BPAA Newsletter

Battle Point Astronomical Association, Bainbridge Island, WA

ISSUE 52: SEPTEMBER-OCTOBER 2002

SEPTEMBER-OCTOBER-NOVEMBER CALENDAR

(Unless otherwise noted, all events are at the Edwin Ritchie Observatory, Battle Point Park)

September

September 4: BPAA Board Meeting 7 p.m.
September 5-8: Mt. Bachelor Star Party, Mount Bachelor, Oregon info@mbsp.org
September 6: New Moon 8:10 p.m.
September 6 – 8: Royal Astronomical Society of Canada (Victoria chapter) Star Party
http://victoria.tc.ca/%7erasc/RASCStarparty/rascstarparty2002.html
September 11: Member Meeting 7 p.m. Harry Colvin
September 13: First-quarter Moon 11:08 a.m.
September 14: Star Party Battle Point Park. Beginner session 7 p.m. Paul Below & Bruce Muggli
September 15: Observatory tours 2 to 4 p.m. Gena Ritchie
September 18: UW Campus Observatory Public Viewing Night 7 p.m.
September 21: Full Moon 6:59 a.m.
September 22: Jupiter's Moons Io, Europa, and Callisto tightly aligned 6:33 a.m.
September 23: September equinox
September 25: Venus at greatest illuminated extent (26 percent sunlit)
September 29: Last-quarter Moon 10:03 a.m.

October

October 2: BPAA Board Meeting 7 p.m.
October 6: New Moon 6:21 a.m.
October 9: Member Meeting 7 p.m. Harry Colvin; Draconids Meteor Shower Peak
October 12: Star Party Battle Point Park. Beginner session 6 p.m. Paul Below & Bruce Muggli
October 13: Observatory tours 2 to 4 p.m. Gena Ritchie; First-quarter Moon 2:47 p.m.
October 16: UW Campus Observatory Public Viewing Night 7 p.m.
October 21: Orionids Meteor Showers Peak; Full Moon 5:41 p.m.
October 26-27: Daylight Savings Time ends
October 29: Last-quarter Moon 10:29 p.m.

November

November 3: Taurids Meteor Shower Peak
November 4: New Moon 6:38 a.m.
November 6: BPAA Board Meeting 7 p.m.

(Cont. on p. 2)

November 8-9: Imaging the Sky 2002, Salem, Oregon
November 9: Star Party Battle Point Park. Beginner session 6 p.m. Paul Below & Bruce Muggli
November 10: Observatory tours 2 to 4 p.m. Gena Ritchie
November 11: 430th Anniversary, Tycho Brahe's Discovery of Supernova 1572; First-quarter Moon 1:55 p.m.
November 13: Member Meeting 7 p.m. Harry Colvin
November 19: Leonids Meteor Shower Peak
November 20: Full Moon 4:57 p.m.; Lunar Eclipse
November 26: Last-quarter Moon 10:48 p.m.

Calendar Notes:

Summer proved to be great for viewing, providing much needed opportunites for stargazing after a dismal Spring. Here's hoping Autumn will afford us some good opportunities as well. The long evenings in Fall are a definite advantage, providing several extra hours of darkness for investigating the night sky.

Cassiopeia, with its distinctive W-shape, dominates the Autumn sky. The great square of Pegasus is also prominent. Use the right side of the square to form a sight line south to Fomalhaut, a first–magnitude star near the horizon. Use the left side to aim down to Diphda, a second-magnitude star in the constellation Cetus.

Next door is the constellation Andromeda, whose stars angle up to the northeast. Andromeda contains the only galaxy similar to the Milky Way Galaxy that is visible to the unaided eye. The Andromeda Galaxy is a faint fourth-magnitude smudge, the most distant object that can be viewed naked eye. This hazy patch is so remote that the combined energy of its 500 billion stars barely produces a detectable image in the eye.

Our Star Parties in October and November will begin at 6:00 p.m. to take advantage of those extra hours of darkness. Other Star Parties may be scheduled at any time via our email yahoogroup. Any member who plans to observe can invite others to join in by sending an email to bpaa@yahoogroups.com. To join our email group, send an email with your name to bpaa-owner@yahoogroups.com and we can enroll you. If you want to also have web access to the messages and files, you can join the yahoogroups by clicking the register link for new users on http://groups.yahoo.com/, and then you can request to join our group on this page: http://groups.yahoo.com/group/bpaa/. The system will send us a message, and we'll approve your request after we verify your membership.

