Winter 2012-13
Issue 100

Battle Point Astronomical Association BPAA

Quarterly

www.bpastro.org Bainbridge Island, WA

Events Calendar

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

DECEMBER

December 21 Winter Solstice (3:12 a.m. PST)

December 28 ○ Full Moon (2:21 a.m. PST)

JANUARY

January 1 Earth at perihelion

January 3 Quadrantids meteor shower peak (5 a.m. PST)

January 9 Asteroid 99942 Apophis flyby, BPAA Annual Business Meeting, all members invited

January 11 ●

January 12 7:00 p.m. Planetarium Show and Stargazing

January 26 ○ Full Moon (8:38 p.m. PST)

FEBRUARY

February 9 ● 7:00 p.m. Planetarium Show and Stargazing

February 16 Mercury at greatest elongation east

February 25 ○ Full Moon (12:26 p.m. PST)

MARCH

March 4 Patrick Moore's birthday (1923-2012)

March 9 7:00 p.m. Planetarium Show and Stargazing

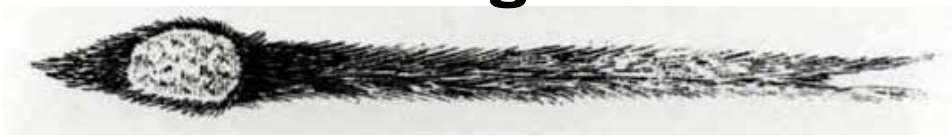
March 10 Daylight "Saving" Time begins, Comet C/2011 L4 Pan-STARRS at perihelion

March 11 ●

March 20 Vernal Equinox (4:02 a.m. PDT)

March 27 ○ Full Moon (2:27 a.m. PDT)

Year of the Long-Haired Stars



Cometary form from Johannes Hevelius' Cometographia (Danzig, 1668) Image credit: NASA/JPL

It is a great testament to the vision of our founders, Mac Gardiner, Ed Ritchie, and John H. Rudolph, that you are reading issue number one hundred of the Battle Point Astronomical Association's newsletter, the *Quarterly*. Astronomy is amazing. So, too, are the many starry-eyed people of Bainbridge Island (and beyond).

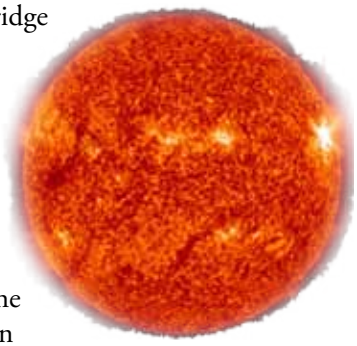


Image credit: NASA

January begins with the Sun at perihelion, its closest approach to Earth for the entire year. Actually that's not quite right; it's the Earth that does most of the moving. Still, from our planet-bound vantage it will be the Sun that appears to spend the next six months drifting away. But it will, or at least should, be ramping up. This year the Sun may finally reach Solar Maximum (a condition unrelated to the Earth-Sun distance). So watch for sunspots and the glorious aurora!

The Quadrantids, the year's first meteor shower, is one astronomical show that has perpetually eluded me. It is notoriously brief, with a useful maximum lasting only a few hours, so only a small portion of the planet is favored by a nighttime maximum during any given year. And, as Washingtonians know all too well, in January weather does not always cooperate. This year the radiant rises a couple hours before dawn, briefly raising hope. Unfortunately the gibbous Moon will be up then too. I'll still try. It could happen. Some year I'll get to see this last descendant of Quadrans Muralis.

Quadrans Muralis, a constellation no longer recognized by astronomers, from A Celestial Atlas *by Alexander Jamieson, 1822, courtesy Linda Hall Library of Science, Engineering & Technology.*

A more difficult observation will be January 9's flyby of asteroid 99942 Apophis. Apophis, appropriately named after the Egyptian god of chaos and darkness, will be too faint for most of us, at magnitude 16. But it will be intensely studied. Apophis has the unpleasant distinction of being, so far, the only known celestial body possibly able to devastate our planet in our lifetime. Current estimates claim there's "only" one chance in 250,000 that its 2036 approach will be collision. This should not be considered comfortable. Perhaps we'll luck out on Apophis. But someday Earth will take a hit. This is one reason why we need spaceflight, to deflect destruction and save our planet. After the flyby it is likely that scientists will revise the quarter-million-to-one odds. Three days later we'll host our first Planetarium Show and Stargazing of 2013. Come find out your odds of living past 2036!

