BPAA Newsletter

Battle Point Astronomical Association, Bainbridge Island, WA

ISSUE 50: MAY-JUNE 2002

MAY-JUNE-JULY CALENDAR

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

May

May 1: BPAA Board Meeting 7 p.m.
May 2: Lecture Series 2002 7 p.m. Paul Middents; Nebulae Become Less Nebulous
May 4: Last-quarter Moon 12:16 a.m. Mars passes 2.2 degrees from Saturn
May 5: Eta Aquarid meteor shower
May 7: Venus passes 2.4 degrees from Saturn
May 8: Member Meeting 7 p.m. Bruce Muggli, Gabriel Hersberg; VLA Video
May 10: Venus passes 0.3 degrees from Mars
May 11: Observatory tours 2 to 4 p.m. Gena Ritchie & Paul Below
May 12: New Moon 3:45 a.m.
May 14: Moon occults Venus & Mars
May 16: Lecture Series 2002 7 p.m. Paul Middents; The Red Shift; A Distance Scale Evolves
May 17: Comet Ikeya-Zhang passes 2° from M13 in Hercules
May 18: Star Party Battle Point Park. Beginner session 7 p.m. Paul Below & Bruce Muggli
May 19: First-quarter Moon 12:42 p.m.
May 23: Lecture Series 2002 7 p.m. Paul Middents; Cosmology Extends the Distance Scale
May 25: Observatory tours 2 to 4 p.m. Gena Ritchie & Patrick Rooney
May 26: Full Moon 4:51 a.m. Penumbral lunar eclipse
May 30: Lecture Series 2002 7 p.m. Paul Middents; The Large Scale Structure of the Universe
May 31: STS-111 Launch, Space Shuttle Endeavour

June

June 2: Last-quarter Moon 5:05 p.m.
June 3: Venus within 1? ° of Jupiter
June 5: BPAA Board Meeting 7 p.m.
June 9: Observatory tours 2 to 4 p.m. Gena Ritchie
June 10: New Moon 4:46 p.m. Partial solar eclipse 5:02 p.m.; maximum of 48% at 6:04 p.m.
June 12: Member Meeting 7 p.m. Harry Colvin; John Armstrong, University of Washington; The Martian Gullies - Oases in the Desert?
June 15: Star Party Battle Point Park. Beginner session 8 p.m. Paul Below & Bruce Muggli
June 17: First quarter Moon 5:29 p.m.
June 21: Summer solstice 6:24 a.m.
June 24: Full Moon 2:42 p.m.

July

July 2: Mercury passes 0.2° from Saturn
July 4: Grand Old Fourth in Winslow. 5th Anniversary (1997) Mars Pathfinder Landing on Mars
July 6: 315th Anniversary (1687) Isaac Newton's *Principia* published

July 8: 10th Anniversary (1992) Comet Shoemaker-Levy 9 Near-Jupiter Flyby
July 11 – 13: Table Mountain Star Party www.tmspa.com
July 20: Star Party Battle Point Park. Beginner session 8 p.m. Paul Below & Bruce Muggli. Mercury passes 1.2° from Jupiter
July 21: Observatory tours 2 to 4 p.m. Gena Ritchie
July 25: Mercury passes 0.6° from Mars

Calendar Notes:

Let's hope for clear skies in the coming weeks, because lots of good viewing is coming up. Not that the last few weeks lacked interest. When it cleared, we were treated with impressive views of Comet Ikeya-Zhang and a marvelous planet show. The five bright planets, Mercury, Venus, Mars, Saturn, and Jupiter, lined up in a row for people to view on a number of clear nights, including Astronomy Day and during one of Paul Middents' lectures. The best viewing was on April 30, when it was unusually clear and all five were naked-eye visible.

Best of all, the planetary show is not yet over. During early May Venus, Mars, and Saturn will be in a triangle, with Mercury to the lower right of the three. In mid-May, a crescent moon will join Venus and Mars. Eventually the constellation Gemini gets into the act, embracing Venus and Jupiter and Mars. By late June, the show will be pretty much over, with Jupiter and Mars making an early exit on the horizon after dusk, leaving Venus in a starring solo role for a few hours.

But that's not all! At the risk of sounding like a barker in an infomercial, I would be remiss not to call attention to the fact that we will be treated to a partial eclipse of the sun on June 10. Along with the heads up alert, comes the necessary warning: **Do not look directly at the sun without a solar filter.** A safe, low-tech way to view the eclipse is by pinhole projection. All you need is two pieces of cardboard and a small piece of aluminum foil. Cut a hole in one of the pieces, tape the aluminum foil over the hole, and put a pinhole in the aluminum foil. Then move the cardboard pieces back and forth to get a satisfactory image.

