

March-April  
2014  
Volume 62  
Issue 2

# The Observer

The Newsletter of Central Valley Astronomers of Fresno

## In this Issue:

Omar Khayyam-poet,  
mathematician, and as-  
tronomer

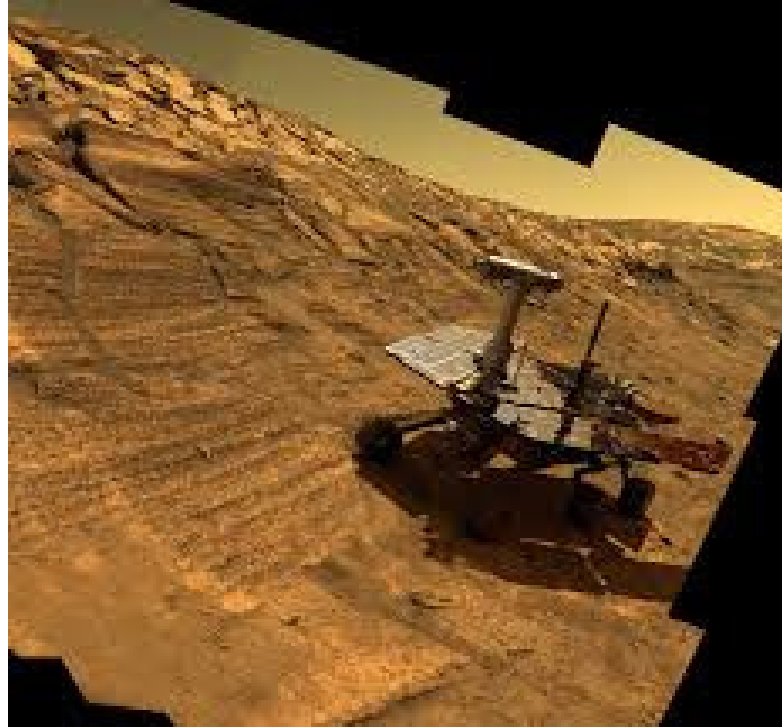
Opportunity's 10th Anni-  
versary

Saturn's Moons

The Purple Mountain Ob-  
servatory

CVA Returns to Riverpark

The Original Apollo Crews



## CVA Calendar

March 1-Messier Marathon  
at Eastman Lake

March 8-Riverpark public  
star party

March 15-CVA monthly  
meeting-CSUF 7pm

March 29-Messier Mara-  
thon #2 at Eastman Lake

April 5-Public star party at  
Riverpark

April 12-CVA monthly  
meeting at CSUF 7pm

---

---

---

---

---

---

---

## CVA Observer Image of the Month- Mars Opportunity Celebrates ten Years of Exploration

January 25, 2014 was the tenth anniversary of Mars Opportunity's landing on the Red Planet. Originally built to last only three months, it has succeeded beyond anyone's dreams, and is still going strong. Above, an image taken of Opportunity from its lander in 2004. More inside. Image-NASA/JPL

## Quote of the Month-

I had a dream that was not all a dream  
The bright sun was extinguished and the stars  
Did wander darkling in the eternal space  
Rayless and pathless, and the icy Earth  
Swung blind and blackening in the moonless air...

Lord Byron "Darkness" 1816



Full Moon-March 16



New Moon-March 30



Full Moon-April 15



New moon-April 28

Remember your 2014 CVA dues if you have not already paid them!

Central Valley Astronomers  
Web Address:  
www.cvafresno.org  
Webmaster  
Aaron Lusk 559-332-3102  
admin@caservers.net

The Observer March-April 2014

*The Observer* is the newsletter of the Central Valley Astronomers  
of Fresno

## Officers and Directors for 2014

President and  
Star Party Coordinator  
Fred Lusk 559-436-1833  
fel3@pacbell.net

Vice-president  
Steve Britton 559-897-4529  
sbritton@cviip.net

2d Vice-president  
Randy Steiner

Secretary-Treasurer  
Steve Harness 559-292-2753  
sharness@sbcglobo.net

Historian  
Larry Parmeter 559-276-8753  
lanparmeter3@hotmail.com

Director  
Lynn Kliewer 559-251-3656  
lelliottk@att.net

Director  
Clarence Noell 559-271-9304  
xmascnn@sbcglobal.net

Director  
Dave Artis 559-658-8016  
Dave.artis@direcpc.com

Director  
Greg Morgan 559-348-1160  
gmorgan@oldstarlight.com

Director  
Warren Maguire 559-294-7444  
slicker1948@yahoo.com

## The President's Message

Winter—well, what winter we have had— is only weeks away from ending and already your fellow CVA members have been actively observing and imaging the 2014 night sky. The last several Eastman Lake star parties have been blessed with excellent conditions. On February 1, we had about a dozen telescopes at Eastman; Scott Davis and I even stayed until about 2:30 a.m. The skies that night were steady and clear and it wasn't very cold. There is a lot to see in the winter skies, but more often than not we are stuck with fog or clouds. I know we need rain...as long as it's not on a star party night.

