BPAA Newsletter

Battle Point Astronomical Association, Bainbridge Island, WA

ISSUE 60: NOVEMBER - DECEMBER 2003

NOVEMBER-DECEMBER-JANUARY CALENDAR

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

November

November 5: BPAA Board Meeting 7 p.m.
November 7-8: Imaging the Sky Conference, Salem, Oregon
November 8: Full Moon 4:14 p.m.; total eclipse of the Moon 5:20 p.m.
November 11: Tycho Brahe discovers supernova in Cassiopeia (1572)
November 12: Member Meeting 7 p.m.; speakers Paul Below & Cathy Koehler "Galileo:The Probe That Could"
November 13: William Herschel discovers planetary nebulae (1790)
November 15: Star Party Battle Point Park. Beginner session 6 p.m. Paul Below & Bruce Muggli
November 16: Last-quarter Moon 8:16 p.m.
November 17: Leonids Meteor Shower peaks
November 22: 5th Anniversary (1998), Galileo, Europa 18 Flyby
November 23: New Moon 3:00 p.m.
November 26: Galileo spacecraft flies closest ever approach to Io (1999)
November 30: First-quarter Moon 10:17 a.m.

December

December 3: BPAA Board Meeting 7 p.m.
December 7: Galileo spacecraft arrives at Jupiter (1995)
December 8: Full Moon 12:38 p.m.
December 10: Member Meeting 7 p.m.
December 13: Star Party Battle Point Park. Beginner session 6 p.m.: Paul Below & Bruce Muggli,
Geminids Meteor Shower peaks
December 16: Last-quarter Moon 10:43 a.m.
December 17: 100th Anniversary (1903), Wright Brothers' First Airplane Flight
December 21: Winter Solstice 11:05 p.m.
December 23: New Moon 1:44 a.m.
December 25: Beagle 2 Lands on Mars
December 30: First-quarter Moon 2:04 a.m.

January

January 4: Mars Exploration Rover A (Spirit), Mars Landing
January 7: BPAA Board Meeting 7 p.m.; Full Moon 7:41 a.m.
January 14: BPAA **Annual Meeting** 7 p.m. **ALL MEMBERS INVITED!** Last-quarter Moon 8:46 p.m.
January 17: Star Party Battle Point Park. Beginner session 6 p.m. Paul Below & Bruce Muggli;
January 21: New Moon 1:06 p.m.
January 25: Mars Exploration Rover B (Opportunity), Mars Landing
January 28: First-quarter Moon 10:04 p.m.

Calendar Notes:

The dim autumn constellations of Capricornus, Aquarius, Pisces and Cetus will soon exit stage right, making way for the bright winter constellations of Orion, Gemini, Canis Major and Taurus. The winter sky always seems brighter, and it is. The number of bright stars visible is greater in the winter than in other seasons. Look for Sirius, the dog star, bright in the southern part of the sky on winter evenings. Sirius joins with Procyon and Betelgeuse to form the Winter Triangle.

On November 8 there will be a total eclipse of the Moon. The eclipse will be brief, with a totality of only 25 minutes. In the Western U.S., the partial phase of the eclipse will already be in progress when the Moon rises around sunset. If November 8 should bring clear skies to the Pacific Northwest, members will no doubt gather at Ritchie Observatory for the event. Look for further information on our email group.

Winter also brings us the Leonids and Geminids. The Leonid meteor showers are predicted to return to normal activity this year, after five years of intense activity. They peak on November 17-18, and even if low in number, are likely to be bright. On December 13 the Geminids peak, coinciding with our **December Star Party**. The Geminid meteors are predicted to be the best annual shower, better even than the Perseids in August. Join us at the Star Party to see how many you can count per hour.

And while Mars fades from our up close and personal view of it this summer, it remains in the news. The European Space Agency's Beagle-2 lander will descend through the Martian atmosphere and land on the planet on December 25. NASA's twin Spirit and Opportunity spacecraft are also on their way to Mars. Spirit will land on January 4, Opportunity on January 25. Go to http://www.esa.int/export/SPECIALS/Mars_Express/ for more information on the ESA project. Details about Spirit and Opportunity are available from JPL at http://mars.jpl.nasa.gov/mer and from Cornell University, Ithaca, N.Y. at http://athena.cornell.edu .

