Fall 2010
Issue 91

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)

SEPTEMBER

September 1 ◑
7 p.m. BPAA Board Meeting

September 4
7:30 p.m. Planetarium Show "Galaxies in the Hood," and Star Party

September 8 ●

September 14
John Dobson's 95th birthday

September 15 ◐

September 23 ○
Autumnal Equinox 8:09 PDT

September 30 ◑

OCTOBER

October 2
7 p.m. Planetarium Show and Star Party

October 4
53rd Anniversary of Sputnik 1, first man-made object to orbit Earth

October 6
7 p.m. BPAA Board Meeting

October 7 ●

October 14 ◐

October 21
Orionids Meteor Shower Peak

October 22 ○

October 30 ◑

NOVEMBER

November 3
7 p.m. BPAA Board Meeting

November 5 ●

November 6
7 p.m. Planetarium Show and Star Party

November 7
Daylight Saving Time Ends

Calendar con't page 2

Sundial and Bluegrass

The all-day 5th Annual Bainbridge Bluegrass Festival on July 24th featured music, crafts, jam sessions, picnics, children's games—and a life-size model of our proposed sundial. It was a fine, hot, sunny day, and the festival stage was set against the north facing wall of the Ritchie Observatory. Bluegrass attendees on the berm looked across and up at our domed telescope, like sun worshipers of old. Bill Baran-Mickle put the wooden model of our proposed sundial on top of the north berm, our preferred location, for public comment. BPAA volunteers talked to attendees about their impressions of the sundial and location. Both got complete support. "Who would not like a sundial?" was the general refrain. Apparently it's true. We are all sun worshipers, or at least sundial lovers—now, to get this message to the Park Board.

BPAA volunteers Jody and Russ Heglund set up a table outside of the Observatory, handed out brochures and talked to people about BPAA and astronomy. Malcolm and Vicki Saunders picked up where Russ and Jody left off, and Keith Ost led innumerable tours of the dome. Bill Baran-Mickle took photos, and we all took comments. More photos and a sampling of public comments on pages 3 and 4.—*Russell M. Heglund and Vicki Saunders*

November 10
Deadline for Winter Issue of BPAA Newsletter

November 13 ◐

November 17
Leonids Meteor Shower Peak

November 21 ○

November 28 ◑

DECEMBER

December 1
7 p.m. BPAA Board Meeting

December 4
7 p.m. Planetarium Show and Star Party

December 5 ●

December 13 ◐
Geminids Meteor Shower Peak

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.

CALENDAR NOTES: What a summer! It arrived late, but once the weather pattern changed for the better, we were gifted with a long stretch of clear skies. Those of you who are suffering from the resultant sleep deprivation, may welcome fall this year. Or perhaps clear skies will continue. At least autumnal evenings offer extra hours of darkness for extended viewing, allowing an earlier bedtime.

Autumn offers great viewing, although the constellations of autumn are dimmer than those of other seasons. The best starting point is the W-shape of Cassiopeia. Below Cassiopeia is the constellation Pegasus. You'll find the Andromeda galaxy in the constellation Andromeda that extends from the upper left corner of Pegasus. The galaxy is the most distant object visible to the unaided eye. With binoculars, you can see the oval shape. Light from the stars in Andromeda takes more than two million years to reach Earth.

The Andromeda Galaxy Courtesy NASA

In late Fall you may want to get your reclining lawn chairs out of storage for viewing meteor showers. The best bets are the Orionids, peaking on October 21, and the Leonids, peaking on November 17. The Orionids are dust particles thrown off by Halley's comet. They were first discovered in 1839. The Leonids were discovered in 1833, and would have been hard to miss. Astronomers estimated the rate at a thousand meteors per minute! The Leonid meteors are dust particles ejected from the periodic comet Tempel-Tuttle.

Our monthly planetarium show times are 7:30 p.m. in September and 7:00 p.m. in October and November. These shows continue to draw large crowds. Join us this fall if you haven't yet had the chance to attend. The topics vary and are always interesting —*Diane Colvin, BPAA Events Manager*

Good Things Happening

PRESIDENT'S MESSAGE: Every once in a while a good thing happens, even though Murphy still tries to get in the way. Back in the early part of this year, BPAA member and Olympic College Astronomy Professor Dave Fong had Greg Hunt as a student. Greg is an enthusiastic student of astronomy and is studying for his teaching credential. Greg was doing his teaching intern work at Peace Lutheran Elementary School in Bremerton and decided that a portable planetarium experience would be a good thing for his students in the after-school program.