Diane Colvin (dcolvin@bainbridgeisland.net)

NEWS BRIEFS

LIGHTS DOWN – THE SHOW CAN BEGIN

The Bainbridge Island City Council has approved a lighting ordinance for the city that BPAA's President Paul Below has been working towards for several years. This will improve the darkness of the sky for star watchers at the Observatory and around the Island. On August 14 the Council voted to forbid the "light trespass," meaning any light shining directly beyond the owners' property, or indirectly with a brightness greater than a 60-watt bulb at 25 feet. Lights must be shielded and pointed downward.

In doing so, Council members noted that it was a win-win move: Not only will it save us all money; it's also what the city wants.

While the ordinance does not go into effect until January 1, 2003, the Council has directed the city to conduct a program educating people on their new responsibilities.

Congratulations, Paul, on your successful campaign. Anna Edmonds

BOOK RECOMMENDATION

Seeing in the Dark: How Backyard Stargazers Are Probing Deep Space and Guarding Earth from Interplanetary Peril by Timothy Ferris is highly recommended both by the *New York Times* Book Review Section and *Scientific American* as a book that gives glimpses into what kinds of people amateurs are and why they are so dedicated. Look for it to be at the library shortly.

ASTEROID PASS

Asteroid 2002NY40 passed safely by Earth on the night of August 17-18 at a distance of approximately 524,000 kilometers (326,000 miles), about 1.3 times the distance from the Earth to the Moon. The digital movie of it that Brandy Helfin and Bing Zhao of Yale University made (more or less by accident while they were working at the Kitt Peak Observatory), can be found on this link:
http://www.noao.edu/outreach/press/pr02/pr0207.html
Take a peek, it's pretty cool. Paul Below

BI PARK NATURE CAMP VISIT

The Bainbridge Parks Nature Camp for kids visited our observatory on August 16. After an introductory night sky talk and QA session, about 10 kids plus some parents viewed the moon through the Ritchie telescope. Dave Warman set up a video camera on the Moon through his telescope, and I used the Club's 6-inch scope to show Alberio and M13. Paul Below

GIRL SCOUTS VISIT OBSERVATORY

On August 8, 2002, the BI Girl Scout Camp visited the observatory. There were 24 scouts plus about 4 adults in attendance. The scouts each made a planisphere, and then looked through telescopes. The weather was clear and warm.

Assisting with the indoor activities were Diane Clouser and Catherine Koehler. Operating the Ritchie Telescope (and providing magnificent views of M13, the great globular cluster in Hercules) were John Rudolph and Dan Caster. Those that brought their personal telescopes were Bruce Muggli, George McCullough, Dave Warman, and Paul Below. The scouts viewed double stars, clusters, and planetary nebula.

A handful of early Perseid Meteors were spotted. Through the Ritchie telescope, individual stars were observable all the way across M13. The scouts were an active bunch, and had a memorable evening.

Outdoors, we showed the scouts how to find the North Star.

One scout, when offered the opportunity to view the Dumbbell nebula, informed me that it was a planetary nebula caused by an aging star expelling gas and turning into a white dwarf(!) She told me she was going to be a 5th grader next year, and that astronomy was her favorite subject. Amazing. Paul Below

IT'S "ONE CALL FOR ALL" OF US

The Bainbridge Foundation annual drive is coming up in October. This is a community-sponsored, once-a-year activity. Except for paying for paper and mailing, all the contributions to the Foundation are distributed every year to the participating agencies. There are no salaries paid, and the only investments are those distributed as designated by the donors to the listed non-profit organizations.

Battle Point Astronomical Association is one of more than 75 such organizations that derive a significant amount of their income from the Bainbridge Foundation. For BPAA, this helps pay for our work on the telescopes and for our running expenses. (The cost of the *Newsletter* is covered by members' dues.) Without it we would have to be conducting our own drive and asking you for money with every publication; with it we can be a public service to the community.

The Bainbridge Foundation is a service not only to the Island non-profit organizations but also to all the Island residents. It is efficient; it is inclusive, and it saves us both from having to conduct our own drives and from having to respond to each other's drives off and on all year.

