



# Northwest Skies

The Official Newsletter of the Tacoma Astronomical Society  
Tacoma, Washington State, USA

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75 Years of Amateur Astronomy in the Pacific Northwest

November—December 2006

## The President's Message

by Dave Armstrong

Well, we survived the Puyallup Fair. A big "Thank You" to all who participated. I wish we could get more of you to take part, as some spent many extra shifts to cover the days during the fair. For a couple of the Saturday's this year we have added a new feature to our presence at the Fair. Some volunteers brought in their solar telescopes to view the Sun in visible light and in hydrogen alpha emission bands. This was done adjacent to the State Patrol display. There was at least one Saturday evening when some planet and star viewing was also done. I heard this was such a hit, that people reported the events to the Fair Administration. Given the response, we intend to plan more of active participation with the fair attendees next year.

We also distributed several thousand public night schedules, free copies of the Astronomy magazine info brochures, and Sky and Telescope's 'Night Sky' magazines. When a person, young or old, seemed especially interested, we loaded them up with literature.

I didn't hear any stories of members having their ears



talked off by anyone with their own theory of the cosmos or encounter with Aliens.

You never know who might stop at the booth. I had people I used to work with at Boeing, fellows who were past members of the club back in the 1960;s and even an old High School teacher and his wife stop by. I sure hope more of you will participate next year and generate your own chance meetings.

One bit of information I was told and had to go check out, was that the grand prize home-made quilt was titled, "The View from Table Mountain". And it was, complete with Solar System, eclipses, galaxies, clusters

and all – beautiful.

It is Board Member nomination time. We have four trustees each year who finish their term on the Board. Those finishing their terms this year are: Matt Flood, Jerry Armstrong, Bob Isaacs and Sion Heaney. Nothing says they can't be nominated again, but it has to be by their approval. Start thinking about who would enhance the society by their participation on the Board.

Remember the Christmas Party at Trinity Lutheran Church in Parkland across the street from PLU on December 16<sup>th</sup>.

*Dave Armstrong*

**Northwest Skies** is a bi-monthly publication of the Tacoma Astronomical Society. All opinions expressed in this newsletter are those of the contributors and not necessarily those of the Tacoma Astronomical Society.

Original article contributions are strongly encouraged and may be submitted as an email attachment to

[editor@tas-online.org](mailto:editor@tas-online.org)

**Although Pluto's recent change in status is prominent in the general media at the moment, Bert Brown reflects on how the other planets were first discovered and assumptions made on their status throughout history**

## People to Contact

You can also contact us via email through our website at

[www.tas-online.org](http://www.tas-online.org)

Our mailing address is:

**The Tacoma  
Astronomical Society  
PO BOX 8881,  
Tacoma, WA 98418**

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## What's Up In Astronomy

by Bert Brown

I will not take sides over the recent 'demotion' of Pluto from the list of planets, other than to say it may stimulate activity in the astronomy textbook business. However it might worth-while to review the stories of discoveries of the various planets, some of which are pretty interesting.

Mercury, Venus, Mars, Jupiter and Saturn were of course known to the ancients, although there was some confusion over Mercury and Venus because they were closer to the sun and did not behave like the others. The Greeks, for example, called Mercury 'Apollo' when it was in the morning sky, and Venus got the names Phosphorus in the morning and Hesperus as an evening 'star'. Pythagoras, during the

6th century BC, is believed to have been the first to recognize that Hesperus and Phosphorus was the same object. All these planets played parts in the development of physical theories of their motions, from epicycles to Newton's theory of gravitation and Einstein's revision of that.

Uranus is the first planet to be discovered in modern times, if we can allow the 18th century to be 'modern'. It is a 6th magnitude object so is barely visible to the eye in good conditions. Although it had been seen and plotted as a star as early as 1690, credit for recognizing it as a planet is given to William Herschel. In doing a routine telescopic survey of the sky in 1781, in the constellation Gemini, he noted that this ob-

ject seemed to present a disk instead of a point-like star. At first he thought it was a comet, but subsequent observations of its path revealed the orbit to be nearly circular, so it was clearly a planet.