Normally BPAA would gladly provide a planetarium show for a school such as Peace Lutheran, but we had scheduling conflicts. Greg took it upon himself to develop a lesson plan, learn the planetarium scripting language, develop a series of scripts, and learn to use the planetarium and set up the portable dome.

Everything was scheduled to happen in the middle of May, but Murphy got in the way, in the form of a family emergency. In May and June, the planetarium is busy with school field trips, but we were able to reschedule for mid-June.

Meanwhile, at Peace Lutheran word spread of Greg's upcoming planetarium show. He received more and more requests from teachers for presentations for their classes. By the time Greg took the planetarium to Peace Lutheran, virtually the entire school was scheduled to see a planetarium presentation. In the end, Greg did six shows for over 200 students from Pre-K through 8th grade. He received rave reviews from all of the teachers and students.

con't page 3

By the time Greg's after-school students arrived, they had all seen his presentations in their classes. So he gave his students real hands-on experience, driving the planetarium to various objects that interested them.

This is a great example of how we can help schools with astronomy and science education. Greg was able to share his enthusiasm with his students and with a little luck, inspire some young minds to be inquiring scientists.

And as we go to our newsletter deadline, we have two more similar shows coming up. BPAA will be doing Planetarium visits for the Muscular Dystrophy Association's summer camp program on August 23rd and Dave Fong is scheduling a visit for another disadvantaged children's program.

BPAA strives to provide this kind of experience to students. You can help us do this in two ways. If you have students, particularly if they have an astronomy unit, BPAA can provide a planetarium experience to them. Additionally, you could do what Greg did and learn how to use the Planetarium and provide this experience to students. For either option, email *education@bpastro.org*.

Oregon Star Party

I just got back from this year's Oregon Star Party. Dark skies are truly amazing. It seemed as though you could pick out about half of the Messier objects visually. For example, you could see the Andromeda Galaxy, M3, extend about three times farther than the width of the moon. And the Milky Way truly looked like milk.

This year's party occurred during the Perseid meteor shower which was very distracting. Every time a meteorite went by, it was as if you were at a fireworks show. The whole crowd was going "whooo" and "ahh."Of course, by the time you looked up from the telescope, it would be gone.

However, if you plan to go to OSP, understand that the conditions are primitive. The site looks more like a rocky Martian landscape than something you would expect in a "national forest." But it is well worth the experience. I will be back next year.—Thanks*, Steve*

The Milky Way Courtesy NASA

More Notes from OSP

Had the best time at Oregon Star Party 2010. Sighted: 100's of meteors, 2 fireballs; Mars, Saturn, Jupiter and its Galilean moons; M22, globular star clusters, Triffid Nebula, Eagle Nebula (star pillars in the famous Hubble photo), Andromeda, Wild Duck Cluster; four solar prominences, a sunspot, dozens of amazing telescopes--from a Coronado PST to an $18,000 custom Dobsonian with video assist and software for near real-time (15 sec exposure) color images. Amazing amateur astronomers (+700 estimate) who were willing to share their scopes and passions.

Good times. Best dark sky I've seen. Thanks, Milky Way, I'm glad I live in your house.—*Todd Vandemark*

A Sampler of Public Comments on Our Proposed Sundial

Fantastic blend of art, science, math and our connection to the earth and heavens. I hope to see the final installation with park support soon.—*Adam Rubinowitz*, BI

It's very cool.**—***Mary Parker,* Rolling Bay, BI

I love the opportunity to teach the science. Good location.—*Dana Gargus*, BI Lets do it, a great project for this facility—a good educational tool! I love the programs given here. Mark the SPOT—easy for all to Observe.—*Jim Walkawski***,** BI

Great idea! Beautiful and artistic too! Perfect location.—*Molly Suhr* BI

Great location! Please let it be built at the top of berm by the Observatory.—*Scott & Betsy Daniel*, BI

Great, progressive idea, will also be a good project for schools and lectures on the use of such instruments, history, etc... **—***Kerry Rutter*, Bremerton

more, p. 4

Sundial Comments, con't from p. 3

What a wonderful idea!!! We like the ability to teach our kids about time & the ancients. What a great compliment to the Observatory. And where else would you put it? In the shade?—*Jeffery Roger,* BI