Tell your friends. Give yourselves. Please help us support the Bainbridge Foundation. For one. For all!

Anna Edmonds

REP0RTS AND ARTICLES

PROGRESS ON THE 27.5" RITCHIE

By John H. Rudolph, BPAA Facility Director

As has been announced several times previously, our collective resolution for 2002 has been to bring the Ritchie 27.5" Newtonian telescope up to perfection. The optics of this instrument (thanks to Bob Mathews and the late Ed Ritchie) are outstanding in light gathering capacity and resolution. As earlier reported, there were vibration problems. These have been addressed and we are now very close to our goal of being able to use the instrument for serious imaging.

Gross vibration was caused by inadvertent connections between the support tower and the concrete building. This was corrected early in the year by some low tech Count of Monte Cristo-inspired work that removed grout, mortar and Styrofoam connections. After this, we focused on the Right Ascension and Declination drive units. One item after another was discovered and corrected, mostly by Dan Caster. We are now down to what we hope will be the last of a long line of improvements and adjustments.

To summarize the last two months' work in July and August, we rebalanced the telescope in both the RA and DEC axes, trued up the eccentric RA worm gear, polished the dovetail slide, aligned the worm with the driven bronze gears, enlarged and smoothed the (Cont. on p. 4)

compression spring receiver, then set up first the videcon and later the CCD camera to project the image of Vega on monitors so the movements of the enlarged image could be examined for gross and minute movements. We found that there was some vibration from the stepping motor and a periodic wander from the eccentric worm gear. The first was improved by re-exchanging the RA and DEC gear boxes and changing the computer so that the drive motors were again in parity. The second problem seems to necessitate purchasing a commercial worm to replace the RA worm drive gear. This is now in process.

These improvements have allowed us to use the instrument to provide stunning eyepiece viewing of both the moon and M13. On Aug 8, a group of Girl Scouts camping out at Battle Point Park, found the image of M13 to be, "awesome, cool, really wow" and other contemporary remarks taken to be enthusiasm. "How far is it?" was asked. I was too embarrassed to say I didn't know, and guessed at 200,000 light years. Wrong! 22,700 light years is the correct answer. Well, that's only off by a factor of 10. The next question was, of course, "how far is a light year?" I told them to do the arithmetic. Never having done it myself, I did it the next day. 5.87831 trillion miles is one light year. One should memorize this figure for future encounters with inquisitive youngsters. I can't wait! We are certainly gaining some young enthusiasts as it was noted that several girls went around again and again to the end of the line to be able to look through the eyepiece "just one more time, oh, please!" Astronomy does have its rewards. Not one viewer touched the telescope, probably because we announced firmly to each group that we had three rules, (1) Don't touch the telescope, (2) Don't touch the telescope, and asking if they knew what (3) was, we usually got a chorus of, "Don't touch the telescope!"

A new finder scope with a right angle eyepiece was purchased and attached to the 27.5" that gives much easier locating ability. It replaces the Ritchie finder scope and makes the 90mm unnecessary. It has been removed, making it safer to move both the dome and telescope. This can become one of our loaners when mounted on one of the several surplus tripods on hand. The Red Dot Finder was left on for gross locating.

The August 17 Star Party proved the efficacy of all our improvements. About 50 persons came up and were impressed with the image of the limb of the moon. People kept coming up and we were prevented from closing down more than once to accommodate the very impressed "customers." We mounted the BPAA 35mm camera in the remote focuser and took three exposures of the limb of the moon. The camera then quit probably due to faded batteries. So I inserted the high power eyepiece and pressed my own 35mm camera against the eyepiece, focused the camera, matched the wands and took two photos with the last two frames on the roll. It will be interesting to see how these turn out. Next time, this very amateur astronomer will be better prepared.

In summary, while we cannot claim complete victory over the gremlins, we feel that with a little more persistence, and a new worm gear, we should be able to reach our goal. Perfection is always acceptable.