We can only hope that these Mars probes will provide us with as much startling new space data as the Galileo orbiter did. Galileo ended its mission on September 21st, with a kamikaze dive into the atmosphere of Jupiter. Space agency officials decided to destroy the spacecraft lest someday it might crash into the moon Europa and possibly biologically contaminate it. **BPAA's member meeting** on November 12 will feature a presentation on the Galileo Mission to Jupiter by Paul Below and Cathy Koehler. Paul and Cathy will present a summary of the spectacular discoveries made and incredible challenges overcome by this "little probe that could." Be sure and join us to hear this amazing tale.

Our member meeting in November will also include a commemoration of **BPAA's tenth anniversary**. It was in November of 1993 that our founders got together for the first time and conceived the idea of an observatory at Battle Point Park. We are still in the planning stage for this phase of the member meeting. We'll disseminate information on it via email or on the website when plans are final.

Finally, if you're interested in astrophotograhy with a CCD camera, don't miss the 9th Annual Imaging the Sky Conference in Salem, Oregon on November 7th and 8th. The conference offers a fantastic array of information to anyone interested in imaging and image processing. The speakers this year include Richard Berry, Ron Wodaski, and Dave Kenyon. Details are available at http://home.comcast.net/~argojg/its/its2003.html.

Here's hoping for clear skies for our star parties in November, December and January. 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@bainbridge.net)

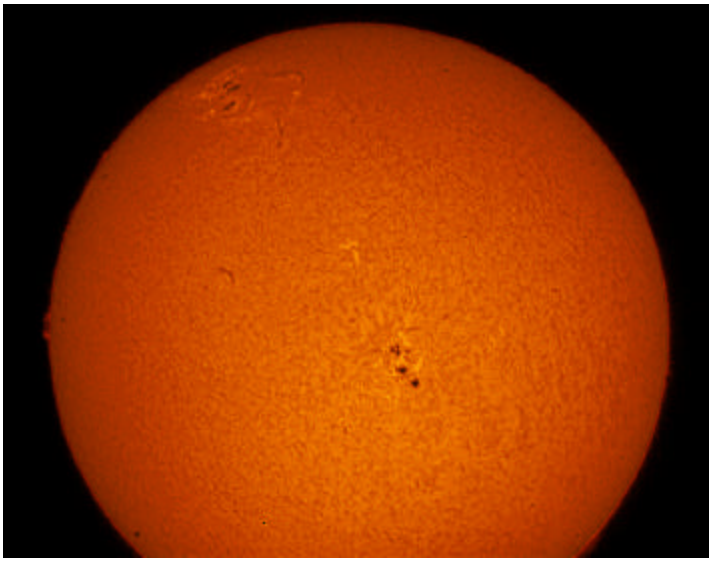
NEWS BRIEFS

SUNSPOTS

Several violent sunspots or solar flares occurred at the end of October, as noted by Paul Below:
"I used my white light solar filter and took a few pictures. These have been posted on the BPAA website, http://bicomnet.com/ritchieobs/

Lyon McCandless alerted members to the stories on http://www.cnn.com/2003/TECH/space/10/28/solar.flare/index.html

Up-to-date space weather, including information about today: (Cont. on pg 3)



Sunspot regions ARO486 and 0484 imaged on 24 October. Taken in H-Alpha. From: http://www.macnmotion.com/sun/sun10242003.jpg

http://www.spaceweather.com/
Another news story about the flares' activity:
http://www.space.com/scienceastronomy/solar_flare_031028.html
Current aurora activity:
http://sec.noaa.gov/pmap/index.html

A sunspot is a dark area seen on the surface of the Sun (the photosphere) that marks a field of intense magnetic activity. If the area is on the edge of the Sun as we look at it (DON'T DO THIS WITH YOUR NAKED EYE!!!) we can see it as a solar prominence, a whispy filament of gasses arcing out and back into the Sun's surface. Until the recent development of solar filters for telescopes, the only way to see them was during a solar eclipse when most of the blinding light from the Sun was blocked. Flares usually last only about 20 minutes; the spots can be tracked for a couple of months.

During a solar flare huge amounts of high energy particles are blasted off into space. When they hit the Earth directly they not only can create the beautiful aurorae, but they also cause havoc with radio commun-ications.

In the early 17th century people began studying these spots. Galileo was the Western astronomer who realized when he followed the movement of sunspots that he was seeing the rotation of the Sun. It turns around about once every 28 days, and its equator rotates faster than its poles.