As we head into spring, March will be a busy month for CVA. This year, both Messier Marathon star parties are in March: one on the 1<sup>st</sup> and one on the 29<sup>th</sup>. March 8 is our first River Park star party of the year. The main attractions will be the first quarter Moon and Jupiter. With a light pollution or DIII filter, we may even be able to show the Orion Nebula decently well. The River Park star parties (Moon parties, actually) are CVA's best venue for sharing our passion for astronomy and interacting with the public. If you have never been to a River Park event, you owe it to yourself to check it out.

April brings a couple of additions to our normal schedule. On April 15 (Tax Day) is a total lunar eclipse. The umbral phase starts just before 11:00 p.m., so a public even seems unlikely. However, if you would like to organize one, let's talk. On April 26 we will be conducting our annual solar viewing in front of the Downing Planetarium at Fresno State for Vintage Days. That night is a star party at Eastman, so it promises to be a long but enjoyable day.

We still have 2014 CVA wall calendars for sale for \$25. They will be available at the next few star parties and meetings. If you are unable to attend one of these events but would like to get a calendar, please contact me directly and I will make arrangements to get this beauty to you.

In case you missed the February 15 meeting and my presentation on astroblemes, I converted the PowerPoint file to jpegs and uploaded them into an album on CVA's Facebook page. The jpegs don't come with flashy effects and my corny jokes, but there is enough eye candy images in the album to keep your entertained for a while.

Keep that starlight coming,

Fred

---

## Reminder— the annual CVA Messier Marathons—

## March 1 at Eastman Lake, and March 29, also at Eastman Lake

## Be there!

## Profiles in Astronomy

### Omar Khayyam 1048-1131

Omar Khayyam, whose real name was Ghayah ad-Din-Fath Umar ibn al-Khayyam Nishapur, is best known in the West as the poet who wrote the famous *Rubaiyat*.\* But he was in reality a highly accomplished man who excelled in philosophy, geography, music, theology, literature, mathematics, and science. In particular, modern mathematics and astronomy owe much to his researches and discoveries.

Khayyam was born in the city of Nishapur, in what is today eastern Iran, but spent much of his childhood in Balkh in northern Afghanistan. His family was well known for tent making, and he was educated by the best private tutors at the time. As a young man, he lived in Bukhara, in present day Uzbekistan, and was an advisor to Malik-Shah, the Sultan of the Seljuk empire. After Malik-Shah's downfall, he moved to Medina in Arabia, and later to Mecca. Eventually he returned to his family home in Nishapur, where he died in 1131. He is buried in an elegant tomb there, which is visited by tens of thousands of people yearly.

Khayyam did groundbreaking work in both algebra (from the Arabic *al-jebra* to unite) and geometry. An influential paper he wrote on algebra, "Treatise on the Demonstration of Problems in Algebra," outlined ways to solve cubic equations and binomial coefficients. An equally important treatise that he wrote on geometry concerned itself with Euclid's parallel postulate and the theory of proportions. These findings made him famous throughout the Islamic world, and eventually reached Europe, where they had a tremendous influence on emerging Western science and mathematics.

In astronomy, Khayyam made many discoveries. In 1073, he and several other scientists established an observatory at Bukhara, under the sponsorship of Malik Shah. Here, they plotted the motions of the sun, the stars, and the planets, and eventually, under Khayyam's leadership, produced a solar calendar more accurate than any in existence up to that time. The official Persian calendar used today is based on it. Khayyam also proved that the Earth rotates on its axis, and that the Earth and the other planets revolve around the Sun, contrary to the accepted Ptolemaic geocentric model of the time. His planetary and solar studies would have a great influence on Copernicus, Kepler, and other Western scientists centuries later.

When Khayyam died, he was lauded as one of the greatest mathematicians and poets of his time, and a magnificent tomb was built for him. In 1963, the tomb was rebuilt in modern style, and is considered a masterpiece of Arab style architecture.