The sundial as proposed is both a work of public art and an enjoyable stepping stone into scientific literacy. Public art elevates a community from merely existing to thriving; scientific literacy is necessary for an informed citizenry. In every way the Sundial Project and endeavors like it should be encouraged.—*Lisa Lewis*, BI

Great idea to add some astronomical observation to daytime park use. An artful looking edifice, and educational. A nice addition to any gathering, including Bluegrass!—*Ronna Dansky*, Seattle

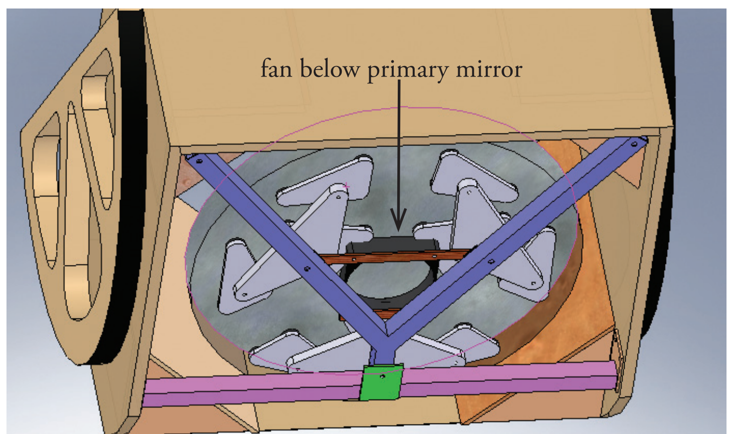
Fabulous for the park. Lets make it happen. Needs to be in wide-open location like the berm. It's a destination!—*Wendy Jones*, BI

Please, please support this! There is a very nice sundial on the Conservatory Building at UDub—I was in Health Services. Every day I slogged to class I looked up at the sundial & it just simply brought me joy. We all need a little joy.—*Gwendalyn Thompson*, BI

All comments recorded at the July 24 Bluegrass Festival on Bainbridge Island. Photos by Bill Baran-Mickle.

Cooling the 20" Mirror: Part 3 in a series on our 20" Dobsonian

Most serious owners of reflecting telescopes know that they can't expect to get sharp images until the temperature of the primary mirror is close to the same temperature as the ambient air temperature. When reflecting telescopes are stored inside and then brought outdoors into colder air, the warmth of the glass gives off heat waves. These heat waves distort the image in a telescope the same way heat waves rising from the asphalt on a long stretch of highway distort the view of the land ahead. In the early morning, when the temperature of the land and air are about the same, the views along that same stretch of highway will be virtually free of distortion, and the same laws of heat transfer apply to telescope mirrors.