More recently it's been discovered that the Sun's north and south magnetic poles swap places about every 11 years. At the beginning of the cycle the sunspots appear at high latitudes. As the cycle progresses, the spots crop up closer to the equator until the magnetic field suddenly switches and they disappear.

We have learned quite a bit about the Sun and its activities, but we don't know the cause of the sunspots or why sometimes the Sun has two north poles but no south pole. In the late 17th century no sunspots were seen for many years; that also marked a time of a mini ice age on Earth. --age

BPAA Financial Statement for September 2003

BALANCE SHEET:	**$**
Current Assets	21,299
Fixed Assets	246,591
Total Assets	**267,890**
Liabilities	-0-
Equity	267,890
Total Liability/Equity	**267,890**

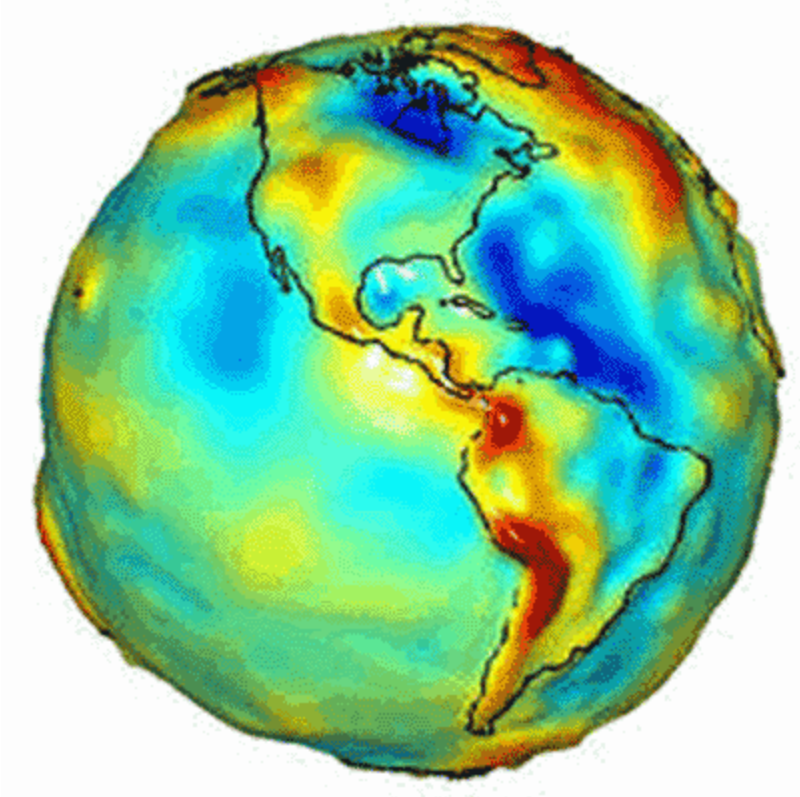
PROFIT & LOSS:	**$ Sep.**	**$ YTD**
Income:		
Contributions	-0-	8,813
Membership Dues	125	1,635
Other	0	3,171
Total Income	**125**	**13,619**
Expense:		
Administration	-0-	945
Program	127	4,786
Utilities	49	688
Total Expenses	**176**	**6,419**
Net Income (Loss)	**(51)**	**7,200**

Eric Cederwall, Treasurer

Astronomy Picture of the Day

Discover the cosmos! Each day a different image or photograph of our fascinating universe is featured, along with a brief explanation written by a professional astronomer.

2003 July 23



GRACE Maps the Gravity of Earth
Credit: GeoForschungsZentrum Potsdam, CSR U. Texas, JPL, NASA

Explanation: Why do some places on Earth have higher gravity than others? Sometimes the reason is unknown. To help better understand the Earth's surface, slight distance changes between a pair of identically orbiting satellites named GRACE have been used to create the best ever map of Earth's gravitational field. High points on this map, also colored red, indicate areas where gravity is slightly stronger than usual, while in blue areas gravity is slightly weaker. Many bumps and valleys on the map can be attributed to surface features, such as the North Mid-Atlantic Ridge and the Himalayan Mountains, but others cannot, and so might relate to unusually high or low sub-surface densities. Maps like this also help calibrate changes in the Earth's surface including variable ocean currents and the melting of glaciers.

Authors & editors: Robert Nemiroff (MTU) & Jerry Bonnell (USRA)
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& Michigan Tech. U.