In July, there's the Table Mountain Star Party for serious viewing. Note that it is being held a bit earlier this year, July 11 through the 13th. If you haven't attended before, check the website listed above for detailed information.

For really serious viewing, try the Oregon Star Party. It too is scheduled earlier than usual this year, August 8th through the 11th. Complete information may be found at www.oregonstarparty.org. See also p. 16 below.

Paul Middents' lecture series continues through May. The lectures have been consistently good and I would encourage any member who hasn't yet attended to do so. Each lecture is interesting and illuminating on its own; having missed some or all of the previous lectures will not diminish what you gain from the remaining sessions.

And don't forget the Grand Old Fourth in Winslow. BPAA has traditionally sponsored a booth at the celebration, and we would like to do so again this year. If you are willing to coordinate our efforts or simply volunteer for a few hours of duty, please let Paul Below (aurorae@sprynet.com) know.

Finally, for those of you who are paying attention, you may notice that there is no board meeting, nor a member meeting in July. They were suspended due to the holiday and the Table Mountain Star Party. Another change involves the Observatory tours. During June and July, they will be conducted once a month, on Sunday, not Saturday; look for announcements.

Here's hoping the frequency of clear skies will increase in the coming weeks. Remember that we can always schedule last-minute star parties 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

RITCHIE TELESCOPE NEWS

Paul Below

We took advantage of the clear skies on May 11 to do some testing of the Ritchie Telescope. Under the prodding of our tireless Facilities Director, we spent the entire evening debugging. The team was John Rudolph, Dave Warman, Doug Tanaka and Paul Below.

First on the list was a hardware issue with the way the RA motor was mounted. Then we discovered that a software value had somehow been set to an invalid number creating the source of our problems with the slow RA speed. Next we found that, because the motors had been swapped, we needed to reverse the direction of the RA motor setting.

The above problems required us to run through the alignment process three times. Even then we didn't have everything working properly. At this point we ran out of time and had to stop work. However, we hope that we've caught all the problems, and that now all we have to do is to run through the 2-star alignment one more time and then monitor for vibration with the video camera.

The good news is that we currently do not think further hardware or dive motor gearing changes will be needed. REAL PROGRESS!

OCEANS AND VOLCANOES IN THE SOLAR SYSTEM

The BPAA hosted a well-attended lecture by Professor John Delaney, from the Oceanography Dept. at the University of Washington, on April 10th. Collaboration with Bruce Claiborne of the high school science faculty made it possible to use the auditorium at Bainbridge High, and the large turnout (over 100 people of all ages) certainly made us glad we were not restricted to the space available at the observatory. Professor Delaney illustrated his talk with some marvelous graphics about the sea, subsurface volcanoes, planetary exploration, lans to search for life on Jupiter's moon, Europa, and his grand scheme for studying the Juan de Fuca tectonic plate that lies just 200 miles off Washington's shore. The evening commenced with the honoring of Mac and Helen Gardiner and ended with an enthusiastic Q&A session that Dr. Delaney enjoyed and handled well. We want to thank all who pitched in to make this presentation to the community a success.

CHECKOUT a BPAA Dobsonian Telescope

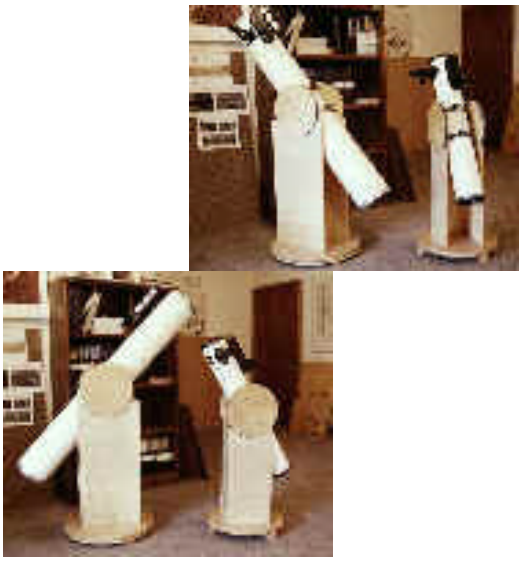
BPAA now owns two small Dobsonian telescopes. These telescopes are available for checkout by club members. The small scope is 4.5 inch, the larger is 6 inch. These highly portable scopes have very smooth movement, and are each equipped with a Telrad finder. These scopes are great for beginners, and fun for advanced observers. Due to its shorter height at the eyepiece, the 4.5 is especially good for children.

Originally, the smaller scope was on a shakey equatorial mount, and the larger was on a heavy, hard to move mount. The original idea to rebuild them came from Terry Hubbert, and Doug Tanaka lent his extensive expertise with some grunt help from Harry Colvin, Larry Hatcher, and yours truly.