The discovery of Neptune, on the other hand, was predicted by calculation before it was discovered, and there was a bit of stumbling by the observers before it was confirmed.

In Newton's gravitation theory, planets in the solar system attract each other a little. By knowing approximate masses and positions one can calculate the amount of "perturbation" of planets on one another. Without computers this was a very tedious procedure.

When this was done for the motion of Uranus, using data for its positions back to 1690 when it was photographed but not yet recognized as a planet, it was found by 1840 that there was a discrepancy of about 2' of arc in the position of the planet from where it should have been. That isn't much but it was enough to set the wheels in motion. In 1843 John Couch Adams of England, a young Cambridge graduate, began analyzing the motion of Uranus and found that there was likely an outer planet affecting its orbital speed. He sent his results to the Astronomer Royal, Sir George Airy, telling him where to look. Airy was suspicious of something from so young a person, and replied by giving him a test problem to solve. Like many students, Adams ignored the problem, so Airy dropped the matter.

But a French mathematician, Leverrier, also worked on Uranus' motion and published his results in 1846. Airy noticed that the French results agreed with Adams' work to within 1°, so he sent Leverrier the same test problem and got an immediate correct reply. Airy then asked the di-

rector of the Cambridge Observatory, Challis, to look for the new planet.

Challis did not have up-to-date star charts for the region to be searched so he began by plotting all the stars in that area, and planned to repeat this over several days to see if anything had moved. He was a bit sloppy in his work however, and did not recognize that he actually had seen it.

Meanwhile Leverrier also asked Galle, of the Berlin Observatory, to look; Galle received the letter on Sept. 23, 1846, began looking that night, and found the new planet immediately--only 52' from the position predicted by Leverrier.

This is considered to be a splendid confirmation of the Newtonian theory of gravitation.

With the success in predicting Neptune, it was obvious that people would try the same method to see if anything else was 'out there'.

Neptune had not moved enough to check for residual motions, so researchers looked for additional residuals for Uranus. Gaillot (1909), Lowell (1915), and Pickering (1928) all pre-

dicted properties of another planet and its orbit based on supposed discrepancies remaining in Uranus' orbit.

Percival Lowell looked for the new planet from 1905 until his death in 1916. Others continued looking also and finally, in February, 1930, Clyde Tombaugh, using a blink microscope, found the object that came to be known as Pluto, about 6° from Lowell's predicted location.

Further observations gave it orbital elements similar to Lowell's calculations. However, subsequent analysis of the old Uranus data showed that the discrepancies in that orbit, about 4" or 5", were smaller than the errors in observations from that time; so astronomers now believe that Pluto's discovery was an accident! Of course this does not detract any from Tombaugh's accomplishment.

It is interesting that the Pluto discovery was made at about the time that the Tacoma Astronomical Society was formed. And some members will recall that Tacoma Astronomical Society heard Tombaugh's sister at a club meeting in Thompson Hall some years back,

### **Membership Subscriptions for 2006**

Membership subscriptions for 2006 are now due. Please mail your membership renewal to

**The Tacoma  
Astronomical  
Society  
PO BOX 8881  
Tacoma, WA 98418**

or bring your check along to the next General Meeting and hand them to John Pettit, our Treasurer.

Membership dues are the primary income for the society and it allows us to fund member activities and parties as well as the Outreach and Student Programs. Your membership is very important to us.

The annual fees are:

Family:	<b>\$35.00</b>
Adult:	<b>\$25.00</b>
Student:	<b>\$15.00</b>
Senior:	<b>\$10.00</b>

Thank you.



### **Snacks for the General Meeting**

Our thanks to these volunteers for providing snacks at our next meeting.

#### **November**

*Joe Witherspoon*

#### **December**

*We need a  
volunteer!*

We will be providing coffee and tea during the break as usual. Thank you!