This web site sent to us by a Turkish friend can be found at: http://antwrp.gsfc.nasa.gov/apod/ap030723.html

ARTICLES AND REPORTS

President's Message

Probably many of you have a story similar to mine. As a youngster I was fascinated by astronomy. I read nonfiction and science fiction books, taught myself some of the constellations, watched space missions on TV, and even wanted to be an astronomer when I grew up. As I went from high school to college and entered a profession to make a living, I somehow forgot all about my love of space and the night sky. Then one day something happened to renew my interest in astronomy and it was not long until it became a major hobby.

With my renewed interest in all things astronomical, one of the things that attracted me to BPAA was the open nature of it all: BPAA can truly be anything that you want it to be. People with good ideas willing to expend some energy can get support for just about anything astronomy related. It has happened over and over in BPAA history.

However, even though BPAA can be ***anything*** you want, it can ***only*** be whatever you are willing to make it.

As we move into the winter season, those seemingly endless cloudless nights fade into memory, and our attention turns to indoor projects.

We are currently searching for a couple of people who would like to take on the management of our facility. We could divide the responsibility so that no one person would be overwhelmed. Our building needs maintenance and repair work from time to time, and we need someone to coordinate and oversee that and keep an eye on things.

Please don't shyly wait for me to get down to your name in our membership list and call you. Come out to a monthly meeting and volunteer. Speak up, we are (mostly!) friendly, and I promise none of us bite.

Also, we have recently gathered a large amount of archival materials (books, pictures, magazines, drawings), which now sit in our library on the second floor and await someone willing to organize and catalog them. This material is a great resource, and many of our future projects will depend on the materials left to us by those who came before.

We need a person willing to handle the check-out of our small telescopes. The small scopes are another great resource, one that encourages newcomers to continue in our hobby and one that engages youngsters.

Speaking of the monthly meeting, I hope you will be able to join us in November. I will present the highlights (and there were many!) of the Galileo Mission to Jupiter, which ended in September of this year. I have asked Cathy to cover the portion on Europa and the possibility of life there.

I think that the Galileo Mission was the greatest unmanned mission of all time. Certainly there have been many other great ones, including the Pioneers, the Vikings, the Voyagers, Mars Pathfinder, Mars Global Surveyor, SOHO, Magellen, and NEAR. Come to the meeting and find out why I would say Galileo was the best of them all.

Hope to see you soon. *Paul*

Mars as Bright as Venus

O brown star burning in the east,
elliptic orbits bring you close;
as close as this no eye has seen
since sixty thousand years ago.

Men saw, but did not understand,
the sky a depthless spatter then;
goddess of love and god of war
were inklings in the gut for them.

Small dry red planet, when you loom
again, this world will be much changed:
our loves and wars, at rest, as one,
and all our atoms rearranged.

John Updike

SEEING STARS **Astronomy 0.001**

Anna Edmonds

One of the debates that has stirred some interest in recent years is concerned with describing Pluto. Is it really a planet? (Notice I refrained from saying "defining.")

Since the orbit of Uranus was discovered to be irregular back in the 18th century, astronomers have been looking for additional solar objects that could be big enough and near enough to make it wobble. This search led first to the Italian Piazzi finding Ceres between Mars and Jupiter in 1801. It turned out to be both in the wrong place for Uranus and not big enough; it was the first of what we know now as asteroids. Next, in 1846 the Frenchman LeVerrier and the Englishman Adams discovered Neptune. Neptune was big, but it too had a wobble, so the questions weren't answered completely.

Then in 1930 Clyde Tombaugh, working in Flagstaff, Arizona, found a faint, slow-moving object farther away than Neptune that seemed to satisfy the need. It was named Pluto, and after it was more completely studied it turned out to be smaller even than our Moon. Therefore Pluto couldn't be the missing large mass.

But then what is Pluto?

Pluto orbits around the Sun in a tilted ellipse at an average of about 40 AU (one Astronomical Unit is the distance from the Earth to the Sun). It is a rocky object like Earth, and like Earth it has a moon. It is spherical, not lopsided like most of the asteroids. And it has a thin atmosphere. It is a "wanderer"—the original definition of "planet." Besides these qualities, it's been called a planet for over you years. So do these qualities make it a planet?

But Pluto's small size (about 750 miles radius), and the fact that its orbit differs considerably from the other "accepted" planets, made astronomers question what it really is and look again for what else might be in its region.