Calendar Notes *con't on page 2*

Calendar Notes *con't from page 1*

Cometary form from Johannes Hevelius' Cometographia (Danzig, 1668) Image credit: NASA/JPL

Another notoriously difficult observation is Mercury. Mid-February offers this year's best chance for Northern Hemisphere folk. In spite of claims to the contrary it is actually quite easy to see the winged messenger of the gods. No equipment is required. All that is needed is a casual gaze across a low western horizon a half-hour or so after sunset. It should be visible up to a week either side of February 16th's greatest elongation east. The one trick is finding an unobstructed horizon. Although I've glimpsed Mercury through the trees from Battle Point Park, the view is far better from the beach. If you've parked at the Observatory I suggest walking down to the beach access at the foot of Skinner. You might want a flashlight for the walk back. (Of course, if you're like me, taking a flashlight is a questionable practice. I typically take one, all properly red-filtered for night-vision preservation. But I'm too macho to use it. Somehow I seem to think it better to utter a string of curses at every tree and rock and blackberry bramble I snag.) Stay as long as you can. Mercury looks stunning as it sinks into the Olympics.

After likely missing the Quadrantids, Apophis, and maybe even Mercury, my next recommendation is another hit-or-miss, a comet, C/2011 L4 Pan-STARRS. The Panoramic Survey Telescope and Rapid Response System (Pan-STARRS) is an Hawaiian facility tasked with detecting Solar System threats like Apophis. It found this comet last July. By March 10, the comet should be easy to see and may reach magnitude zero. Comets are unpredictable; it could fizzle out—plenty have; but C/2011 L4 Pan-STARRS looks primed to put on an amazing show.

In any ordinary year, Pan-STARRS' comet would be the highlight. But I would be remiss not to mention that just a couple weeks ago two Russian amateurs discovered comet C/2012 S1 (ISON) that, come Christmas 2013, may be the best comet any of us have ever seen. Expect to hear lots more about this one.

As I write this Christmas 2012 approaches—a time when, mixed with giving, some of us try to find a little extra to pad our astronomical budget. Considering that 2013 looks to be the Year of the Comets, I'm awaiting a large, fast lens that should make a stunning Richest Field Telescope (RFT). I'm really a pretty lousy craftsman; but I do get a kick out of looking through hand-made telescopes. In this age of techno-overkill I love the elegant simplicity of lens, mirror, and sky.

—Cheth Rowe

Steve Ruhl President's Message

First, I would like to congratulate Michaela Leung on winning the NASA Cassini Scientist for a Day Essay contest *http://saturn.jpl.nasa.gov/education/scientistforaday11thedition/winners2012/* (also see article page 3). I am looking forward to reading her essay on Saturn as soon as it is posted. Michaela would like to be an astronaut some day. I hope this first encounter with NASA is a good omen.

We recently signed a new lease on our building. We have been in negotiations with the Parks Department for a number of years to obtain formal permission for the sundial project. As it progressed, the members of the Parks board suggested that the process include renewing the lease. The original lease was for 35 years and we were a little more than half way through it. While it delayed obtaining permission, I think the end result is worth it. We now have a lease for the building and the sundial location until November 1, 2047.

Now we need to finish funding the sundial. This formal permission should give us a better chance for grants. It is a little hard to go to a granting agency and ask for money for something when you do not have a legal basis for putting the thing up. We have applied for a community grant from BI Rotary for funds for the sundial. And yes, they did ask if we had the"right to access these facilities." We will continue to look for funding options until we have enough.

And speaking of money, I would like to put a plug in for "One Call for All" here on the island. They help many non-profits on the island and provide some of the best glue for this community. Our "One Call For All" funds cover a large portion of our operating expenses such as phone, porta-potty, and heating oil. (Yes, we do have heat in the building. It is a difficult building to heat and it takes a long time to get going.) Anyway, if you are inclined to donate to us, "One Call For All" is an easy way to do it. If you're not inclined to donate to us, consider the other non-profits that rely on "One Call for All" for support.

Now, if the sky would clear for one of these long winter nights….

Any member who is planning 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 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/*. Request to join at *http://groups.yahoo.com/group/bpaa/*. The system will send us a message, and we'll approve your request after we verify your membership.