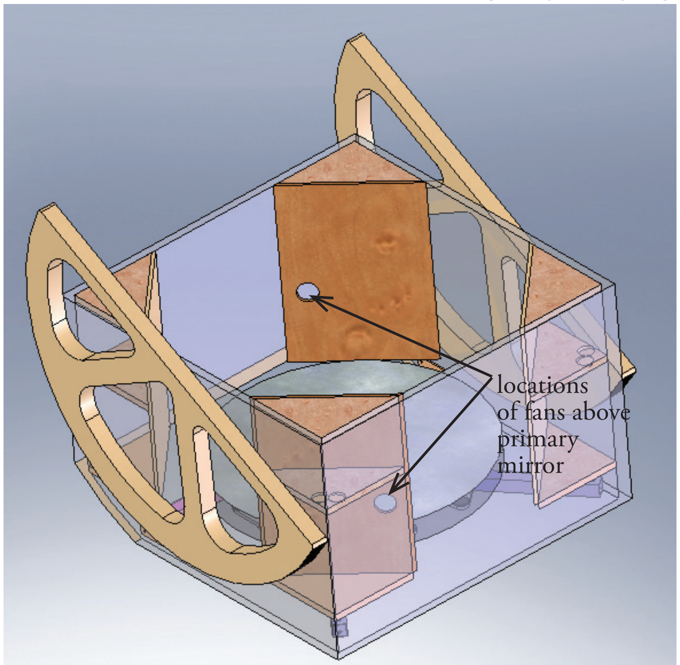


CAD drawing of lower fan and mirror assembly, courtesy Malcolm Saunders

To cool the mirror as quickly as possible the most common solution has been to mount a fan below the primary mirror that blows against its back. This works very well for smaller mirrors that have less mass and, therefore, less stored heat. The larger the mirror gets, the longer it takes for that stored heat to dissipate, even with a relatively larger fan blowing against it. If the difference in temperatures is large it can easily take an hour or more for the mirror to cool down enough to produce decent images, and if the night temperatures are falling quickly the wait can be even longer, since the primary mirror is now playing a game of catch-up with the weather. Because of this, larger mirrors benefit from having fans blowing across their front surface in addition to the fan blowing from the back. We've placed these surface fans on the club's 20" Dobsonian. They do help to cool the front surface of the mirror, but their primary purpose is to break up the warm layer of air that hugs the mirror's surface. This layer of air, called the "thermal boundary layer," was described in great detail in an article by Bryan Greer in the September 2000 issue of *Sky & Telescope*. The thermal boundary layer is now widely considered to be one of the major contributors to poor images in reflector telescopes, producing much more error than large central obstructions.

The basic idea is that when there is a difference in temperature between a primary mirror and the ambient air, the mirror will give off heat via convection to the cooler air. The heat exchange that fuels the convection process takes place on the surface of the mirror and is the source of the boundary layer. If there is no temperature difference between the surface of the mirror and the surrounding air there will be no boundary layer, but as the difference in temperatures between the two increases, the boundary layer becomes more active with convective currents. The image becomes increasingly degraded.

This happens because the bundles of light rays arriving from an object ideally move in a straight line, and the sharpest images occur when these rays travel from the object to our eye in as straight a line as possible. When a thermal boundary layer is present, light rays pass through convective currents that mix hot and cold air into numerous cells before striking the mirror. Because cold air is denser than hot air, light travels slower when going through it, giving it a higher refractive index. Besides slowing down the light ray, the cold air also bends it, shifting it slightly away from its original trajectory.



CAD drawing of upper fans and mirror assembly, courtesy Malcolm Saunders

If a ray of light passes through the hot portion of a convection cell, it will end up with a slightly different trajectory than if it passes through a cold portion. To compound the problem, the now slightly mixed bundle of light rays are reflected back off of the mirror's surface and pass through the boundary layer again, doubling the error. When our eyepiece finally collects these bundles of light rays for us to view, the resulting image will appear blurry because so many of the individual photons of light that make up the image aren't where they're supposed to be.

Another problem with cooling a large mirror by having only one fan blowing against its back is that the thermal boundary layer on the mirror's front surface is shielded from the air being blown by the fan. The air flows around the edges of the mirror, leaving a relatively thick, untouched pocket of warm air hovering over the mirror's surface.

To help break up the thermal boundary layer and the pocket of warm air above it we positioned two 1-1/2" computer fans inside the mirror box so they would blow across the surface of the primary mirror. These two fans and the larger 4" fan blowing against the back of the mirror are powered by the same 12V DC battery. The fans are placed kitty-corner from each other and slightly offset to blow on separate halves of the mirror, creating a gentle, swirling movement of air. The warmer boundary layer gets pushed over the edge of the mirror and is swept away by the air moving forward from the large rear fan. The swirling movement of air is very soft, but strong enough to break up the boundary layer's convection cells into a more homogenous mix of air that has an overall lower refractive index.

When the club's telescope is first set up and the primary mirror is still warm, the difference between having the small fans on or off is very noticeable through the eyepiece. Before the fans have been turned on stars cannot be focused to points of light and appear to be surrounded by pulsating spikes. The instant the fans are turned on the intensity of the spikes diminishes. Detail in moon or planetary images will go from terrible to tolerable. If you own a Dobsonian telescope with an exposed mirror you can easily test this yourself by looking through an eyepiece while someone else manually fans the mirror with something like a small piece of cardboard. Just make sure the telescope is well collimated before the test.

You still have to wait until the temperatures of the mirror and the ambient air are close before you can get the sharpest images, especially on nights when the upper atmosphere is unusually calm, but on most nights you'll get decent images within 15 minutes of cooling and sometimes you'll get them immediately.

