup and use. It can be setup in 10 minutes and collimated in another 5. I am selling the scope because of a new found interest in designing and building scopes. \$3000.00 firm local pickup only. John Mitchell Peoria, Arizona 623-815-2321 (evenings)

Don Boyd PASTimes Editor
701 W. Del Rio St.
Chandler AZ 85225

To:

PAS is incorporated in the state of Arizona as a non-profit, scientific and educational 501(c)(3) organization. Our newsletter PASTimes is published monthly from September to May and distributed by USPS and the Internet. All Issues are available for download on our website www.pasaz.org. Ads for astronomy equipment are provided as a courtesy to sellers and buyers, and do not constitute any endorsement by PAS.

Map To PAS Meeting Location



September 2006

Sunrise: 6:10

Sunset: 6:30



Q1: August 31



Full: September 7



Q3: September 14



New: September 22

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