Our goal was to make the scopes easy to use and easy to transport. We have met both goals. These scopes are perfect for families that would like to try a scope before buying one. Also, we intend to use these scopes as stepping stones for those that would like to learn to operate our larger scopes (an 8 inch SCT, a 16 inch string truss, and the 27.5 inch Ritchie Telescope).

With Astronomy Day successfully behind us for another year, we can focus on setting up a checkout process for these wonderful portable scopes. The checkout period would likely be for one month (with a renewal possible if there is no waiting list). I would propose the monthly beginner session Saturday as a good time to receive and return the scopes. The checkout would also include a short training session in scope operation and etiquette with handout. We also will include eyepieces and a planisphere.

So, yes, these beautiful scopes can be yours! Well, for a month, anyway. This is one of the benefits of BPAA membership Paul Below



DEIMOS

Since DEIMOS can cover a much larger patch of sky than Keck's current spectrograph, collecting galaxy spectra will go about seven times faster. This improvement is the result of state of-the-art optics and the largest spectrographic detector in the world. The detector, a sophisticated version of the ones found in video cameras, converts light into a digital signal. It covers five square inches, a huge area for this type of device, and contains 67 million pixels. It is reported to be so sensitive that it captures up to 80 percent of the photons that fall on it. In astronomy, it's almost always a problem of gathering enough photons, especially when you want to spread the light out across the spectrum.

Excerpted from the following site:
http://scicom.ucsc.edu/SciNotes/0101/astronomy.html

NASA'S SPACE PLACE PROGRAM

NASA is currently contacting notable astronomy clubs across America to invite them to participate in their monthly Space Place column program. Accompanied with high-quality graphics, this column is offered free to organizations for use in the 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. A component of that outreach, the Space Place column is offered to select venues like astronomy associations.

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

If you have any questions, please don't hesitate to call me (Nancy Leon) at (818) 354-1037. If you'd like to sign up now for the monthly column, please e-mail directly at nancy.j.leon@jpl.nasa.gov.

MARTIAN GULLIES–OASES IN THE DESERT

Bill O'Neill

The June Member Meeting will feature John Armstrong, UW astronomer, who will speak on "The Martian Gullies--Oases in the Desert."

The current environment on Mars makes the Gobi Desert look like a Brazilian rain forest. Winds dominate the surface erosion, scouring the surface with dunes, dust devils, and planet-wide dust storms. New simulations of the atmospheric circulation indicate that this situation hasn't changed much for billions of years. Still, there is tantalizing evidence suggesting relatively recent water on the surface of the planet; this is in the form of gullies sculpted from slopes and crater rims. Dr. John Armstrong, an astronomer and astrobiologist at the University of Washington, will discuss this apparent paradox and consider some possible explanations.

The meeting is at 7:00 p.m. on Wednesday, June 12 at the Ritchie Observatory.

REP0RTS AND ARTICLES

EDUCATION DIRECTOR'S REPORT

Michael Walker

The BPAA has had quite a bit of involvement with student groups over the past month and a half. We hosted Boy Scout troops from Silverdale and Bainbridge at the last Star Party. We look forward to any scouts wishing to work on their Astronomy or Space Exploration merit badges to attend Star Parties on a regular basis. We're also in the beginning stages of establishing links with the freshman physical sciences classes at Bainbridge High school. Welcome to the BPAA—Dr. Louise Baxter and your students!—who visited May 6th. The visit

included a presentation by John Rudolph on archaeoastronomy. I'm hoping several of these students will wish to become active members/researchers here at the Ritchie Observatory.

May 7th, Jim Young and I were at the Keyport Undersea Museum for a science educators' open house. We had a table representing the BPAA and our educational program which could benefit local schools/students. We're hoping several good contacts with local educators will develop out of this. John Rudolph, Jim Young and Anna Edmonds will be running a special Star Party for their ProjectASTRO students May 17th.

I found two great resources I'd like to pass on. A few months ago the Edmondses posted a link to a talk, "The World-Wide Telescope" by Jim Gray of Microsoft Research at the UW Department of Computer Science and Engineering. Mr. Gray's expertise lies in creating data base search engines. As data accumulations continue to accelerate, the ability for the existing engines to sort through it all is falling far behind. Since astronomical data is plentiful, available, and non-commercial, he's chosen astronomical data as the test bed for the next generation of search engine. His program called SkySearch is linked to the Sloan Digital Sky Survey. Right now it accesses about 40% of the data, but eventually will include the entire set. No more downloading huge files.

Search the data through the interface from home! It is set up expressly for students of all ages and abilities. The link is http://skyserver.sdds.org/. There's a lifetime of science to be done here.