## **Astrophotography 6: Deep Space Imaging**

by Jarvis Krumbein

In the previous articles, we covered almost all aspects of astrophotography from the simplest taking of star trails up to taking photos through the telescope of the various members of our solar system. Now we will consider what is required for imaging objects outside the solar system such as star clusters and nebula. This will require that the telescope is used as the imaging optics.

Lets look at what will be required in the way of equipment. First, long exposures will be required which means the telescope must have an equatorial mount and an accurate drive system. It should also be possible to finely adjust the position in both declination and right ascension during the exposure. Second, some means must be provided to guide the telescope during the exposure. Third, the camera should have a focusing screen to permit focusing the complete optical system. The third requirement is most easily satisfied by using a 35mm single reflex camera.

Most good equatorial mounted telescopes will satisfy the first condition. It is desirable that electric

motor controlled adjustment for both the declination and RA be possible although strictly mechanical adjustments, particularly for the declination can produce good results. Most important is that there be no backlash or slop and that the adjustments can be made smoothly.

The second requirement means either a second telescope with a guiding eyepiece be mounted with the imaging telescope or an off-axis guider in the optical path of the imaging scope. When the imaging telescope is a Newtonian or a refractor, piggy backing a small refractor as the guide scope is probably the easiest method. A small SCT or Maksutov telescope can also be used as a guide scope. It is a convenience if the guide scope can be shifted a small amount to permit placing a guide star in position in the guiding eyepiece while the image to be photographed is properly centered in the camera.

The use of an off axis guider is most convenient if the imaging telescope is one of the modern SCT or Maksu-

tov types. The guider has a small prism at the edge of the field to pick off some of the light and direct it to the guiding eyepiece. The prism can usually be shifted in position to allow a convenient guide star to be used while the main image is centered.

Some off axis guiders also have access for a separate eyepiece that is switched into the light path to help in centering the image for the camera and is then switched out when the exposure is made. Which ever type of guide arrangement is used, it is a good idea to practice guiding before trying to actually making an exposure.

Picking out an image and a guide star and then tracking for several minutes will give you a feel for which way the guide star will drift in the field and allow you to make adjustments to compensate for the drift. See which way the RA and the declination controls move the scope in response to the guide star's drift. If you have a four button hand controller, turn it so the buttons correspond to the orientation of the guiding eyepiece. When guide star

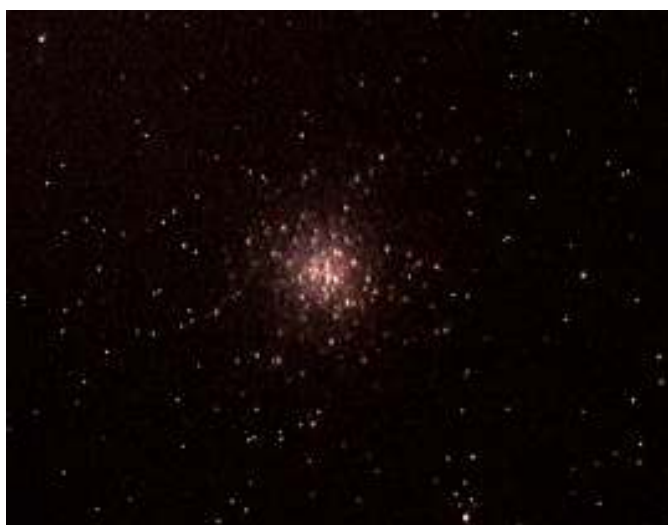
drift occurs, it should be an unconscious motion to push the button to move the star back into the proper place. Unless you have extremely good polar alignment, the guide star will usually drift in one direction and require correction every few minutes. This drift is usually constant and is easily anticipated after the first couple corrections.

The camera, usually a 35mm single lens reflex, should be all mechanical in operation. Newer cameras with electrically operated shutters can be used but battery life becomes a problem when making long time exposures. Cameras such as the Pentax K1000 are available quite inexpensively and are very good for this purpose. A camera that will also permit the mirror to be locked up such as the Olympus OM-1, Canon Ftb, Nikon F and the Minolta SRT 101 has the advantage of reduced vibration when the shutter is operated.