ASTROBIOLOGY – Life Under the Seafloor
By Bill O'Neill

Before my train of thought was interrupted by that exciting news I described in the last issue about the evidence for a lot of water frozen just beneath the surface soil of Mars, I had planned to write a bit about life under the sea - in particular, life beneath the floor of the sea. During the past Spring term at UW, I had the privilege of auditing an oceanography course about life at the liquid-solid interface of the seafloor – the benthos, as such bottom dwellers are known collectively. Those critters live on and in the sediment that has recently fallen from the sea above and from run-off near the continents. More appropriate for this column, which concerns the possible characteristics of extraterrestrial life, I thought I'd try to summarize some of what's known about organisms that inhabit the subseafloor deep beneath the sediments where most benthic creatures creep and dig. Subseafloor organisms are more akin to the deep subterranean microbes that I wrote about in the May-June issue. The name given to this (Cont. on p. 5)

netherworld is the deep biosphere. Literally, such life exists under enormous pressures.

One perspective of the deep biosphere is obtained from hydrothermal vents like those that John Delaney illustrated in his lecture here last April. These occur along mid-ocean sites of seafloor spreading, where new crust is being formed and hot dissolved minerals precipitate to form towers known as "smokers." While the smokers certainly are surrounded by unusual life forms, whose food chains derive from chemical energy and are not linked to the solar photosynthesis most life depends upon, those more obvious organisms are not the aspect of the deep biosphere with which we're concerned here. The few times that Delaney and his colleagues have been able to observe new eruptions on the seafloor, large quantities of organic matter were ejected along with the expected inert material. The earth's crust surrounding these regions is riddled with cracks, and seawater permeates deeply into this deep subsurface fracture zone where it becomes heated, then percolates vigorously back to the seafloor. At recently-formed vents, before a new ecological community has had time to become established, a virtual "snow storm" of organic particles (presumably derived from microorganisms that previously lived within the underlying rock) is observed to accompany the ejected inorganic solids, solutions and gases. DNA gathered from the emissions of such vents is being studied by researchers at UW and elsewhere. Both DNA and intact microbes, detected by fluorescence, turn out to be most abundant in the effluent from those smokers that emit hotter fluids, which probably tap deep subsurface fracture zones most directly.

The second approach to exploring the deep biosphere involves boring into the seafloor directly, as has been done over the past 15 years in the Ocean Drilling Program (ODP) and the Deep Sea Drilling Program (DSDP). Microorganisms have been recovered from depths as great as half a mile below the seafloor. Like other microbes buried more than a short distance in marine sediments, they probably use sulfate, a universal constituent of seawater, to oxidize their nutrients, because no free oxygen is available. There is evidence that they respire 10,000 times more slowly than bacteria that inhabit the earth's surface. Samples of 15-million-year-old volcanic glass recovered from beneath 1200 feet of sediment, where the ambient temperature was about 40°C, show thin, irregular channels (1 mm diameter, 20-40 mm long) that appear to have been created by microorganisms capable of digesting the basalt.

Although the concentrations of organisms dispersed in deep submarine niches are far lower than those in more hospitable environments, the volume of such environments has given rise to estimates that the deep biosphere accounts for between ten and fifty percent of the biomass on earth.

Mad Cows and Dust Devils: A Report on the Mt. Kobau and Oregon Star Parties

By Harry Colvin

The first leg of our 1,200 mile star trek began with a drive on Highway 2 crossing the Cascade Mountain Range, then following Highway 97 paralleling the Columbia River, before turning due North to the extreme northern tip of the Sonoran desert and the resort town of Osoyoos, British Columbia. The Canadian border guards asked what our business was in Canada and I told him we were in search of dark skies. This was not a good answer, and we spent the next five minutes explaining why it was necessary to bring so much stuff into Canada, and promising that we had no plans to sell any of it while there.

Osoyoos is in a beautiful setting by Lake Osoyoos, carved by glaciers during the last ice age. It is an active fruit and grape production area, and in some ways reminds one of valleys in central California. It was Friday night and the permit for the Mt. Kobau Star Party did not begin until the next day, so we stayed in the town of Osoyoos that night. After dinner, we were struck by the absolute black skies, even in town. The next morning, however, the black skies did not turn blue as expected, but were a dark gray, as low pressure moved into southern British Columbia. Before going up the mountain, we had time to visit a desert preserve just north of town, and learned about the plants, critters, and ecology of the Sonoran desert, which covers a large portion of the western U. S. and Mexico and a small portion of southern British Columbia. Before our trip was over, we would become very familiar with this desert, a kind of "in your face" experience, as well as in your sleeping bag, your tent, your car, or on your mirror, etc.