As far back as 1953 a British amateur astronomer, Kenneth Edgeworth, predicted that a very large number of small bodies might exist in the outer solar region. With more study, others suggested that if there were enough of them they might account for the wobbles. These bodies could also be stuff that was left over from the formation of the Sun and the planets we know already.

One study concentrated on comets with the questions of where they come from and what they are. A striking number of comets originate in a region between 30 and 100 AU, the region where Pluto is orbiting. Apparently the region is shaped like a disk circling the Solar System; it has become known as the Kuiper Belt. The composition of comets is what would be expected in this cold outer region, that is, dirty snowballs, or frozen gasses loosely packed around a rocky core. With the help of a new generation of telescopes, the first real objects in this belt were photographed in 1992 by astronomers Jewett and Luu. Since then several other Kuiper Belt objects have been discovered, the largest of which is 15 miles in diameter. The current theory is that occasionally these objects are pulled out of their usual orbits and sent toward the Sun. When they approach the Sun they not only throw off a cloud of their gasses but also because of that cloud they become visible as comets.

The study of the Kuiper Belt objects has still left unanswered the question of what Pluto is. It has a rocky core surrounded by gas; its orbit is elliptical like a comet; and its average distance places it well within the Kuiper Belt. Perhaps it's a tiny planet, or perhaps it's a large future comet. British scientist Alan Fitzsimmons may have come the closest: He remarked that Pluto is merely schizophrenic, a bit of both.

References:

Beyond Pluto, John Davis, Cambridge University Press, 2001

"The Kuiper Belt and The Oort Cloud," http://seds.lpl.arizona.edu/nineplanets/nineplanets/kboc/html

"The Kuiper Belt," http://www.solarviews.com/eng/kuiper.htm

Congenital Infectious Enthusiasm: A Tribute to John H. Rudolph

By Bill O'Neill

John Rudolph spread infectious enthusiasm and, if you were susceptible, no immunity could be developed. Somehow he would become aware of something off-beat and then find a way to bring it to others' attention. One example of this process occurred during our Astronomy Day in July. With the help of Sally Metcalf and Diane Clouser, we were engaged in setting the planets in their orbits on the Solar System Walk-- which John had designed and had just made new interpretive posters for. As we walked John said, "You're interested in navigation, aren't you?" Sensing this might open a topic, such as GPS technology or how Polynesian navigators found their way around, to which I could make no contribution, I replied simply, "No!" Never one to be daunted by rejection, John rolled right on into a fascinating description of what he was reading at the time.

The subject turned out to be a book, *1421: The Year China Discovered America* (published around the first of this year), by Gavin Menzies, a retired British submarine commander. In his inimitable way, John described how the 3rd Ming Emperor had sent fleets of

"treasure ships" to the far reaches (Cont. on p.9) of the world. Many were enormous ships for their time, 400 feet long and 160 feet wide (several times the size of those sailed by the European explorers we all know about), some with nine masts. They were armed with cannons and rockets, and included vessels designed to carry three month's supplies of fresh water or hundreds of horses. In command were eunuch admirals, foremost of which was Zheng He (also known as Sin Bao and, in legend, aka Sinbad the Sailor). Various of the squadrons allegedly sailed to and from regions (such as around the Cape of Good Hope) that wouldn't be explored by Europeans for decades; they went even to Antarctica and Australia, which wouldn't be visited again until Capt. Cook was there three centuries later.

Menzies found clues that they established settlements on both coasts of the Americas and sailed up the Mississippi and Sacramento Rivers. He is convinced that those Chinese admirals brought back charts, derived via exclusive navigational technologies, that provided some later European explorers with foreknowledge that had been obscurely presented by renaissance cartographers. This secret information apparently had been carried overland to Europe by Niccolo da Conti, who happened to be in Calcutta when some Chinese ships visited. Shortly after the explorers' return to China, most of their fleet and documentation of its accomplishments were intentionally destroyed, due to a reversal of the policy of outreach by a new administration, which enforced a sort of fundamentalist Confucianism that emphasized domestic affairs rather than exploration and foreign trade.

Existence of a so-called "Treasure Fleet" is known to modern China scholars and had been concisely documented by the National Geographic historian, Louise Levathes, in *When China Ruled the Seas* (1994). But Capt. Menzies' speculations and aggregation of fragmentary evidence led him to much more global implications, and a much thicker book! It engendered scornful criticism and disdain from professional historians, though most admitted that *1421* is highly entertaining, eye-opening, and describes in a colorful way its author's pursuit of a notion that the history taught in our schools is missing an important chapter about the exploits of early 15th century Chinese sailors.

