

# IO – July 2003

[www.eugeneastro.org](http://www.eugeneastro.org)

**Eugene Astronomical Society**, Annual Club Dues \$25, President: Jean Grendler, School Star Party Coordinator , 683-9382, [moejren@msn.com](mailto:moejren@msn.com),  
Vice-President & Treasurer: Sue Moe, [suemoe@worldnet.att.net](mailto:suemoe@worldnet.att.net), Telescope lending program: Jeff Phillips 685-0973, [phichu@epud.net](mailto:phichu@epud.net) ,  
*\*Io (EYE-oh) is nearest to Jupiter and fastest orbiting of the four Galilean moons.*  
Web Master Dave, [Nexstar11.com](http://Nexstar11.com) ; IO editor, Sam Pitts, [sampitts@aol.com](mailto:sampitts@aol.com)

## EAS - Meeting Change



### July Meeting will be held June 28, 2003 at Elija Bristow State Park 12:00 Noon-



Site "B" has been reserved for EAS to have a get together/Pot-Luck so everyone can have a great time and mingle. Members are encouraged to bring items for Sale or Swap along with food and good cheer. This will be a great place to socialize and possibly star gaze later in the evening. Jean has received permission for EAS to stay late and do some stargazing for those so inclined.

**TIME:** The club has the site from NOON on..... Arrive anytime after that... Some of us will arrive that early to check things out, relax, and start the barbecue. It might be noon, though! Maybe we'll do some games or solar viewing in the early afternoon. There is a wildlife viewing area at the park, so some might enjoy some terrestrial pursuits with binoculars or scopes. Jean (President), personally, would like to spend lots of time getting acquainted with members and their families. If you have games to share, or ideas, let me know! We can have snacks and hors d'oeuvres all day if people bring them, then our real meal about 5pm? (Coals ready around 4:30?) That should leave plenty of time for those who can't arrive until mealtime to relax and visit afterward, too.

**Lat.:** 43.936372 N **Long.:** -122.845031 W

[http://www.oregonstateparks.org/park\\_83.php](http://www.oregonstateparks.org/park_83.php)

General driving instructions: From I-5 travel east on HYY 58 for 9 miles to Rattlesnake Road, turn North (left) onto Rattlesnake (N) and travel to Wheeler Rd. (not very far) turn Right onto Wheeler Rd and travel to the park entrance on your left (according to the map) Go to the "Group Picnic Areas" and look for "B".

-Jean

## See our Treasure Sue Moe

Subscribe to Sky & Telescope and/or Astronomy Magazine  
Take advantage of our club's 10% discount  
You also get a 10% discount at the S & T Store

## Image of the Month

Please submit your Astronomy photos, images or drawings to Dave Cole so he can select one to post on the EAS Web-Site. I can digitize 35mm negatives or prints so they can be used. -Sam

Web Master Dave : [Nexstar11.com](http://Nexstar11.com)

## OREGON STAR PARTY AUGUST 28-31, 2003

Email: [info@oregonstarparty.org](mailto:info@oregonstarparty.org)  
OSP: PO Box 2035, Gresham, OR 97030.  
(503) 306-2992

## Table Mountain Star Party

Late-registration for this year is July 11, 2003. **Table Mountain will be held on: July 24-26, 2003**  
Key note speaker is Al Nagler

Pre-Registration Form will be on line from our web site at:  
<http://www.tmspa.com>

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## Comet Observers Club Chair:

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In observing the wonders of the universe, there are perhaps no more wondrous and beautiful objects as comets. Since the invention of the telescope hundreds of years ago, astronomers have continually searched for new comets, and in the process, have discovered nebulas, star clusters, galaxies and more. Comets are important members of our solar system, and their study is important to mankind. Thus, having this observing program for members of the Astronomical League is long over due. We hope you enjoy your quest!

## COMET TUTORIAL

Unlike the other small bodies in the solar system, comets have been known since antiquity. There are Chinese records of Comet Halley going back to at least 240 BC. The famous Bayeux Tapestry, which commemorates the Norman Conquest of England in 1066, depicts an apparition of Comet Halley.

As of 1995, 878 comets have been cataloged and their orbits at least roughly calculated. Of these, 184 are periodic comets (orbital periods less than 200 years); some of the remainder are no doubt periodic as well, but their orbits have not been determined with sufficient accuracy to tell for sure. Comets are sometimes called "dirty snowballs". They are a mixture of ices (both water and frozen gases) and dust that for some reason didn't get incorporated into planets when the solar system was formed. This makes them very interesting as samples of the early history of the solar system. When they are near the Sun and active, comets have several distinct parts:

**nucleus:** relatively solid and stable, mostly ice and gas with a small amount of dust and other solids;

**coma:** dense cloud of water, carbon dioxide and other neutral gases sublimed from the nucleus;

**dust tail:** up to 10 million km long composed of smoke-sized dust particles driven off the nucleus by escaping gases; this is the most prominent part of a comet to the unaided eye;

**ion tail:** as much as several hundred million km long composed of plasma and laced with rays and streamers caused by interactions with the solar wind.