The drive to the Star Party site began 7 miles north of town, on a dusty, bumpy, 12-mile wash-board road up to the 6,200 foot summit of Mt. Kobau. The views from the summit were outstanding (as long as you observed downward), with the valley, Lake Osoyoos, vineyards and orchards stretching north and south. The Mt. Kobau Star Party site is fairly small, and the number of participants generally does not exceed 200. After getting a weather report, we set up our mountain tent but not our scope. Observing was just not in the cards.

After sunset, we found that we were not welcome at the site, nor were the other astronomers. Cows started emerging from the woods, below us and also above us. They wanted to get together for the night, (Cont. on p.6)

and we were separating two parts of the herd. The bovines were clearly not pleased with the invasion of their mountain realm and became extremely vocal. Bearing in mind that most large mammals don't care for me, I retreated to the safety of our SUV, which has both front and side impact airbags. Things just went downhill from there, as black clouds rolled in, and the wind became very cold. We managed to spend a comfortable night in the mountain tent, but dawn came with gray skies and an even colder wind. The forecast was for more of the same, through Tuesday. It was Sunday morning and we decided to drive south 550 miles to Indian Springs in Oregon in search of black clear skies.

We pushed on to Prineville, knowing that the Oregon Star Party (OSP) permit could be cancelled at any time because of all the forest fires in Oregon. The final leg to Indian Springs included a number of sheep herds, guarded by large scary white dogs, more scary even than the mad cows previously encountered. Smoke from fires burning to the south caused a bluish gray tint in the air and if things were not gloomy enough, black cumulus clouds seemed to be building when we arrived at the site around 5 p.m. It was Monday, the beginning of the permit period for OSP. We arrived very early, the 2nd party there. The site is excellent, with views to the horizon in every direction and plenty of parking. Now the bad news. This is the Sonoran desert continued, complete with hot days, cold nights, dust, wind, and sage bushes (a.k.a. known as dammit bushes, because that's what you say when you trip on them during the night). No cows, but plenty of coyotes howling.

The next morning things began to look better. The rain had settled the dust, the wind had died, and the porta potties arrived. The tent crew raised the big meeting tent, anchoring it with 50 gallon barrels filled with water. The forest service rangers came by to make sure that the Level III fire prevention rules would be enforced. Then the smoke began clearing. All during the day there was a steady procession of astronomers arriving and setting up. Finally, after a beautiful sunset, it finally happened: DARK CLEAR SKIES! First Venus and a thin sliver of the moon with its earth glow, then the Summer Triangle, the Dipper, Polaris, and Arcturus. All seemed brighter somehow. By 11 p.m. a cloud appeared, but it was a cloud of stars, the Milky Way, with more detail than many of us had ever seen. Magnitude 6 to 7 stars were easily visible naked eye and looking through a finder revealed so many stars that star hopping was actually made more difficult. I worked the Herschel 400 list all night until things "washed out" with the morning light. Using the 10-inch Dob and a 35-mm eyepiece I located and logged 18 assorted galaxies, clusters and planetaries, all without the use of averted vision, a common tool in Seattle's light polluted skies.

Wednesday the espresso vendor arrived, and just in time. Getting sufficient sleep is a challenge when one crawls in the sleeping bag at 5 a.m. and by 9 a.m. the tent is at least 90 degrees and climbing. So triple tall mochas are almost as essential as the five layers of clothing required when the temperature drops into the low 40's and even 30's. Wednesday's sunset was beautiful as expected, and shortly thereafter we witnessed a spectacular Iridium flare, lasting at least 5 seconds before fading. Then came the ISS fly-by, 250 miles above. I tried tracking it with my Dob but it was moving too fast. The night's viewing was just as fine as it was the previous night, and I began the Ursa Major Herschels, mostly galaxies with magnitude 11 to 13. Later Ursa Major got too low and I began to explore the little known and elusive Camelopardalis constellation. It is just to the left of Perseus and is outlined with stars maginitude 6 to 7. Star hopping to locate the Herschels was extremely difficult because the view thru the 6 x 30 finder presents one with a field of view saturated with stars of magnitude 5 to 6. I spent over an hour finding one Herschel. I packed it in at 4:30 a.m., exhausted but with another 18 Herschels logged.