The camera must have a shutter that can be opened (B position) and be equipped with a locking cable release to keep the shutter open during the exposure. All of the cameras mentioned here have this capability. Since the normal camera lens is

not used, an adaptor is required to allow the camera to be attached to the telescope. Adaptors are available from the major suppliers such as Meade, Orion, Celestron etc. and can be acquired at most of the larger camera and telescope dealers.

One additional accessory that might be desirable when the imaging telescope is an SCT is a focal reducer which lowers the focal ratio from f10 to about f6. This allows shorter exposures and a larger image scale. Recommended films include those made by Kodak and Fuji with ASA speeds of 400 and higher. Also recommended is getting a CD with the prints when having your film processed.



M13 Globular Cluster

Credit: John Pettit

Several books are highly recommended for the astro-photographer and will provide much more useful information than can be included in these short articles. Two of these are "Wide Field Astrophotography" by Robert Reeves, published by Willmann-Bell and "Splendors of the Universe" by Terrence Dickinson and Jack Newton which is published by Firefly.

For further information and help, feel free to contact me directly via e-mail at

[jkoptic@centurytel.net](mailto:jkoptic@centurytel.net).

***The goal of most astro-photographers is in perfecting the imaging of deep sky objects. In the sixth article on astrophotography Jarvis details how.***

### **Magazine Subscriptions**

Don't forget to use your member benefit by receiving a discounted annual subscriptions to either Sky & Telescope or Astronomy magazines.

**Sky & Telescope**  
\$32.95 / year

**Astronomy**  
\$34.00 / year

Contact the Treasurer, John Pettit, for more information.

## November Schedule of Events

- **November 7th:** Outreach event at Camas Prairie Elementary, Spanaway. Program on 'The Moon'. 12:00—2:00 PM
- **November 8th:** Outreach event at Terminal Park Elementary, Auburn. Program on 'Mercury's Transit of the Sun' 10:00AM—3:00 PM
- **November 9th:** Outreach event at Parkside Primary School, Des Moines. Stomp Rockets 10:00AM—12:00 PM
- **November 10th:** Student Observing Night. 9:00 PM
- **November 14th:** Outreach event at Camas Prairie Elementary, Spanaway. Program on 'Scale of the Solar System'. 12:00—2:00 PM
- **November 15th:** Outreach event at Cherrydale Elementary Science Fair, Steilacoom. 6:00—10:00 PM
- **November 17th:** Student Meeting. 7:00 PM.
- **November 18th:** Public Night at Pierce College, Sunrise Building. Program will be 'The Great Pluto Debate' presented by TAS Student Group. 7:30 PM.
- **November 21st:** Outreach event at Camas Prairie Elementary, Spanaway. Solar Viewing party. 12:00—2:00 PM
- Trustees Meeting. 7:30 PM.
- **November 25th:** Public Night at Pierce College, Sunrise Building. Program will be 'The Moon' presented by Ken Slavens and Katie Dennis. 7:30 PM.
- **November 30th:** Outreach event at Camas Prairie Elementary, Spanaway. Presentation on 'Comets'. 12:00—2:00 PM

# November 2006

Sun	Mon	Tue	Wed	Thu	Fri	Sat
			1	2	3	4
5	○ 6	7 Outreach event. General Meeting.	8 Outreach event.	9 Outreach event.	10 Student Observing.	11
12	☾ 13	14 Outreach event.	15 Outreach event.	16	17 Student Meeting.	18 Public Night.
19	20	● 21 Outreach event. Trustees Meeting.	22	23	24	25 Public Night.
26	27	28	☽ 29	30		