Comets are invisible except when they are near the Sun. Most comets have highly eccentric orbits which take them far beyond the orbit of Pluto; these are seen once and then disappear for millennia. Only the short- and intermediate-period comets, stay within the orbit of Pluto for a significant fraction of their orbits.

## COMET AWARD LEVELS

Observers can receive a certificate from the Astronomical League for two different levels of observations. A lapel pin will also be awarded for the Gold Level. The levels are:

**Silver Level - observe at least 12 different comets.**

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## COMET AWARD LEVELS (Continued):

Comets observed and logged can be at any magnitude. Two of these comets can be observed prior to January 1, 2003, considering that all appropriate documentation is provided.

### **Gold Level - observe at least 18 additional comets**

Comets observed and logged can be at any magnitude. Two of these comets can be observed prior to January 1, 2003, considering that all appropriate documentation is provided.

The observations can be accomplished through the use of:

- binoculars
- observatory telescope
- observer's personal telescope
- or accessible robotic telescope.

The observer can make these observations visually (eye to eyepiece) and hand sketch the comet. Those certificates will be registered in the Visual category. Or the observer can image the comet by using camera and film or by using a CCD camera. These certificates will be registered in the Imaged category.

## WHAT TO DOCUMENT

Your observation log should be recorded in a notebook, hard copy print out or some other method. You can also use the observing form attached. Whatever method you use to record your observations, the following needs to be included:

- (1) Name of the observer, email and location of the observer
- (2) Date and time of observations/image and location at which the observation/image taken
- (3) Official designation of the comet and name
- (4) The size of the telescope, location of telescope, exposure length, time of exposure (UT time) and additional information, power used, etc
- (5) Documentation of observations:
  - (5a) A sketch/ drawing or CCD image or photograph. When it is a faint comet with no tail, at least two should be submitted indicating the movement of the object against the background stars. Planetarium programs may be used to indicate comet position and stars names.
  - (5b) Regarding the drawings made by the observer- The nucleus, tail and background stars (drawn as dots) should be identified and labeled especially when the comets are very faint and non-comet like (little or no tail or coma). Tick marks can indicate the direction of movement against the star background, indicating hourly/ daily movement of fainter comets, to indicate movement against the stars either on a hourly basis or over two nights.
  - (5c) Computer based images can be submitted on 3.5-inch floppy diskette, CD, or ZIP disc in jpg, gif, or tiff format or on a html page, word document, etc. Images can be inverted (a negative exposure) if it brings out more detail in the comet. The name of a electronic file should indicate the common name of the comet and/or letter designation and date photographed-month/date/year (example, Ikeya-Zhang2001c10402).
  - (5d) Each photograph/image should be numbered and identified appropriately in the log/journal (ex. cometlinearwm1112001.jpg)
  - (5e) Photographs/Images can be printed out and included with the journal/log either background sky as dark with stars and comet white on black or an inverted image (black on white). An option is place the images on an html page, PowerPoint or other multimedia product on a ZIP disc or 3.5-inch floppy diskette. Appropriate documentation of the files and application used should be also sent.
  - (5f) While comets are quite noticeable because of the coma/tail, two or more observations should be used to verify the motion and identity of the comet that is dimmer than 6th magnitude and/or does not have a noticeable tail or coma.

## PROGRAM RULES

The rules for obtaining a Comet Award as follows:

1. Be a member of the Astronomical League, through either an affiliated club or as a member-at-large.
2. Observe comets as a group or individually.
3. Each observer should keep his or her own data on the report form or own log system.
4. The completed observing report should include the following submission/index information: Observer's Name, Observer's E-mail address, Address of observer, and a listing of the comets included in the final submitted

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## Monster Trucks on Mars

by Patrick L. Barry and Dr. Tony Phillips

We all know what Mars rovers look like now: Robotic platforms, bristling with scientific instruments, trundling along on small metallic wheels. Planetary rovers of the future, however, might look a little different-like miniature monster trucks!

Enormous, inflatable tires can easily roll right over the rocks and rugged terrain of alien planets, just as they bound over old cars like as many speed bumps.

That's the idea behind a novel concept for robotic planetary rovers known as the "big wheels inflatable rover." Unlike rovers similar to the Sojourner robot that explored the surface of Mars in 1997 that depend on instructions sent from Earth or complex programmed intelligence to steer through rough terrain, this rover has three beach ball-like tires roughly five feet across that make it a true off-road vehicle.