The OPS officially began on Thursday and by early morning the shower truck arrived. What a wonderful invention! And by early afternoon the food vendor was open for business with my favorite gut busters on tap. After dehydrated meals since Monday, I was in heaven. The lecture series started and as always at the OPS it was excellent, with topics ranging from adventure observing trips to Australia to cosmic sea ripples. Thursday night was another winner, viewing-wise. I worked Herschels until about 1 a.m., when I began to notice that my platform was not tracking. But I managed to log another 17 Herschels from several constellations including Perseus, Scorpius, Aquila, and Sagittarius.

By Friday morning after another 4 hours of sleep, things were in full swing, with a swap meet, more lectures, and the telescope walk-about conducted by Mel Bartels. The walk-about is always a highlight of the OSP. The telescope construction techniques are cutting-edge, and the scopes are openly evaluated in a quest to find out what works and what does not work. This walk-about also included an up-close and personal view of a large dust devil. It was a funnel dust cloud about 50–100 feet across, filled with papers and other stuff that it had picked up after hitting several scopes and tents, including the Registration tent.

Tom Osypowski of Equatorial Platforms sold me a

(Cont. on p. 7)

replacement motor controller for my platform so I was back in business by sunset and again was rewarded with another night of excellent viewing. This evening we took a tour of the big Dobs. The highlight was the Veil Nebula in Tom's 22 incher. He focused in on the waterfall area and the detail was breathtaking. After the tour, I logged another 20 Herschels before turning in.

Saturday morning promised another clear night. Five in a row! The Perseids meteor showers were near peak and very rich. I spent the night finishing up the Herschels in Scorpius, Taurus, and Serpens Caput, logging a personal record of 25 before retiring when the skies washed out around 4:30 a.m. Saturn and its rings were as stable and detailed as I ever recall.

Sunday a.m. was the official end of OSP but about 50 of us decided to stay another night to observe the Perseids. In the afternoon, the wind picked up and the dust devils came at us with a vengeance. Some of us threw rocks at them, which proved to be somewhat effective. But around 3 p.m. we were hit again by one which this time ripped the awning off our vehicle, threw stakes about and nearly impaled Diane. About 5 p.m. it clouded up for awhile, but by 9 p.m. it had cleared. Another near perfect night, and the Perseids were worth the wait, averaging about 1 per minute for several hours.

The OPS is a well-run, excellent event in a great observing site. If you have time for only one major star party, this is the one you can't miss. But be prepared for temperature extremes, dirt and grit, and the infamous dust devils of the Sonoran Desert.

NASA's SPACE PLACE COLUMN

NASA is asking astronomy clubs across America to participate in their monthly Space Place column program. Accompanied with high-quality graphics, this column is offered free to the clubs for use in their newsletters.

NASA created the Space Place program to give the public the opportunity to explore the space program's technological advancements and delve into its discoveries. Attached below is an article from this month's column. The column includes varied topics from all of the areas within NASA -- planetary exploration, of course, but also observing earth from space, and even spinoffs from space -- as the column below highlights.

In addition, The NASA Space Place program has two Web sites aimed at children but equally fun and educational for adults. They invite you to explore these web sites at http://spaceplace.nasa.gov or the Spanish version at http://spaceplace.nasa.gov/espanol.

What Space-age Inventions Have You Touched Today?

Exploring space is not easy. Space engineers and scientists have invented many new devices to make it safe and not too expensive to go into space. Some of the inventions are used to help humans live in space. Showers and toilets that work without gravity are examples of inventions used on the Space Shuttle and International Space Station. Other inventions are used on spacecraft going to Mars and beyond.

Many devices invented for space are also very useful right here on Earth. New inventions or new uses for things invented for space are referred to as "spinoffs." For example, special materials were developed for space suits to protect astronauts from the harsh environment of space. These same materials are used in the special clothing that fire fighters wear to protect them from the harsh environment of a building on fire! Cordless tools were invented for the Apollo astronauts to use on the moon. Cordless drills and vacuum cleaners are examples of spinoffs from these inventions.

Doctors can now take amazing images of people's insides to find out exactly what is wrong with them. These images are possible because of technology developed to process pictures from space. And what about the TV satellite dish you may have on your roof? Space program technology helped to make those pictures and sounds crisp and clear.