Jim Gray's speech is available in recorded video stream at: http://www.cs.washington.edu/info/videos/asx/temp_colloq/JGray.asx
This link requires a 256K connection and Windows media player. His paper, "The World-Wide Telescope" is at http://www/research.microsoft.com/~gray/

My second find of the month is a new book at Kitsap Regional Library: *Star Struck: 1000 Years of the Art and Science of Astronomy*. This book is a catalogue with text of an exhibit at the Huntington Library. The curators/authors are Ronald Brashear (Dibner Library at Smithsonian) and Daniel Lewis (Huntington Library). The book features fine reproductions of original documents from Brahe, Galileo, Hubble, and others.

ROBOT CLUB – AMATEUR RADIO

Jim Vaughan

As a result of Astronomy Day, we added several new members to the Robot Club. We went to the Robothon at the Seattle Science Center that Saturday and had a good time watching the Sumo and Minisumo robots pushing each other out of the ring.

We have started an Amateur Radio class for obtaining the Technician Class License. We started Sunday with several kids and three dads. We plan to have them take the test on the third Saturday of June at Olympic College. The test consists of 35 questions taken from a pool of 384 questions. The test includes rules, operating procedures and some electrical theory. All the questions and answers are in the book. Morse Code is not required, but if one can pass a 5-word per minute test one earns extra privileges and can transmit on more frequencies.

The Amateur Radio classes are Technical, General, and Extra. Technician allows operating on the higher frequency bands. General allows operating on the lower frequency international bands. Extra allows working on a few more frequencies.

If anyone wants to join us, get the Technician Class book at Radio Shack and come to the Observatory. We meet from 4:00 to 5:00 p.m. on Sundays after all the stuff from the Robot Club is cleaned up.

Speculations on a Black Hole Experiment

Lyon McCandless

Black holes are not unique in bending light; they just do it better. In fact, Stephen Hawking has said that light at the event horizon and tangent to it would circle the black hole, returning to its starting point. He left the method of generating the tangent light as an exercise for the student. Postponing solution of this problem for a while, let's consider another possible application of the principle. Conceptually, an experiment could be designed to transmit a beam of energy towards a black hole in such a way that some of the energy could be received back at the transmitting site. The received energy would not be reflected by the black hole, but would be re-directed unmodified, except in amplitude.

Let's consider how such an experiment might be set up. The first step would be to find a nearby candidate black hole (say, 10 light years distant) and establish a good track so that its position could be predicted accurately for 10 years ahead. The earthside transmitter would use a

laser capable of generating a very intense series of pulses in as tight a beam as possible. The pulses would be coded so as to facilitate auto correlation and high signal to noise ratio.

During the test the transmitter would be aimed to cover the area where the black hole would be when the test pulses arrive. When the beam arrives at the black hole, even with a tight beam, it will have spread to a diameter much larger than the black hole. All of the laser light will undergo significant Einstein effect bending, but a small part of the beam will be bent in such a way as to approach the event horizon almost tangentially. These select quanta will undergo a deflection of almost 180 degrees. (A full 180-degree deflection is impossible by the nature of the event horizon.) The remainder of the original beam will be fanned out over a large solid angle, probably exceeding 90 degrees.

The conclusion of the experiment comes in twenty years (2 x the distance in light years) when the earth has moved ahead along its own path in space, and when the pulse-coded signal is received and correlated with the transmitted signal. It would have no Doppler shift. Receipt of the signal would verify the existence of the hypothesized black hole.

Whether or not such an experiment could ever be accomplished in real life depends on parameters such as transmitter power, distance to the black hole of interest, losses due to dust, process gain, and so on. In the limiting case, the signal strength approaches zero as the deflection approaches 180 degrees. The theoretical signal strength increases for lesser deflections. The best target would be a suspected nearby black hole on a line perpendicular to the earth's proper motion. In any case, success will probably require counting quanta rather than measuring received signal strength.

Snow Storms, Dead Horses, and a Comet

After a week of skiing at Mt. Batchelor in Oregon, we ventured north on Saturday March 16 about 80 miles to Kah-Nee-Ta, a wonderful desert resort and site for the Rose City Astronomical Association's annual Messier Marathon. We were delighted that there were clear skies, the first that we had seen in a week!

The observing area was about six miles to the north of the lodge and casino, off the main road and easy to find. About 3:30 p.m. we went on a "scouting trip" to locate a site for our scope that evening. We found a perfect place, level, with good views to the horizon. But climbing out of our vehicle into the high desert air we were enveloped with a stench, not of the dung type but of decaying flesh. We looked over to our right and discovered a partially decayed carcass, that of a horse, according to Diane, ex-farm kid. To me it looked like a large mammal of the kind one sees on stories about Africa on Channel 9. We were quick to conclude this was not the site for us, so we found another about a quarter mile away.