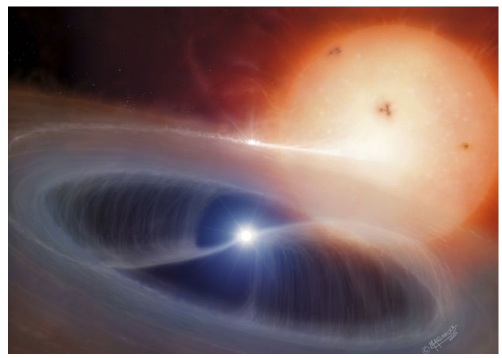
An added bonus is that the gentle swirl of air across the surface of the mirror works well at keeping dew at bay. I had noticed this on my personal telescope, so when we built the club's telescope we also mounted a small fan inside the secondary cage, right next to the focuser, so it could blow air at the secondary mirror and keep it dew-free as well.

Secondary mirrors, especially in truss-tube Dobs, where they're more exposed to the elements and cool down faster, have a strong tendency to dew up later in the evening. Because of this many amateur telescope makers attach resistors or nichrome wire to the back of a secondary mirror, wiring them to a power source so they become miniature heaters. Calculations are made to keep the amount of heat as low as possible and when done properly they do a good job of keeping the secondary mirror free of dew. But controlling the temperature to match varying weather conditions can be tricky, and if the temperature difference between the heaters and the ambient air becomes great enough, convective cells will be produced which are strong enough to degrade the image. Our solution avoids this problem but still does an excellent job of keeping dew at bay. It also helps in the initial cooling of the secondary mirror.

The big question is the amount of vibration produced by the fan and its effect on the final image, and to be honest, the jury is still out on that. I can say I haven't noticed any difference with the fan on or off but in the handful of times we've set up the new telescope there's never been the right combination of an object with fine detail and steady skies that would give a true enough test. If vibration is an issue the fan can easily be switched off for planetary viewing.—*Doug Tanaka*

Variable Stars and an Invariable One

SEEING STARS ASTRONOMY 0.001: Bodrum,Turkey, July 2010. Have you ever considered how much you might add to serious scientific research by observing and recording variable stars from Bainbridge? That you might even find a new one?



Cataclysmic variable. Illustration courtesy NASA

There are two main kinds of stars whose light output varies over time, binary stars and variables. Binary stars are two (or more) stars that circle around each other because of their gravitational attraction. As they circle, we see that some eclipse each other periodically, perhaps in a matter of minutes, perhaps every million years. Thus they're sometimes confused with variables.

Variable stars can change in size, and when they do we see the difference in their brightness. There four main types: Miras, Cepheids, RR Lyraes, and Cataclysmic. Mira variables (named for the star Mira in the constellation Cetus the whale) are old, red giant stars in a late stage of their evolution. They are unstable and pulsate, not necessarily consistently, between a few hundred days and several years. Their brightness can vary as much as ten magnitudes.

Cepheid variables (named for Delta Cephei, the brightest star in the constellation Cepheus) change no more than two magnitudes and their cycles of only a few days are regular. The astronomer Henrietta Leavitt discovered that there is a direct correlation between the time it takes a Cepheid to go from bright to dim and its absolute magnitude (or true brightness). Once the true brightness of a star is known, astronomers are able to determine the distance to the star.

The RR Lyrae stars have a short period of pulsation—less than a day—and are about 90 times brighter than our Sun. Cataclysmic variables have a second companion like the binaries. Their pulsation occurs because one of them repeatedly attracts matter from the other until a critical level is reached and there is a dwarf nova outburst, raising its brightness as much as ten magnitudes. Its cycle can be hundreds of thousands of years.

Back in 1915 Harlow Shapely used Cepheid variables to determine the size and shape of the Milky Way and to show where the Sun is in it. Nine years later Edwin Hubble found Cepheid variables in the Andromeda galaxy, proving that our Milky Way is just one of many galaxies in the universe. He and Milton L. Humason then used Vesto Slipher's measurements of the speed of galaxies moving away from us and theorized that the universe is expanding (Hubble's law). Cepheid variables have shown us the distances to galaxies, our Sun's height above our galactic plane, our distance to the center of our galaxy, and our galaxy's spiral structure.

Besides their importance in telling us where we are and where we may be going, I've just realized that one of the stars I count on to be reliable is a Cepheid variable—the North Star, Polaris—and also happens to be the closest to us of its kind.

I've also discovered that I have a galactically distant link to a bright name among astronomers who've studied variables. In 1960-61, while I was studying at the American Collegiate Institute (ACI) in İzmir, Turkey, I substituted for one of the teachers, and taught astronomy for a week. Dr. Janet Akyüz Mattei, the director of the American Association of Variable Star Observers (AAVSO) from 1973 to her untimely death in 2004, could have been in that class.