If it weren't for the space program, some of these incredible inventions might never have come about! Find out about more space program spinoffs at http://www.sti.nasa.gov/tto/ and share the fun of spinoffs with kids by playing the Memory Game at The Space Place, http://spaceplace.nasa.gov/spinoffs.htm/ .

The Space Place is a web site for children with fun and educational activities and facts related to many of NASA's space missions. This article was provided by NASA's Jet Propulsion Laboratory, managed by Caltech in Pasadena.

NOTE; Watch the local Kitsap County newspapers and our website, http://bicomnet.com/ritchieobs/ for announcements of upcoming Member Meetings with speakers and their topics. Special Star Parties are announced through bpaa-owner@yahgoogroups.com (see p. 2 for more information on joining BPAA's email group).

Financial Statement for July 2002

BALANCE SHEET:	**$**	
Current Assets	15,501	
Fixed Assets	242,314	
Total Assets	**257,815**	
Liabilities	-0-	
Equity	257,815	
Total Liability/Equity	**257,815**	
PROFIT & LOSS:	**$ July**	**$ YTD**
Income:		
Contributions	50	4,411
Membership Dues	25	2,040
Other	30	1,599
Total Income	**105**	**8,050**
Expense:		
Administration	35	1,442
Program	29	2,123
Utilities	46	554
Total Expenses	**110**	**4,119**
Net Income (Loss)	**(5)**	**3,931**

Eric Cederwall, Treasurer

IN THE WINK OF A STAR

By Anna Edmonds

At about 2,400 light-years distance and located in a cluster of young stars called NGC 2264 in the winter constellation of Monoceros, the star KH 15D shines at full brightness for 48.36 days and then "winks" at astronomers (their whimsical term) 18 days. The star's eclipse is remarkable, not in its regularity, but in its duration. A single object like another star, a planet, or a moon could not be big enough or move slowly enough to act as the intervening body. Therefore astronomers are positing a collection of smaller objects such as dust grains, rocks, and/or asteroids that could be strung together in an orbiting band or disk. Perhaps it would be like an interrupted ring around Saturn.

Mac Gardiner drew our attention to the article by John Noble Wilford in the *New York Times* (June 20, 2002) concerning KH 15D. A wealth of similar material can also be found on Internet. This recent spate of interest is because astronomers are debating seriously if this "young" star (it's only 3 billion years old) and its occluding dust can lead us to discoveries about how our "middle-aged" solar system (4.5 billion years old) was formed.

In order to concentrate the studies of KH 15D, the research team led by graduate student Catrina Hamilton and Professor William Herbst of Wesleyan University (Middletown, Conn.) organized an international observing campaign for the fall, winter, and spring of 2001-2002 of astronomers in Tashkent, Munich, Tautenberg, Heidelberg and Tel Aviv, plus five additional US locations. This geographic spread permitted observations around the world as fully as possible. After the five-year preliminary study at Wesleyan, the effort resulted in the announcement in June about KH 15D at a meeting of extra solar planet astronomers at Carnegie Institute in Washington, DC.

According to Hamilton and Herbst, the data gathered this past year not only confirms its basic pattern of eclipse, but also suggests that there may be more than one clump of dust. Even more amazing, they believe that in the last several months they have seen the effects of increasing clumping. Two clumps seem to have slightly different shapes, suggesting that the orbital period may be 96.72 days rather than the originally calculated 48.36 days. Besides these clumps, there is an unusual color difference: When KH 15D is faint it is bluer than when it is bright. On Earth when the light gets dim it generally turns reddish because dust particles scatter blue light better than red. What may be happening with KH 15D is that, rather than the star itself, astronomers may be observing light reflected off the solid objects of the band.

Astronomers are studying the sizes of the clumps trying to find what gravitational force could be keeping the clumps organized. Another question related to the sizes is whether or not they are large enough to make the main star wobble. One possibility suggested is that the orbiting objects might cause "density wave" ripples in the band, some of which would extend high enough above the band to block the light from the star at the regular intervals.

The interaction of the orbiting band and its clumps is central to the study of extra solar planetary systems. The mass of KH 15D is too far away for astronomers to know yet how big it or its clumps are. However, they believe the clumps are closer to the star than Mercury is to our Sun. This situation is typical of many massive planets orbiting other stars that have been found since 1995. The puzzle with this proximity is how the building blocks of planets—the elements—could be condensed or trapped in the intense heat so near a star. Could the clumps have "migrated" in from the outer regions, propelled by the density waves? The astronomers acknowledge that all this needs much more study.