We scurried back to the lodge and casino for some computer poker and a nap before the Marathon. We returned to the observing site about 5:50 p.m. to initiate our "attack" on the Messier objects.

As we stopped the car and turned off the engine, a dark cloud came over the horizon and slowly covered the clear blue skies to the north. First popcorn snow, then a full blizzard of snow and wind that shook the car. Then as quickly as the skies darkened they cleared, and the sun set to reveal totally clear black skies by 7 p.m. What a view. But it was cold, 25 degrees with a good 20 knot wind from the north as we lay down the tarp and set up our 6" scope.

We were too late for M74 and M77 but I went after M33 with 7x50 binoculars and found it! The real find however was a comet with a long tail to the Northwest from our position right on the horizon. We didn't know which comet at the time, but it was extremely bright and distinct. I continued on to other Messier objects, M31, M32, M110, M76, M52, M76, M34, etc. It was an interesting challenge, but it was cold, with ice on the scope and tarp, and significant wind. I found M41, M93, and M47, then things started to go south as the clouds came in again with flurries. Important guide stars were blotted out, then entire constellations, forcing me to find any "holes" I could looking for any opening to get some more M's. It was so cold, I retreated at times to the warm confines of the car. By 11:30 pm we were defeated. The clouds and swirling snow returned, and in the pitch black night we packed up and somehow managed to find our way back to the road that led to the highway and finally to the lodge.

(Cont. on p. 7)

Back at home, we found out the comet we saw was none other than Comet Ikeya-Zhang. We had several subsequent opportunities to view it, and it was spectacular indeed. Ikeya-Zhang achieved a peak brightness of magnitude 3.4 by late March and was naked-eye visible for a time. Most hailed the comet as the finest since Hale-Bopp in 1997. The comet's name recognized the two comet hunters who first found it, Kaoru Ikeya in Japan

and Daqing Zhang in China, using their backyard telescopes. Shortly after it was discovered, astronomers noticed similarities between the orbital path of Ikeya-Zhang and that of comets observed in 1532 and 1661. There is now general agreement that this is the object seen in 1661, making its first return visit to our solar system in 341 years. According to *Sky and Telescope*, no other comet with such a long period has been observed on successive orbits around the Sun. The orbit of Halley's Comet, by comparison, is approximately 76 years. Viewing the comet is thus the chance of a lifetime, and if you haven't seen it yet, you should try to do so. It is much dimmer now as it recedes from the earth, but still visible with binoculars or a telescope.

Harry Colvin
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ASTRONOMY DAY

(Pictures on page 8)

Astronomy Day is a grass roots movement designed to share the joy of astronomy with the general population - "Bringing Astronomy to the People." On Astronomy Day, thousands of people who have never looked through a telescope have an opportunity to see first hand what has so many amateur and professional astronomers excited. Astronomy clubs, science museums, observatories, universities, planetariums, laboratories, libraries, and nature centers host special events and activities to acquaint their population with local astronomical resources and facilities. It is an astronomical event that helps highlight ways the general public can get involved with astronomy - or at least get some of their questions about astronomy answered.

Astronomy Day occurs annually sometime between mid April and mid May on a Saturday near or before the 1st quarter Moon. The date is published by the Astronomical League and by *Sky & Telescope* Magazine.

Astronomical League:
http://www.astroleague.org
Sky & Telescope:
http://skyandtelescope.com/

The BPAA observation of Astronomy Day, April 20, was well attended this year, and the weather was mainly cooperative, although a bit cool. The good news is that Astronomy Day 2003 is May 10. Perhaps the three extra weeks will result in warmer, sunnier weather.

Following are excerpts from emails assessing the big event:

Here's my review of Astronomy Day. I kept a rough count and saw at least 100 people come through with about 40-50 percent being children. We got one new membership and sold two tee shirts. My count did not include the 10 or so robot club members who were busy "working" when I arrived. I think the day's events went off very well and I heard lots of positive feedback from people. Many people stopped on their way home and expressed thanks for the job that was done by all members. Bruce Muggli

Another successful Astronomy Day. A big thank-you to everyone who helped out. In addition to the numbers noted by Bruce, we had a very nice attendance at the evening star party, and the weather was perfect (after having been mostly cloudy for most of the day). At one point, I had a line of about a dozen folks lined up to see Ikeya-Zhang, and the other scopes were busy at the same time. Paul Below

Astronomy Day was a great success again this year. We had at least 100 people come to the observatory that day, and probably 20-30 (other than us) that night. We had a good number of prizes to give away, and we had decent weather all day with some sun breaks, and clearing that night (I called it). We had a number of great lectures, and many excellent activities and demonstrations. We also once again had the very popular "Stellar Passport" for the kids, and of course some Milky Way candy bars for completing the passport. I want to thank all the volunteers for their help and support, and also those who donated prizes. We had a great year; hopefully I can take on the role as manager next year as well. Jared Barnhill

The robot club ran the Mars Rover event at Astronomy Day. It was totally run by the boys. Neither Malcolm nor I did any organizing or running it. We have several new members as a result of Astronomy Day. One of the fathers stayed. I taught him Ohm's Law and the resistor color code and he taught two of the new kids. One of the kids started building a simple radio transmitter. I plan to make that into a lesson on how radios work.
Jim Vaughan

Jared & his scope with Dave Warman.