Janet Akyüz spent her childhood in the small port of Bodrum, now a thriving tourist center. Her home was across from the beach. The view to one side was the 16th century Crusader Castle of St. Peter; in front the Bay of Cos opened out into the Aegean Sea.

Her sister remembers taking blankets out at night to throw down on the beach so they could watch the stars in the then unpolluted sky. But in the 1950s Bodrum had limited educational resources.

The family moved to İzmir to pursue a better education for their children. After a competitive exam, Janet was accepted as a middle-school student at the private American Collegiate Institute in 1954.

During the years that Dr. Mattei was director of AVVSO it grew from a not-very-well-known special interest group into a major, internationally recognized association that has the largest world-wide data base of optically variable stars (over ten million).

Dr. Mattei effectively bridged the distance between amateur and professional astronomers. She guided over 600 observing programs where amateurs and professionals cooperated using large, ground-based telescopes in well-known observatories and space satellites.

She helped amateurs get time to observe using NASA's Hubble Space Telescope from 1986 to 1995, and helped NASA select eligible astronomers.

Also with NASA's funding, she co-directed the AAVSO's education programs of "Partnership in Astronomy" and "Hands-On Astrophysics: Variable Stars in Math, Science, and Computer Education," in addition to National Science Foundation programs and 200 other observing programs in schools and for student science projects.

To a large extent because of the encouragement of the AAVSO programs, observing the variable stars has become one of the best areas for amateur astronomical research because, although it's important, most professionals have neither the time nor the money for it. Amateurs can and do make significant contributions.

If you're starting out with the variables, try to work with someone who's experienced in star-finding, measuring, and recording so that your records will be accurate. And, most important, report what you've found to a place like AAVSO.

Dr. Mattei found her direction in a summer research program on Nantucket at the Maria Mitchell Observatory where the director, Dr. Dorrit Hoffleit, saw her potential.

Mattei's international recognition eventually included, among other things, awards and medals from the Royal Astronomical Society, the Societe Astronomique de France, the Union Astrofili Italiani, and the naming of the minor planet 11695 Mattei, all in honor of her leadership of AAVSO.

Perhaps even more important than her outstanding quality control of AAVSO's educational programs and its data base was her genuine warmth. In an interview with David Levy (*Sky & Telescope,* December 2003), she said that her interest was not only in the mathematical value of the stars. She was fascinated by what their discoverers felt: "To me, an observation of a variable is not a number, not a statistic. It's something very much alive. I see the estimate and imagine the observer's face light up as he or she looks at the star through a telescope." Levy called her "AVVSO's invariable star."

If Janet was in that class in İzmir, could I have nurtured her interest in astronomy? I very much doubt it. But I would like to keep a little of her true leadership qualities and invariable twinkle radiating among amateur astronomers.—*Anna Edmonds*

For more on Dr. Mattei:

"Janet Akyüz Mattei (1943-2004)," Francis Reddy, *Astronomy*, March 24, 2004

"Janet Akyüz Mattei, Astronomer, Dies at 61," Wolfgang Saxon, *The New York Times*, April 2, 2004

"Janet Akyüz Mattei (1943-2004)," David H. Levy and Edwin L. Aguirre, *Sky and Telescope* (Astronomy.com), April 4, 2004

"Janet A. Mattei, astronomer with a passion for flowers," Gloria Negri, *The Boston Globe*, April 7, 2004

"Janet Akyüz Mattei 1943-2004," *The AAVSO*

For more on variable stars:

"Observing Variable Stars, AAVSO" *http://eso.org*

"Binary and Variable Stars" *http://burro.astr.cwru.edu*

"Cepheid variables" *http://en.wikipedia.org*

"American Association of Variable Star Observers" *http://en.wikipedia.org*

Further Adventures in Backyard Astrophotography

This is the 3rd article chronicling the saga of my SBIG camera. The news is good. The camera is repaired and I have my color wheel. And the skies have cleared for the summer (at least as much as they do clear in the Pacific Northwest). I am now spending a good number of my nights in the backyard accompanied by Kepler, my dog.

(Ed. note: Anyone receiving the black-and-white printed *Newsletter* should also check out the color pictures online at *www.bpastro.org*.)

Wide Field Pictures

In addition to using a telescope, I have been trying some wide field work. This is a lot more forgiving in terms of accuracy. The next two photos are images from a Super-Takumar f3.5 135mm lens that I picked up on eBay for $14.