"We sent this rover out to Death Valley, to a place called Mars Hill that has a general geological formation like Mars, and nothing could stop it," says Jack Jones, the mastermind of the inflatable rover concept at JPL. "It just kept going and going and going."

Lots of current research is devoted to developing advanced robotic intelligence that allows rovers to detect rocks in their path and maneuver around them. The alternative to such on-the-spot intelligence is tedium: Ground controllers on Earth working out the maneuvers by hand and waiting an hour or more for the instructions to travel to the distant planet.

A "big wheels" rover would need such computer intelligence to avoid very large boulders, but Jones asks, "Why worry about every little rock, pebble, and crack when you can just roll right over most of them?"

Jones imagines a scenario where multiple inflatable-wheel rovers could be sent out to explore the Martian terrain-easily and quickly traversing the rugged terrain. Samples gathered by the rovers could be returned to a central, stationary laboratory module for detailed analysis.

"The Martian surface is really very, very rough with a lot of rocks, and to be banging this laboratory equipment up and down over all of these rocks aboard the rovers doesn't make much sense," Jones says. "I suspect it might be better to leave it in a central location."

At the moment it's all very speculative; NASA currently has no definite plans to send inflatable rovers to Mars. But who knows, one day monster truck-like vehicles could be zipping over Mars' rough, red surface.

Kids can baffle their friends with a robot puzzle (including a "Big Wheels" rover) they make themselves at [http://spaceplace.nasa.gov/robots/robot\\_puzzle.htm](http://spaceplace.nasa.gov/robots/robot_puzzle.htm) . For adults, find out more about NASA's inflatable rover program at [http://www.jpl.nasa.gov/adv\\_tech/rovers/summary.htm](http://www.jpl.nasa.gov/adv_tech/rovers/summary.htm) .

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## Eyepieces

By Sam Pitts ©

No single eyepiece will handle all your needs. Like telescopes of different types and sizes offer different performance, so do eyepieces. First lets consider the standard sizes, base on the diameter of the eyepiece barrel (tube), also called an ocular. Eyepieces come in three basic sizes, .956", 1 1/4" & 2". Most "department store" (bargain) models come with .956" eyepieces. These are not usually of good quality and may work for very simple low power magnification. The standard size for most amateurs is the 1 1/4". However the 2" is also being used by professionals and amateurs alike. Let's make a very important note here, spotting scopes and some other small scopes may not have interchangeable eyepieces. The magnification would be fixed, except for a few that may have a zoom feature.

There are many types of eyepieces I will only concentrate on the most proven and popular type, brand and manufactures. A good telescope will produce very poor images with an inferior eyepiece. The basic designs are Huygens, Ramsden, Kellner (type 1,2 & 3), Orthoscopic, Erfle, König. The type 3 Kellner is now usually referred to as a Plössl and is a very popular design. The design names refer to the optical experts that first invented them up to two centuries ago.

An eyepiece is a group of lenses or elements in a metal barrel that is used to magnify the image a telescope produces at its focal point. All eyepieces have a focal length that is usually inscribed on the top in millimeters. The larger the number the longer the focal length and the less the magnification. To figure the magnification of a particular eyepiece, take its focal length and divide it into the focal length of the telescope ( $40\text{mm} \div 1200\text{mm} = 30\text{x}$ ).

How large an area we actually see of the sky depends on an eyepiece's magnification and field of view with any given telescope. Remember the shorter the focal length of the telescope the less the magnification and the larger the field of view (same size Objective). The same rule applies for an eyepiece. Thanks to modern designs, some makes offer a wider *apparent field of view*, than others. The Fig. 2.3 below will list popular eyepieces, field of views and costs.

The major brands include Celestron, Meade, Orion, Tele Vue, Parks, Takahashi, Apogee, University to name a few. Manufactures may apply their own trade name to a specific design, like a Plössl and call it an Ultrawide or Superwide based on its apparent field of view. Wider fields are preferred for deep sky observing and are not needed to planetary or lunar observing. Wider fields are more expensive to make and produce sharp images, so they will cost a lot more.

To find the FOV (field of view) of an eyepiece with a particular telescope, take the magnification of the lens and divide it into the apparent field of view of the eyepiece. Example: using our 1200mm fl (focal Length) and 40mm Plössl 30x(44°):  $44^\circ \div 30 = 1\frac{1}{2}^\circ$ .