Waiting to see the 27.5 inch telescope

SEEING STARS **Astronomy 0.001**

Anna Edmonds

Radio telescopes, which we talked about last time, help us explore the non-visible wavelengths that are longer than visible light. Since radio waves penetrate our atmosphere, we don't have to send the telescopes into space to find them. They also can be ganged in order to increase their power.

The next development was telescopes that explore wavelengths shorter than visible light. Virtually none of these wavelengths—the X-rays and gamma rays—reach the surface of the earth. They are either reflected off the gasses of our atmosphere or are absorbed by them. In order to study these wavelengths, scientists devised both the instruments that can interpret the information and the means to place them securely at appropriate distances from Earth. Thus there are the obvious disadvantages of the great expense and engineering expertise necessary to launch, hold in place, and monitor space exploration. But, space frees these telescopes from the pollutions of Earth's atmosphere, both its turbulence (that makes the stars twinkle), its frequent clouds, and the dirt we spew into it.

X-ray and gamma ray telescopes were first put to use in the early 1960s. They have greatly increased what we can "see" in our universe beyond the capabilities of optical telescopes; at the same time, they have deepened our puzzlement at what the universe contains and what it all means.

Among these puzzles that astronomers have found using X-ray 'scopes is a strong source of X-rays at the center of our galaxy; they believe it shows a lot of violent activity there that they call a black hole. But—what does a black hole really do? (See McCandless's article, "Speculations on a Black Hole Experiment, p. 5) How does it start? They have studied X-ray emissions from comets and the churning vortexes on the Sun's surface.

By chance, in the 1970s when the US Vela spy satellite series was looking for Soviet nuclear testing, it recorded instead gamma ray flashes coming from outer space. Subsequent discoveries have shown that these violent bursts of energy occur anywhere, any time. Scientists do not understand them, but they believe they originated between three and ten billion light years away. (That's a long time ago!) Among the most powerful known events in the universe, some last (or, more accurately, lasted) only fractions of seconds.

There's always more to explore. Perhaps there are signals we don't know exist. Certainly there are ways of looking that we haven't thought of.

The pictures that astronomers have created from the data of all these 'scopes show our universe to be both violently explosive and fantastically beautiful. They draw us into the mysteries at the basis of all science: How much more? What does it all mean?

Sources: Kaufmann, Comins, *Discovering the Universe*NASA websites, "Telescopes"
Encyclopedia Britannica, 14th ed., "Telescopes"
http://www.Space.com

3C 273, Or, WHY I STAY UP ALL NIGHT

When a non-astronomer sees my telescope for the first time, I'm usually asked two questions, "How powerful is it?", and "How far can you see?" I end up trying to explain that astronomers are more interested in things like light gathering ability, resolution, optical quality, yada, yada, yada, but more often than not, the look on their face tells me the answer is about as satisfying as eating at a five-parsley restaurant. The nuances and subtleties are great, but "WHERE'S THE BEEF?"

The reason I bring this up is that this time of year, the spring, there is a well-situated object in the constellation Virgo that will answer at least one of the questions. It is a quasar called 3C 273, and at 2.6-3 billion light years away, it is generally regarded as being the most distant object, by a wide margin, visible with the average amateur telescope. The name 3C 273 designates that it is the 273rd object in the third Cambridge Catalogue of Radio Sources.

3C 273 shines at about magnitude 12.8, and to be visible at this distance it must be one of the brightest objects in the universe. It is estimated to be thirty trillion times brighter than the sun and 100 times brighter than a large galaxy. I'm pretty sure it's brighter than my neighbor's yard light. At magnitude 12.8 it's easier to see than Pluto at magnitude 14. It's located about 3.5 degrees NE of Eta Virginis and 3 degrees SE of the galaxy M61. A detailed finder chart can be found on page 2101 of "Burnham's Celestial Handbook" and various places on the Internet. It is shown on SkyAtlas 2000, but the scale is too coarse on this atlas to be of much use. 3C 273 is just a faint point of light, so it looks like a small, bluish star. In order to find it you need a chart that shows stars at least as faint as magnitude 13 or 14. Most of the software for the better planetarium programs go down to mag 15.