\*In Persian, the word *Rubaiyat* means "four lines," or quatrains, referring to the four line stanzas that make up the poem.

Source-Wikipedia, "Omar Khayyam"







## CVA Returns to Riverpark

As it has for the past several years, Central Valley Astronomers will hold public starwatches at the Riverpark shopping center starting on March 8, and running probably through October. These events give the public a chance to see the (well, brightly lit) nighttime sky of north Fresno. At times, as many as 500 people have received views through the members' telescopes as part of CVA's public outreach. A Riverpark experience is a good time for all!



# CVA Calendar March-April 2014

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						March 1 Messier Marathon #1 at Eastman Lake
2	3	4	5 Ash Wednesday	6	7	8 CVA public star party at Riverpark
9 Daylight Savings Time begins	10	11	12	13	14 Pi Day	15 The Ides of March  CVA monthly meeting at CSUF 7pm
16 Full Moon 	17 St. Patrick's Day	18 First space walk by Alexi Leonov 1965	19	20	21	22
23	24	25	26	27	28	29 First flyby of Mercury by Mariner 10, 1974  Messier Marathon #2 at Eastman Lake
30 New Moon 	31	April 1 April Fools' Day	2	3	4	5 CVA public star party at Riverpark
6	7	8	9	10	11	12 CVA monthly meeting at CSUF 7pm  First manned spaceflight by Yuri Gagarin 1961
13 Palm Sunday	14	15 Full Moon  Passover Begins	16	17	18 Good Friday	19
20 Easter	21	22 Earth Day	23	24	25 Arbor Day	26  Hubble Space Telescope deployed 1990
27	28 New Moon  Annular Solar Eclipse In Australia and Antarctica	29	30	May 1	2	3

# What's New in Space

## The Original Apollo Astronaut Crews



With the advent of the Orion-MPCV program(NASA will conduct an unmanned mission of the MPCV later this year to test the heat shield and the overall strength of the vehicle. It will be launched aboard a Delta IV from Cape Kennedy, using launch pad 39A, which as been modified to handle the SLS-MPCV system), interest has re-focused on the Apollo program of the 1960s and early 70s. Many space buffs still wonder about the makeup of the original Apollo crews, and exactly how they were chosen. The Apollo crew members, many of whom are either dead or in their 70s and 80s, are themselves still not sure how they were picked for particular flights. What is known is that Alan Shepherd, one of the original Mercury astronauts, who was grounded for several years due to an ear disorder, was the head of the astronaut corps, and that his boss was fellow Mercury astronaut Deke Slaton(who himself was grounded for a number of years because of a minor heart anomaly), was the head of flight crew operations. It is strongly believed that these two made almost all the decisions concerning crew choices. They would choose the commanders first, then fill in with the rest of the crew members, as well as the backup and support crews. Each mission had a primary crew, a backup crew, and a support crew. According to Shepherd and Slaton's system, the backup crew would become the primary crew two missions later, and the support crew would become the primary crew four missions later. This worked-sometimes. In reality, only four of the support crews ever went into space.



Also, after the Apollo 1 fire in January 1967, which killed the entire primary crew of Gus Grissom, Ed White, and Roger Chaffee, the crew selections and missions were shuffled around.(this also leads to one of the semi-mythic stories that has been floating around the spaceflight world for some years. Betty Grissom, the wife of Gus Grissom, claimed, many years after the Apollo 1 fire, that her husband told her in 1966 that Slayton had chosen him to command the first Moon landing mission. How true this is nobody knows; both Grissom and Slayton are dead; Slayton never mentioned it either before or after the fire, and if anyone associated with NASA at the time knows about it, they're not saying). At any rate, the following are the original Apollo crew selections, and who ended up flying on each.