BPAA Member Michaela Leung Wins NASA Essay Contest

For the past year or two, Michaela Leung has attended almost all of BPAA's Planetarium shows. An aspiring astronaut, the Odyssey Middle School seventh grader never wants to miss the monthly Saturday night presentations at the Ritchie Observatory.

In 2012, Michaela also took the "Introduction to Astronomy" and "Advanced Astronomy" classes taught by Steve Ruhl, BPAA President, and Dave Fong, education officer. Over the summer, with help from Malcolm Saunders, chief astronomer, she borrowed and used BPAA telescopes.

The astronomy education offered through BPAA helped Michaela this fall when she decided to enter the NASA "Cassini Scientist for a Day" essay contest. Participants in grades 5–12 had to explain why they would choose to aim Cassini's camera at one of three target areas: Saturn's moon Pan, Saturn's F ring, or Saturn. After seeing the essay contest on the NASA website, Michaela chose to write about Saturn. An excerpt:

> "One of the rings, the E ring, is made mostly of small particles spewed out by Enceladus. Most of the other rings are made out of small pieces of ice and rock. How did they become that way? Are they remnants of unfortunate moons? Or are they the last remains of planetoids from the formation of the solar system? These are just a few of the many questions that could be answered…"

More than 2,000 students from 36 states entered the contest. A panel of Cassini scientists, mission planners and the education and outreach team at NASA's Jet Propulsion Laboratory in Pasadena, California judged the essays. On Thursday November 15, Odyssey Middle School teacher Liz Finin called Michaela to tell her that she had been selected as a national winner.

The 11 winners of the award, along with their classmates, were invited to a nation-wide videoconference on December 12 with three JPL Cassini scientists: Rachel Zimmerman Brachman, Solar System and Technology Educator; Amanda Hendrix Ph.D., Planetary Scientist; and Jo Pitesky Ph.D., PlanetQuest Scientist and Cassini Science Planner.

The scientists shared Cassini's most recent images of Pan and the F Ring.

Michaela asked the scientists, "What more do you hope to learn from the Cassini Solstice Mission?" They listed the thermal anomalies of Mimas and Tethys, the seasonal variations and polar vortex on Saturn, the mass of the rings, and the lakes on the surface of Titan. They also described the end of the mission in 2017, when Cassini will plummet into Saturn's atmosphere.

Other students asked: "How does a probe analyze samples?" "Will NASA return to Saturn?" "Is there life on other planets?" "Why did NASA choose Saturn?" One elementary school student in California wanted to know "How did you become interested in becoming a scientist?" The three women told stories of fascination with space and science that began when they were the ages of this year's contest winners.—*Julie Leung*

Using The Star Test To Collimate Newtonian Telescopes

When I set up my telescope for a night of observing the first thing I usually do is look up to see whether bright stars are twinkling or not. Here in the Pacific Northwest the jet steam is often overhead. Twinkling stars are a sure sign of its presence.

The presence of atmospheric turbulence (twinkling stars) makes it almost impossible to see images through your telescope that have high definition. It's very similar to being in a swimming pool and trying to read a newspaper held above the water on a windy day. The ripples on the surface of the water would make reading the paper impossible, but if the air was very still and the surface of the pool was like glass, it would be very easy to read the paper.

So, when I see that bright stars are twinkling, I know trying to see detail will be frustrating and I make plans to view extended objects like nebulae and galaxies, objects that usually have very little definition anyway and whose images won't suffer from turbulent skies. This works out better, anyway, because high winds overhead often means skies that are freer of clouds and atmospheric humidity—skies with better transparency. This produces darker skies which allows for better contrast against extended, deep sky objects.

When stars are twinkling and I decide to concentrate my observing on deep sky objects I will set up my telescope as usual but I won't go overboard in collimating my telescope because I know the turbulent skies are the weak link in achieving detailed resolution. Going back to the example of the swimming pool, if you needed glasses to read, it wouldn't matter if you

The Star Test *con't next page*

The Star Test *con't from page 3*

wore glasses or not if the surface of the pool was ripply because you couldn't see detail anyway. With twinkling stars perfect collimation is not really necessary.

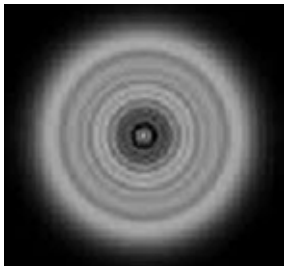
However, when I look up and bright stars are steady points of light, I know the upper atmosphere is relatively calm and the possibilities are high that we'll have very good seeing conditions. In that case I'll take a little more time to collimate my telescope using my laser collimator. And, later in the evening, when my primary mirror has cooled to the ambient air temperature, I'll use a star test for the finest collimation.