Theoretically 3C 273 should be visible in a 6" scope, but practically you'd need at least 8", and 10" would be better. On a clear, moonless night, it should be fairly easy in the club's 16" scope. Once the moon goes down, I'm going to seriously try to find it so the next time I'm asked, "How far can you see?" I'll be able to confidently say, "Oh, about 2.6 billion light years". Now, about the question of, "How powerful is it?" That's easy. On a clear, dark, steady night, powerful enough to keep me up most of the night.

Doug Tanaka

MAC AND HELEN GARDINER HONORED

John Rudolph

When Mac Gardiner stepped down from his official capacity as President and Chairman of the Board of Directors of the BPAA, many members felt that something special should be done to honor him and Helen for their unstinting efforts to make this organization a success. The recognition for them took place at the April Members Meeting held in the LGI room at Bainbridge High School.

It is well known that Mac was one of the founders in 1993. It should also be noted that he raised virtually all of the funds to make the Ritchie Observatory a reality. His contributions are legion. He wrote the charter and many of the by-laws; he talked Boeing Company out of two VERY valuable mirrors, even after their accountants said that Boeing could not donate that much value in one year. Mac's persuasive powers turned the tables. His fertile mind was (and is) always busy on interesting projects such as a spectroscope and a digital planetarium projector. His crowning achievement (to date) is the idea for an amateur telescope, remotely controlled, to be mounted on the International Space Station. He proposed this project to NASA and Boeing together, along with a magnetic mount that would release the telescope so it would be free of space station vibrations. This idea is moving toward reality. *

When we tried to think of something appropriate to honor Mac, the traditional gold watch came to mind, but cooler heads prevailed. However, behind the scenes, this idea kept inserting itself, and when a friend donated a 16" diameter wall clock made to look like a giant gold watch, temptation overcame discretion. Thus Mac was presented with probably the world's biggest pocket watch, complete with gold chain and watch fob with the BPAA logo on it. Of course there is an inscription on a brass plate on the back just to make it official.

*Note: The next issue will include an article by Mac Gardiner concerning the Hubble Telescope and the improvements that have been made to it this spring. An instrument that started out flawed and that was expected to wear out by now, it continues to give us some of the most spectacular views of our universe that we've ever seen.

(Article continues on p. 10)

John Rudolph & Paul Below presenting Helen's gift

Helen was presented with a set of cookie cutters in star shapes in thanks for and to replace those she wore out making the endless supply of cookies for the construction volunteers. These were good for some laughter both from the recipients and the audience. After the watch and cookie cutter hokum, we gave Helen a dozen roses to show how much we deeply appreciated her unwavering good humor and supporting enthusiasm all during the six years of construction.

Paul Below reading the illuminated scroll

Mac was also presented with an illuminated scroll, suitably framed, with the BPAA logo on a gold seal with blue and gold ribbons, signed at the bottom by the current Board members. It reads as follows:

IN APPRECIATION
We the President and members of the
BATTLE POINT ASTRONOMICAL ASSOCIATION
On February 6, 2002 at regular meeting, do hereby adopt this Resolution to express our appreciation to
E. M. "MAC" GARDINER
For your extraordinary and successful endeavors from October 27, 1993 through January 9, 2002 as Founder, President, and Prime Mover of this organization, for your capable, organizational powers, for your skill, diligence and ingenuity to find funding for the Association, and for you good humor, gracious manner and dedication to our purpose.

It is with high esteem and unbounded gratitude for all you have done, that we, the President and Members of the BPAA Board of Directors, inscribe our names to this scroll.

Paul Below, President — Rik Shafer, Secretary
George McCullough, Vice President
Eric Cederwall, Treasurer — John H. Rudolph
Anna G. Edmonds — Michael Walker
Harry Colvin — Diane Colvin

ASTROBIOLOGY—LIFE IN DEEP SPACES

Bill O'Neill

Recently I'm immersing myself in marine biology, but I'll defer writing on life at extremes in the sea to address a more down-to-earth topic—down in the earth—**subterranean life.** Life didn't appear on the earth's surface until the early Devonian era, about 400 million years ago, but in the preceding 3 billion years subterranean (and marine) creatures were becoming established. This relates to where and how we might look for signs of life elsewhere in the solar system. It turns out that terrestrial life inhabits earthly environments only recently penetrated by science.