With this lens, I get a field of view (FOV) of about 7.5 x 5.75 degrees

NGC 7000 & IC 5070 (The North American Nebula and The Pelican Nebula) Distance 2,200 ly (light-year)

F3.5 135 mm Super-Takumar with SBIG ST-8300M w/ Color Wheel

8x4 minute Luminosity and 4x4 minute RGB (48 minutes of exposure) 7/6/2010

The next photo uses the same setup but is the Veil Nebula, the remnant of a supernova that exploded about 5000 to 8000 years ago.

The Veil Nebula (NGC 6960, 6979, 6992, and 6995) Distance about 2000 ly

F3.5 135 mm Super-Takumar with SBIG ST-8300M w/ Color Wheel

10x4 minute Luminosity and 4x4 minute RGB (56 minutes of exposure) 7/8/2010

The Veil has a lot of interesting filament structure. The next two show some detail in the Eastern and Western section of the Veil. Both of these are shot with a narrow band O-III filter. This is the primary emission of this nebula so it increases the contrast.

The Eastern Veil Nebula (NGC 6992 and 6995)

Celestron C8 w/ f6.3 field reducer and SBIG ST-8300M

6 x 10 minute O-III (60 minutes of exposure) 7/28/2010

The Western Veil Nebula (NGC 6960)

Celestron C8 w/ f6.3 field reducer and SBIG ST-8300M

6 x 10 minute O-III (60 minutes of exposure) 7/28/2010

First Shot with Color Wheel, M13 and NGC 6207 Distance 25,000 ly and 190,000,000 ly

Celestron C8 w/ f6.3 field reducer and SBIG ST-8300M and Color Wheel

4x4 minute Luminosity & 2x4 minute RGB (40 minutes of exposure) 6/13/2010

M27 Dumbbell Nebula Distance 1,260 ly

Celestron C8 w/ f6.3 field reducer and SBIG ST-8300M and Color Wheel

8x2 minute Luminosity and 4x2 minute RGB (40 minutes of exposure) 7/18/2010

M71 Globular Cluster in Sagitta Distance 12,000 ly

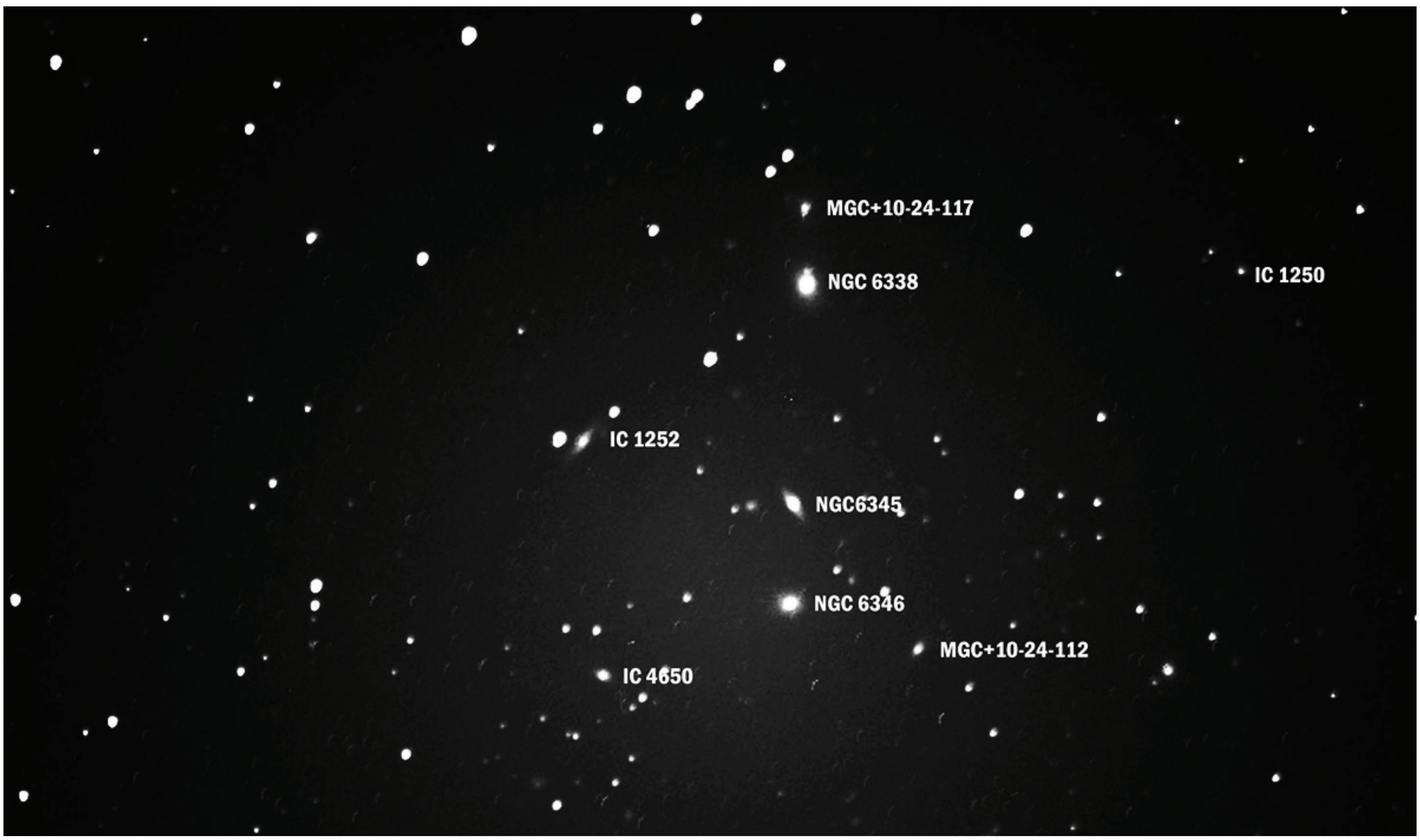
Celestron C8 w/ f6.3 field reducer and SBIG ST-8300M and Color Wheel