## December Schedule of Events

- **December 5th:**  
Cub Scout Pack 444 Star Party. Sunrise Building, Pierce College. 6:30pm—8:00pm
- **December 7th:**  
Outreach event at Camas Prairie Elementary, Spanaway. Stomp Rockets. 12:00—2:00 PM
- **December 9th:**  
Public Night at Pierce College, Sunrise Building. Program will be 'Telescopes, Binoculars and Great Gifts for Astronomers' presented by Sion Heaney and John Finnian. 7:30 PM.
- **December 15th:**  
Student Observing Night. 7:00 PM
- **December 16th:**  
TAS Christmas Party at Trinity Lutheran Church in Parkland across the street from Pacific Lutheran University.
- **December 23rd:**  
Public Night at Pierce College, Sunrise Building. Program will be 'The Christmas Star' presented by Matt Flood. 7:30 PM.
- **December 30th:**  
Student End Of Year Party.
- **General Meeting.**  
Please note we are meeting at Wyatt Hall, Room 109 at UPS until further notice. 7:30 PM.

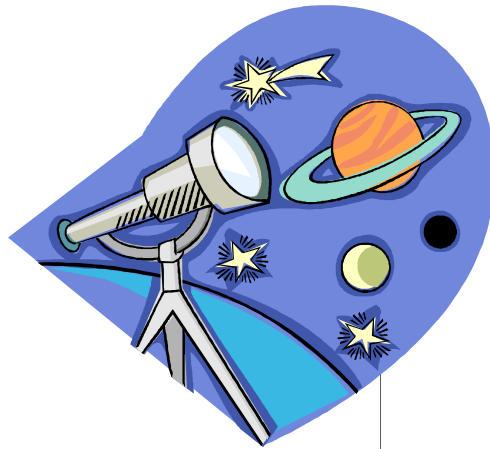
# December 2006

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					1	2
3	4	5 Star Party. General Meeting.	6	7 Outreach event.	8	9 Public Night.
10	11	12 ☾	13	14	15 Student Observing.	16 TAS Christmas Party.
17	18	19	20	21 ●	22	23 Public Night.
24	25	26	27 ☽	28	29	30 Student End of Year Party.
31						

### Outreach Events

Unfortunately, there is not enough room here to detail all the exciting events Outreach is providing so please check the website for further details. For more information and to help volunteer for these events please contact Joe Witherspoon or Ray Stinson.

## Northwest Skies



First Class

If undelivered, please return to

Tacoma Astronomical Society  
PO BOX 8881  
Tacoma, WA 98418

### We need your articles.

If you are interested in contributing an article or would like to make a suggestion as to what you'd like to read in **Northwest Skies** then please do contact the Editor. We are always in need of original contributions.

Deadline for submitting articles for inclusion in the next edition of **Northwest Skies** is the last Thursday of the month before publishing.

We're on the web!  
[WWW.TAS-ONLINE.ORG](http://WWW.TAS-ONLINE.ORG)

### Observations: Thank you, Jeff Mayor!

by Sion Heaney

If you are a regular reader of the Tacoma News Tribune, our local newspaper, you may well have noticed frequent mention of the Tacoma Astronomical Society's events. A couple of months ago we were also very lucky to have over a full page of print focused on our activities and advice for newcomers just beginning their adventure in astronomy.

This is all very much due to the efforts of Jeff Mayor, a regular columnist for the SoundLife team and editor for the Adventure section.

Jeff has provided the society with much publicity and through his articles we know that many of our newer members locally have heard about us first through the local newspaper.

Jeff has been very proactive in contacting the society and has demonstrated a keen interest to understand some of the complexities of astronomy. This is exemplary since Jeff has gone the extra mile in presenting accurate information for the readers of the Tacoma News Tribune and giving the society some great publicity. After

meeting Jeff at our interview for the most recent and largest of articles about the Tacoma Astronomical Society, it was a clear observation for me, a very amateur editor, that the shared interest in Astronomy brings together so many different disciplines and backgrounds.

As the year wraps up I'd like to offer heartfelt thanks to Jeff Mayor, our correspondent with the Tacoma News Tribune, and a fellow amateur astronomer.

Thank you, Jeff!