"In summary," writes Professor Herbst, "it appears that nature has provided us (Cont. on p. 9)

with a unique opportunity to study the early evolution of a disk by orienting KH 15D in just the right way to show us its clumpy disk. If we looked at any other angle, we would either see no eclipse at all, or, perhaps, a very faint star all the time. No one can predict exactly how KH 15D will evolve with time…. Time will tell---but, of course, only if we keep watching."

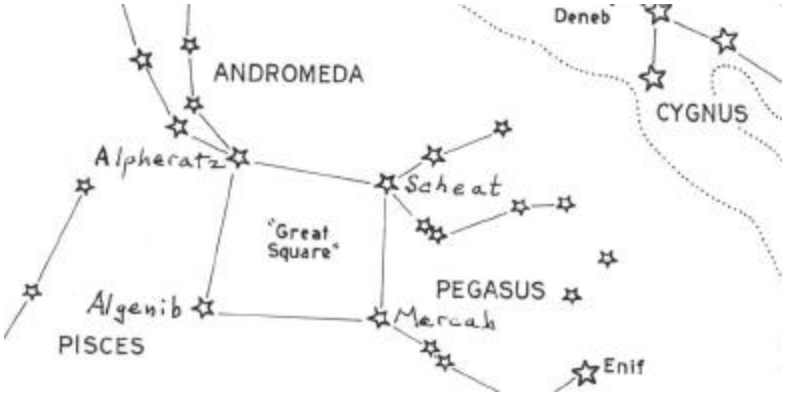
For the winking of a star.

SEEING STARS

Astronomy 0.001

By Anna Edmonds

THE GREAT SQUARE OF PEGASUS



The flying horse Pegasus is one of the most prominent constellations in the fall. By the end of September it's high enough in the sky to be visible as soon as it gets dark.

The constellation is easy to spot and easy to remember because it's big and because of the four second-magnitude stars that define the Great Square. The two most southern stars of the Square are Algenib and Marcab. Algenib is the Arabic word for "the side," or "the wing." Marcab means "the saddle." The star in the northwest corner is Scheat, meaning "the foreleg." Obviously all of these have to do with parts of a horse. The fourth star of the Square is called Alpheratz, or less commonly Sirrah; the two names together mean "the navel of the horse." Alpheratz used to belong to the constellation Pegasus, but now astronomers count it as part of the constellation Andromeda.

There's one other second magnitude star in Pegasus. It's Enif, meaning "the horse's nose." Enif is at the end of an imaginary line running southwest through Algenib and Marcab, and is about the same distance beyond Marcab as Marcab is beyond Algenib. Enif comes up before the whole Square. With it as the nose and Algenib as the wing, Pegasus is flying west trying to overtake Cygnus or the Swan. In a way, the main stars of Andromeda look also like the left rear leg of the horse stretched out in a gallop.

Enif is also helpful in locating the very rich globular cluster M15 which is 4º NW of it. Barely visible to the naked eye in an absolutely dark sky, in binoculars M15 is a fuzzy blob. If you look through a small telescope you can begin to make out some of the individual stars. Globulars being the oldest kind of clusters, these stars are almost all the same color, one of their qualities that suggests that they are all about 15 billion years old—the age when the universe began. Measurements also suggest that M15 is about 39,000 light years (ly) distant, and that its total luminosity is that of 200,000 Suns.

Northwest of Scheat is the spiral galaxy NGC7331, the one sometimes used in astronomy textbooks to show what our own galaxy might look like from a distance. Spiral galaxies when they are viewed edge-on show a central bulge; when face-on, the concentrated center is surrounded by pin-wheel arms. Unlike the globular clusters, the spiral galaxies contain some stars that are being formed. Astronomers have calculated that NGC is 50 million light years away; if that is the case, those new stars are only that old. NGC7331 is thought to be made up of 140 billion stars. Its size is 64,000 ly from one edge of the disk to the other.

The visible distance between the edges of our own galaxy is about 100,000 ly, and our own Sun, in contrast, is middle-aged at 4.5 billion years.

INSIDE THIS ISSUE

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