Many amateur astronomers, myself included, consider the star test to give the ultimate in collimation. Of course, this assumes that the focuser and secondary mirror are already properly aligned and collimated using conventional tools (sight tubes, cheshire eyepieces, laser collimators, etc).

What I like about using the star test to collimate a telescope is that you're using an actual image produced by the optical train you're using for the alignment.

It's easy to do once you understand the basics. While it's possible to do it by yourself, it's much easier to do with another person, one looking through the eyepiece and one turning the collimation screws on the primary mirror.

- To start, insert an eyepiece into the focuser that gives a high magnification. I recommend an eyepiece with a focal length shorter than your telescope's f/ ratio. For example, if your telescope has an f ratio of f/6 you might want to use a 4mm-5mm eyepiece. For an f/8 telescope use a 5mm-6mm eyepiece. The exact number isn't important, just so the magnification is high.
- Next, point your telescope towards Polaris, the North Star. That's because it's a relatively bright star and it's circumpolar, meaning it won't be moving out of your field of view during the test and will remain centered. If you're lucky enough to be using an equatorial platform you can point the telescope at any bright star.
- Look through the eyepiece and center the star as exactly as you can within the field of view. Then turn the focus knob until the star becomes a large, unfocused blur composed of light and dark rings in a roughly bulls-eye pattern. If your telescope is correctly collimated the rings will be concentric and perfectly centered in relation to each other—a perfect bulls-eye pattern. However, if your telescope is out of collimation the rings will appear to be lopsided. To get perfect collimation adjust the collimation screws on the primary mirror so the bulls-eye pattern is perfectly symmetrical when the unfocused star is centered in the field of view.



You can do this through trial and error but it becomes a very hit-or-miss process as far as which screws to turn, how much to turn them and which direction to turn them. This is much easier to figure out if you have a helper. The following instructions work best with a helper. If you're doing it alone, use the same method, but expect collimation to be slower.

- While looking through the eyepiece at the concentric rings, move the telescope so the blurred image moves around in the eyepiece's field of view. You will notice that as the image moves around the bulls-eye pattern will become more or less symmetric. If you were fairly close with your original collimation you won't have to move very far to find a place where the rings become perfectly centered on each other. If you were farther out of collimation you'll take the image to the place where the rings are the closest to being centered. Now to collimate the primary mirror all you need to do is turn the collimation screws so the image of the blurred star returns to the center of the eyepiece's field of view.
- To make it easier to know which screws to turn, put your hand into the telescope's optical path, next to the secondary mirror. You will see the silhouette of your hand against the blurred image of the star. Move the silhouette around the optical path until it's in line with the direction you need to go to move the blurred star image into center of the field of view. The primary mirror's collimation screws that are either directly below or directly opposite from your hand are the ones to turn. If you're lucky there will only be one collimation screw along that path and that's the one to turn. Otherwise you'll have to adjust two screws in concert with each other.
- Have your helper turn a screw while you're looking through the eyepiece, watching which direction the blurred image moves. If it moves in the wrong direction have them stop and reverse. At this point it's just a matter of moving the concentric ring image back to the center. If the image is still slightly off, move the whole telescope tube again to align the concentric rings and repeat the process to move the image back to the center of the field of view.

—Doug Tanaka

For the best results it's important to understand this process only makes adjustments to the primary mirror. I've assumed that the focuser and secondary mirror have been properly positioned using other methods (sight tube, cheshire eyepiece, laser collimator, etc.).

One Hundred and Counting

This issue of the *Battle Point Astronomical Association Quarterly* celebrates the one hundredth appearance of news about organized star watching on Bainbridge. Our *Newsletter* has chronicled the beginning and the development of the Association for over eighteen years. From the details of the changes to the Helix House/ Ritchie Observatory to the broad sweep of the members' interests the excitement of the group comes alive in its pages. It preserves the names of people who have been most influential: the three founders, Mac Gardiner, Ed Ritchie and John Rudolph, through the succeeding Board members. It has covered the mundane and the sublime; the renovation and the installation of astronomical equipment, the concern to have plants around the building reflect astronomical interests, lectures by members and experts, professionals and amateurs; astrophotography, financial records, mythology and archeoastronomy. In fact, the whole universe is its subject.