8x4 minute Luminosity and 4x4 minute RGB (80 minutes of exposure) 7/17/2010

NGC 6946 Fireworks Galaxy in Cepheus and Cygnus Distance 22,500,000 ly

Celestron C8 w/ f6.3 field reducer and SBIG ST-8300M and Color Wheel

8x5 minute Luminosity and 4x5 minute RGB (100 minutes of exposure) 7/30/2010



The final shot is not the prettiest but I find it the most interesting. I was experimenting during a full moon and happened to point the telescope in the direction of NGC 6338. I took a 2-minute test shot. I could see the galaxy, but it looked like there was more there, so I tried taking a deep field shot. The background is somewhat washed out by the moon, but you get some impression of what else is out in the universe. The galaxies labeled with an NGC number were identified by Hershel in the early 19th century. The IC galaxies were included in the "Indexed Catalog" at the beginning of the 20th century. The MCG galaxies were identified by the Palomar Survey in the mid-20th century. In addition to those galaxies there are many fuzz balls that matched up to galaxies in the Sloan Digital Sky Survey of the early 21st century. These galaxies are identified by a highly descriptive 18-digit number that I decided I did not need to add to the photo. Note that this photo was not calibrated—some of the streaks you see are hot pixels. These artifacts look like faint commas.—*Stephen Ruhl*

In this Issue

Events

Articles

BPAA Quarterly is a publication of the Battle Point Astronomical Association. Submissions due on the 10th of the month before the quarter begins: quarters begin December, March, June, and September. Query newsletter@bpastro.org. Send graphics as separate files. Newsletter Editor **Vicki Saunders**.

BATTLE POINT ASTRONOMICAL ASSOCIATION

206.842.9152 http://www.bpastro.org/
Ritchie Observatory, Battle Point Park
P.O. Box 10914, Bainbridge Island, WA 98110

Officers

Stephen Ruhl, President
206.855.7883,president@bpastro.org
Mike Browning, Vice President
206.861.1630, bjjm@qwest.net
Russell M. Heglund, Secretary
206.842.8758, rmheglund@yahoo.com
Frank Schroer, Treasurer
206.842.1974, frank@schroer.net
Nels Johansen, Facilities Officer
206.842.7968
Stephen Ruhl, Education Officer
(acting), education@bpastro.org
Malcolm Saunders, Chief Astronomer
206.780.1905, astronomer@bpastro.org

Founders

Edward M. (Mac) Gardiner,President Emeritus
206.842.3717, macg@bainbridge.net
Ed Ritchie, Chief Astronomer
1993–1997
John H. Rudolph, Facility Director
1993–2003

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