You can see that John provoked my interest as the instigator that he was, and added yet another topic to the list of things I think I ought to try to learn more about. I'll bet I'm not the only one that John Rudolph inspired that way, and we probably won't recover soon.

Black Holes: Feeling the Ripples

Astronomers have finally confirmed something they had long suspected: there is a super-massive black hole in the center of our Milky Way galaxy. The evidence? A star near the galactic center orbits something unseen at a top speed of 5000 km/s. Only a black hole 2 million times more massive than our Sun could cause the star to move so fast. (See Oct. 17, 2002 issue of *Nature* for more information.)

Still, a key mystery remains. Where did the black hole come from? For that matter, where do any super-massive black holes come from? There is mounting evidence that such "monsters" lurk in the middle of most galaxies, yet their origin is unknown. Do they start out as tiny black holes that grow slowly, attracting material piecemeal from passing stars and clouds? Or, are they born big, their mass increasing in large gulps when their host galaxy collides with another galaxy?

A new space telescope called LISA (short for "Laser Interferometer Space Antenna") aims to find out.

Designed by scientists at NASA and the European Space Agency, LISA doesn't detect ordinary forms of electromagnetic radiation such as light or radio waves. It senses ripples in the fabric of space-time itself—gravitational waves.

Albert Einstein first realized in 1916 that gravitational waves might exist. His equations of general relativity, which describe gravity, had solutions that reminded him of ripples on a pond. These "gravity ripples" travel at the speed of light and, ironically, do not interact much with matter. As a result, they can cross the cosmos quickly and intact.

Gravitational waves are created any time big masses spin, collide or explode. Matter crashing into a black hole, for example, would do it. So would two black holes colliding. If astronomers could monitor gravitational waves coming from a super-massive black hole, they could learn how it grows and evolves.

Unfortunately, these waves are hard to measure. If a gravitational wave traveled from the black hole at the center of our galaxy and passed through your body, it would stretch and compress you by an amount far less than the width of an atom. LISA, however, will be able to detect such tiny compressions.

LISA consists of three spacecraft flying in formation—a giant triangle 5 million km on each side. One of the spacecraft will shoot laser beams at the other two. Those two will echo the laser signal right back. By comparing the echoes to the original signal, onboard instruments can sense changes in the size of the triangle as small as 0.0000000002 meter (20 picometers).

With such sensitivity, astronomers might detect gravitational waves from all kinds of cosmic sources. The first, however, will probably be the weightiest: super-massive black holes. Will "feeling" the ripples from such objects finally solve their mystery, or lead to more questions? Only time will tell. Scientists hope to launch the LISA mission in 2011.

(The source of this article is: Nancy Leon, Education & Public Outreach Lead, NASA New Millennium Program.)

IN THIS ISSUE;

Battle Point
Astronomical Association
P. O. Box 10914
Bainbridge Island, WA 98110

BATTLE POINT ASTRONOMICAL ASSOCIATION
P.O. Box 10914, Bainbridge Island, WA 98110
Website: http://bicomnet.com/ritchieobs/
Ritchie Observatory, Battle Point Park
Bainbridge Island, Tel. (206)842-9152
Public Tours:
To be announced, or by special appointment.

Officers & Directors
Paul Below, President
(360)779-2961, paulbelow@computer.org
Harry Colvin, Vice President/Special Interest Group Coordinator
(206)842-6617, hcolvin@bainbridge.net
Richard V. (Rik) Shafer, Secretary
(253)639-0927, rikshafer@aol.com
Eric Cederwall, Treasurer
(206)842-8587, ecederwall@bainbridge.net
Mike Walker, Education Director
(360)638-1576, michaelw@cksd.wednet.edu (work)
Anna Edmonds, Publicity Director
(206)780-2708, waed@bainbridge.net
Diane Colvin, Events Director
(206)842-6617, dcolvin@bainbridge.net
Malcolm Saunders, Telescope Director
(206)780-1905, saunders@drizzle.com
Edward M. (Mac) Gardiner, President Emeritus/Founder
(206)842-3717 macg@bainbridge.net
Ed Ritchie, Chief Astronomer/Founder
1993-1997
John H. Rudolph, Facility Director/Founder
1993-2003

Bill Edmonds, Editor *BPAA Newsletter*