Many people on the island have telescopes; in fact several personal observatories have been built with highly sophisticated equipment. But BPAA has concentrated varied astronomical interests, and made a place for members to share their enthusiasms and come together.

Since May 1994 BPAA volunteers have created a paper trail (and now an electronic one) in its regular publication of the interests, the challenges, and the activities of its creative and varied membership.

BPAA was begun with the purposes of giving to the community an up-to-date center for the public to enjoy, to learn, and to contribute to astronomy. At the beginning the emphases in the *Newsletter* were on making this center, a place to share enthusiasms, knowledge, and curiosity. That meant attracting people who would give freely of their time and their abilities. It turned out that the sheer possibility of such a facility existing here has called forth a remarkable collection of local residents eager to contribute their skills in accounting, mechanical engineering, architecture, optometry, physics, publication work, biology, and, yes, astronomy.

The first Board of Directors was told by a professional fund raiser that their idea of a volunteer organization would not get off the ground without a dedicated paid staff. An estimate of the amount needed for the first three years was $125,000. The fund raiser was thanked politely, and the Board set about starting a financial campaign—minus the paid staff.

The *Newsletter* acted to encourage the local community to support the facility financially. It reported the focus of the several drives, and then the names of the contributors along with the total amount raised. With Eric Cederwall's help, precise accounts of income and expenditures were kept and presented at the monthly meetings. Eric reported in the second *Newsletter* an income of $1,550, and an expense of $725. That was a start; a positive balance has been kept ever since. Shortly thereafter the Board could report a gift worth, on the books, $90,000. (This was the value assigned by Boeing to two Zerodur mirrors it found useless with the end of the Star Wars program.)

To insure that the Association was a reality meant setting up a program of activities that would entice people to come to the facility to learn and explore and share what they had learned. The timing was favorable: in July the demise of the Shoemaker-Levy comet on Jupiter caused a lot of questions of "what if it had been aimed here." Professor Paul Middents who was teaching astronomy at Olympic College helped explain the event to a crowd gathered at the Helix House with telescopes pointed at our "distant" neighbor. The lectures, the star parties, and the chances to use donated equipment, (like the loaner telescopes that Michaela Leung borrowed—see page 3) were described in the *Newsletter*.

One Hundred *con't on page 6*

Pictures from the *Newsletter*...

Ed Ritchie building the Ritchie Telescope.

The foundation for the Ritchie Telescope Dome.

Volunteers build the dome.

BPAA at the Grand Old Fourth

Sundial Model at Bluegrass Festival

One Hundred *con't from page 5*

With Sally Metcalf's dedicated efforts, John Rudolph's dream of a planetarium became a reality. BPAA raised money for a projector and Jim Vaughan designed a dome that was built in the meeting room so that programs about the sky could be projected overhead. Of course, the *Newsletter* announced it.

Members also used the *Newsletter* as a place where they could tell each other about their interests: Tom Medchill wrote about the Table Mountain Star Parties; John Rudolph meticulously informed the readers about the hard work of the people who helped renovate the building; Ed Ritchie talked about his progress in grinding and figuring the mirror; Mac Gardiner usually had some problem in mathematics; and Harry Colvin, Doug Tanaka (see article page 3), Stephen Ruhl, Anna Edmonds, Bill O'Neill, Jim Young, Frank Anderson, and Harry Colvin often contributed to the paper.

Hanging the domed planetarium screen.

Planetarium projector

The *Newsletter*—now *Quarterly*—with Diane Colvin's and, more recently, Cheth Rowe's work—has kept a calendar of events where members can check on both astral and worldly goings-on. In its reports of activities it has provided a record of those who have been active and a reminder of how their activities have changed. The *Newsletter* is distributed through the Kitsap County Library system, by mail to members who pay a nominal fee, as well as on the BPAA website, and gives BPAA an authenticity in its claims of serving the community.

When Vicki Saunders accepted the responsibility for editing and producing the *Newsletter* she gave it a major boost in presentability—color, improved format, electronic access. With these her excellence has been twice recognized by the Astronomical League's Mabel Stearns awards.

BPAA faces a lot of challenges as it looks ahead. The Association always welcomes new members. It needs to keep working to clean up our sky so we can see the stars. It needs to keep offering basic classes in astronomy: in learning the constellations, in using telescopes, in making robots, in tides and astrophotography, and a dozen other related subjects.