To get started purchase two to three eyepieces in the five-element Plössl design by Orion, Meade, and Celestron. From Meade this would be the Super Plössl series 4000, Celestron Ultima Series, Tele Vue Plössl or Orion Ultrascopic. Most scopes come with a 26mm eyepiece, add a 32mm to start. Should you be able to, purchase a 20mm for the third one. This will give you the sharpest images to start. Higher magnifications using smaller focal length eyepieces may not be as sharp depending on the seeing conditions. This set of eyepieces is based on an F/10 system, but will work well with F/6 & F/8 systems as well.

The next most important item to consider is a good quality Barlow lens. A Barlow lens or group of lens that will increase the magnification of any given lens. They are available in 2x-5x models. I suggest on getting an APO, or at least a three element Barlow, from one of the manufactures mentioned. A decent one will cost \$80 - \$120. I recommend the Tel Vue, Meade, Celestron three element Barlow for \$ 80.00. Should you want the best, get one of the Powmates from Tele Vue starting at \$170.00.

A 32mm eyepiece inserted into a 2x Barlow will become a 16mm, doubling your magnification. The star diagonal that is used on some scopes will add another benefit. Insert the 2x Barlow into the telescope then the

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## Eyepieces

diagonal into the Barlow, the eyepiece then goes into the diagonal and will result in a 3x gain. With this setup the original three eyepieces the 32mm, 26mm & 20mm will be like having nine eyepieces. The 2x Barlow positions will yield, 16mm, 13mm, 10mm, the 3x position 10.6mm, 8.6 and 6.6mm.

Contrary to what you may hear, a good quality Barlow will not degrade the image at all, none! Some of the expensive eyepieces costing several hundreds dollars use this lens configuration within the barrel of their eyepieces. However, poorly made low cost Barlows will yield very poor results. Think before you buy any eyepieces. High quality eyepieces will be kept for as long as you enjoy this hobby. Telescopes may come and go, but good quality eyepieces are can be retained, they will work on any telescope you buy.

Eye Piece Designs	Barrel Size	Apparent Field	Deep Sky	Planetary Lunar	Average Cost	General Recommendation
Kellner (1 )	1 ¼"	35°- 40°	OK	OK	\$ 40.00	Fair
Orthoscopic	1 ¼"	30°- 50°	OK	Excellent	90.00	Very Good
Plössl (4+ elements )	1 ¼"	45°- 55°	Very Good	Excellent	120.00	Very Good +
Super & Ultra Wide	1 ¼"-2"	60°- 84°	Excellent	Excellent	180.00+	Excellent
Erfler	1 ¼"	60°	Very Good	Fair	100.00	Good
Panoptic	1 ¼"	68°	Excellent	Excellent	240.00+	Excellent
Nagler	1 ¼"-2"	80°- 84°	Excellent	Excellent	200.00+	Excellent +

## Mars Desert Research Station Mars Party

August 29-30-31 2003

Imagine observing Mars this summer from a place that looks like the Red Planet- complete with a fully functional Mars Habitat and Observatory. You are cordially invited to attend a Mars Party held at the Mars Desert Research Station near Hanksville, Utah. The site was chosen for its Martian landscape and is a research facility used by the Mars Society to make studies for the human exploration of Mars. With its 6.7 magnitude skies it is an ideal location for observing the wonders of the universe. And most importantly- the event is free!

The Event: Bring your telescope, cameras and camping gear (and plenty of food and water) to camp out near the HAB. Porta-john facilities will be available at the site. The town of Hanksville is 6 miles from the HAB and has motels, food and gas. Observing sessions will be held nightly with images updated of Mars from the Celestron CGE1400 telescope in the Observatory. HAB and Observatory tours will be available as well as Dr. Robert Zubrin, the visionary whose work has set the stage for the human exploration to Mars. Contests will be held throughout the weekend with prizes given by the Mars Society and Celestron. You could even win the opportunity to don a space suit and go on a simulated Mars EVA (great picture opportunity). Or win a Celestron NexStar 5i with tripod, upgraded hand control, and GPS accessory (a \$1200 value)!

The Internet: This is where your Mars vacation begins. Check the Mars Society ([www.marssociety.org](http://www.marssociety.org)) or Celestron ([www.celestron.com](http://www.celestron.com)) websites for directions and a list of suggested items to bring. Participants will meet at the Whispering Sands Motel in Hanksville where they can pick up a map to the HAB. Escort service will also be available at certain times from the Motel if you wish to follow someone to the site. If you can't make the event you can also check the websites that weekend for updated images of Mars taken from the Observatory and other chances to win prizes.

Make this opposition of Mars a memorable one. Join us for MARSpectacular; our post opposition party over Labor Day weekend.

MARSpectacular is sponsored by:

The Mars Society [www.marssociety.org](http://www.marssociety.org) & Celestron [www.celestron.com](http://www.celestron.com).

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