In the 1920s, bacteria were found in water associated with deep oil deposits, but it was impossible to ensure that samples were not contaminated in the extraction process. More than 60 years elapsed before the EPA and Department of Energy (DOE) concerned with underground wastes, funded a Subsurface Science Program. The DOE retrieved rock cores (initially near Savannah River, SC, and

later in the Northwest) under conditions where contamination by drilling fluids and surface water could be detected and prevented. Microbes were recovered from depths as great as 2.8 Km (nearly 2 miles) below earth's surface living in interstices of "solid" rock. At that depth the temperature is 75°C (170°F). We don't know for sure how much heat is too much for life, but some organisms survive "sterilization" conditions (135°C) and thrive at over 110°C around deep-sea volcanic vents. Typically, temperature rises about 25°C per Km in continental crust (15°C/Km in oceanic crust), so life's possible at least 4 Km down. Needless to say, there ain't much to eat down there, so the population's usually pretty thin. However, that varies: at 400 meters (roughly a quarter mile) in sedimentary rock it ranges from as few as 100 to as many as 10 million bacteria per gram of rock. (For comparison, agricultural soil contains more than a billion bacteria per gram of dirt.) Vital prerequisites for life include water, space, and nutrient elements (carbon, nitrogen, phosphorus, and traces of a few metals). Most important is some form of usable energy, and there's no sunlight down there.

Diverse microbial communities thrive in sedimentary rocks, which provide a rich supply of organic nutrients—produced eons before at the surface. Microbial metabolism can draw upon the energy stored in oxidized forms of sulfur, iron or manganese, and flourish in the absence of oxygen we surface creatures require. Over geologic time, as sediments are buried they are increasingly compacted. Microbes can deal with the enormous pressure, but they do require space. (Recent laboratory experiments support the notion that bacteria are not killed by pressures far exceeding those we're talking about.) As the rock becomes denser, the distribution of organisms is confined to spots especially rich in nutrients—which makes them harder to find. But Hanford scientists have shown that the larger the sample you collect, the more likely you'll find life. Surprisingly, they've even found microbes deep in basalt—rock solidified from molten magma which contains little carbon. Conversely, two miles down in South Africa's Driefontein mine, the carbon-rich vein that yields gold contains 100,000 to 1 million organisms per gram—some "breathing" iron oxide and others exhaling methane (natural gas). Some of these make unusual use of cobalt and uranium in their biochemistry.

The best-studied subsurface lithoautotrophic microbial ecosystems (SLIME for short) were "unearthed" in our Columbia River basin in the 1990s. In this basaltic aquifer, the organisms at the base of the food chain obtain their carbon from CO_2, and lab studies suggest they "burn" hydrogen gas derived from the reaction of water with the iron-silicate compounds in the rock. They produce methane. Verification that hydrogen from basalt-water reaction can provide enough energy to support an entire community of microbes will have profound implications for the search for extra-terrestrial life. This supports estimates that the biomass up to 4 Km deep in the earth (200 trillion tons) may vastly exceed that which we are familiar with on the surface. To any reader who might like to dig deeper into this subject, I recommend *Tales from the Underground* by David Wolfe (2001), which is in the Kitsap Library's collection.

BPAA Financial Report for month of April 2002

BALANCE SHEET:	**$**
Current Assets	17,371
Fixed Assets	241,559
Total Assets	**258,930**
Liabilities	-0-
Equity	258,930
Total Liability/Equity	**258,930**

PROFIT & LOSS:	**$ Apr.**	**$ YTD**
Income:		
Contributions	8	4,233
Membership Dues	50	1,620
Other	170	1,029
Total Income	**228**	**6,882**
Expense:		
Administration	-0-	1,174
Program	40	249
Utilities	47	414
Total Expenses	**87**	**1,837**
Net Income (Loss)	**54**	**5,045**

Eric Cederwall, Treasurer

OREGON STAR PARTY

Bill Jensen the coordinator of the Oregon Star Party has extended a cordial invitation to our members to this great event. It will be held August 8-11, 2002. The web site already has information on this year's event, and an opportunity to sign up as a volunteer. Online registration will be up and running very soon. Feel free to browse the web site at: http://www.oregonstar party.org/

As in the past, speakers, food and telescope equipment vendors, on site showers, daily kids' activities and a swap meet highlight the daytime fun. The night skies of Central Oregon's high desert country in the Ochoco National Forest are the real attraction. however. Over 800 attended last year's party including some from our own BPAA.

Goldendale Observatory State Park

Jim White of the Washington State Parks & Recreation Commission has informed BPAA of the potential closure of this Observatory. The State is looking at numerous budget cutbacks. One park likely slated for closure is Goldendale, largely since it brings in no income (it's one of the remaining free sites in the system). He urges us to help keep this park from closing by letting the State Parks Commission and our legislators know of our concern that it remain open.

For more information check out the Observatory's web page: http://w3.gorge.net/jwhite/friends/friends_page.htm

BATTLE POINT ASTRONOMICAL ASSOCIATION

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Website: http://bicomnet.com/ritchieobs/
Ritchie Observatory, Battle Point Park,
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Public Tours:
To be announced during the summer, or by
by special appointment.

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1993-1997