Astrophotography by Steve Ruhl

Mac Gardiner liked to remind the first editor/publisher Bill Edmonds that the Newsletter was of no financial value. It was never listed as one of the assets in any formal accounting. Yet he and others thought of it as part of the glue that held the Association together.

We're now at one hundred and counting. Counting on you.

—Anna Edmonds

Editor's Note: During my tenure, Anna Edmonds has contributed more regularly to the *Newsletter* than any other BPAA member. Before my tenure, she edited the publication with Bill Edmonds, as well as serving on the BPAA Board. She and Bill also won the Astronomical League's Mabel Stearns award for their work on the *Newsletter*.

Nels Johansen with the renewed 16"

Sweet 16

It all started long, long ago. Around the turn of the millennium, BPAA members built a 16 inch telescope. They incorporated some new ideas into a lightweight telescope, including a three-sided secondary mirror holder made from carbon fiber. They fastened the mirror with glue, plastic, and screws. But stray light was attacking the secondary mirror and eyepieces.

The secondary cage was made from Styrofoam to save weight, supported by three one-half inch poles and six strings. Promising ideas, but the materials lacked strength and the telescope could not be collimated, not even close. It was also pretty difficult for one person to set up.

After studying what was happening and why, Dave Janich and I started the process of rebuilding. Later, Eben Calhoun joined in. We replaced the secondary mirror holder with a store-bought, off-the-shelf, four-vane spider; built a new secondary cage six inches taller to stop the light from hitting the focuser and secondary mirror; constructed a new platform to hold the secondary cage and attached the poles and strings to it; strengthened the support system by replacing the three one-half inch tubes and six strings with four three-quarter inch tubes and eight strings; and moved the leg supports into the four exterior corners, attaching the strings as close to the base and top of the legs as possible and keeping everything symmetrical. The strings have small turnbuckles in them to allow very fine adjustment, in order to perfectly center the secondary cage over the mirror. The original primary mirror box twisted as the telescope went from vertical to horizontal, so we added more plywood to the exterior to strengthen it, and covered the bottom of the mirror box with a light shield to stop light from entering the telescope.

The telescope is assembled and in the shop now. We have put the laser in the focuser and run from vertical to horizontal without any shift in the laser position. Success at last! We look forward to first light. However all is not finished: we still need to add electrical fans, build a heated eyepiece box, rebalance the telescope, and sew a new light shroud. Then we'll adjust the strings to their final length. The hardest of all is getting a beautiful clear night for the next star party!

We have had a great time rebuilding the 16". I thank Dave Janich and Eben Calhoun for working on the telescope with me.—*Nels Johansen*

James Young February 12, 1921–December 5, 2012

It is with deep regret that we report the death of James Young on December 5. At the same time we express our thankfulness for the years he was active in BPAA, serving on the Board and contributing to community involvement in astronomy.

A professional astronomer himself, Jim's career began during World War II with the use of radar in the army. He went on to become co-director of the Holmdel Radio Research Laboratory of Bell Telephone Laboratories in New Jersey. On retirement he and his wife Janet moved to Bainbridge Island. Janet preceded him in death.

Jim talked to BPAA in November 1996 about his field of radio astronomy: "History is fun, when it occurs within one's own lifetime and

starts at the place where one spent most of his working career [the Holmdel Laboratory]. The start was the reception of radio waves identified as coming from the stars by Karl Jansky in the early 1930s. A later event at the same location that led to the awarding of the Nobel Prize in physics to Arno Penzias and Bob Wilson in 1978 was the discovery of the cosmic background radiation noise, the 'noise' left over from the 'big bang.' "

The *BPAA Newsletter No. 17*, January-February 1997 goes on to report "[Jim's] lecture was illustrated by slides showing radiographic plates covering radio and radar observations within the solar system, radio maps of the center of our galaxy, the Milky Way, and other objects such as quasars and supernovas from distant galaxies. Strikingly evident were the plumes and debris extending over a hundred thousand light years of space from some of these objects. Radio astronomy has produced the most accurate measurements that we have of these objects which can be identified to a millisecond of arc."

There will be a memorial service at Rolling Bay Presbyterian Church at 2:00 p.m. on January 3.—*Anna Edmonds*

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In this Issue

Articles

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Chief Astronomer 1993–1997
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BPAA would like to thank ONE CALL FOR ALL *for their generous support*