Crew 1	Grissom, White, Chaffee		Apollo 1*-died in January 1967 fire
Crew 2	Schirra, Cunningham, Eisele	crew 1 backup	Apollo 7
Crew 3	McDivitt, Scott, Schweickart		Apollo 9-Delayed lunar lander test mission, flew after AS-8
Crew 4	Borman, Lovell, Collins	crew 2 backup	Apollo 8-Collins removed due to surgery; Anders took his place
Crew 5	Stafford, Cernan, Young	crew 3 backup	Apollo 10-originally scheduled to make the first lunar landing
Crew 6	Armstrong, Aldrin, Anders	crew 4 backup	Apollo 11-Collins reassigned to first Moon landing crew
Crew 7	Cooper, Eisele, Bean	crew 5 backup	Apollo 12-Conrad took Cooper's place as commander; Gordon took Eisele's place
Crew 8	Shepherd, Mitchell, Roosa	crew 6 backup	Apollo 14-Original assignment was AS-13; delayed and switched to AS-14 because Shepherd needed more training time
Crew 9	Lovell, Haise, Mattingly	crew 7 backup	Apollo 13-Swigert took Mattingly's place three days before launch
Crew 10	Scott, Irwin, Worden	crew 8 backup	Apollo 15
Crew 11	Young, Duke, Swigert	crew 9 backup	Apollo 16-Mattingly reassigned to AS-16
Crew 12	Cernan, Evans, Engle	crew 10 backup	Apollo 17-Schmitt took Engle's place; last lunar mission
Crew 13	Slayton, Allen, Schmitt	crew 12 backup	Would have been Apollo 18; a lunar mapping, not landing, mission; never flew
Crew 14	Gordon, England, Lousma	crew 13 backup	Would have been Apollo 19; mission cancelled
Crew 15	Haise, Overmeyer, Crippin		Would have been Apollo 20; mission cancelled
Crew 16	Roosa-rest of crew not named		Would have been Apollos 19 and 20 backup crew

\*Grissom gave this designation to what would have been the first manned Apollo mission. After the fire, NASA renumbered *ex post facto* all the unmanned Apollo test flights from 1965, 1966, and 1967, and then gave the first Apollo manned flight the next number, hence Apollo 7.

# A Two-Toned Wonder from the Saturnian Outskirts

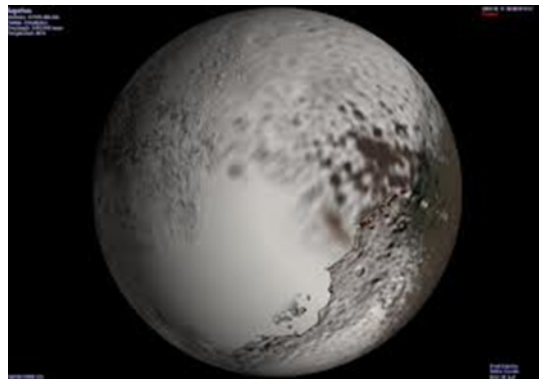
By Dr. Ethan Siegel

A though Saturn has been known as long as humans have been watching the night sky, it's only since the invention of the telescope that we've learned about the rings and moons of this giant, gaseous world. You might know that the largest of Saturn's moons is Titan, the second largest moon in the entire Solar System, discovered by Christiaan Huygens in 1655. It was just 16 years later, in 1671, that Giovanni Cassini (for whom the famed division in Saturn's rings—and the NASA mission now in orbit there—is named) discovered the second of Saturn's moons: Iapetus. Unlike Titan, Iapetus could only be seen when it was on the west side of Saturn, leading Cassini to correctly conclude that not only was Iapetus tidally locked to Saturn, but that its trailing hemisphere was intrinsically brighter than its darker, leading hemisphere. This has very much been confirmed in modern times!



In fact, the darkness of the leading side is comparable to coal, while the rest of Iapetus is as white as thick sea ice. Iapetus is the most distant of all of Saturn's large moons, with an average orbital distance of 3.5 million km, but the culprit of the mysterious dark side is four times as distant: Saturn's remote, captured moon, the dark, heavily cratered Phoebe!

Orbiting Saturn in retrograde, or the opposite direction to Saturn's rotation and most of its other Moons, Phoebe most probably originated in the Kuiper Belt, migrating inwards and eventually succumbing to gravitational capture. Due to its orbit, Phoebe is constantly bombarded by micrometeoroid-sized (and larger) objects, responsible for not only its dented and cavity-riddled surface, but also for a huge, diffuse ring of dust grains spanning quadrillions of cubic kilometers! The presence of the "Phoebe Ring" was only discovered in 2009, by NASA's infrared-sensitive Spitzer Space Telescope. As the Phoebe Ring's dust grains absorb and re-emit solar radiation, they spiral inwards towards Saturn, where they smash into Iapetus—orbiting in the opposite direction—like bugs on a highway windshield. Was the dark, leading edge of Iapetus due to it being plastered with material from Phoebe? Did those impacts erode the bright surface layer away, revealing a darker substrate?



In reality, the dark particles picked up by Iapetus aren't enough to explain the incredible brightness differences alone, but they absorb and retain just enough extra heat from the Sun during Iapetus' day to sublimate the ice around it, which resolidifies preferentially on the trailing side, lightening it even further. So it's not just a thin, dark layer from an alien moon that turns Iapetus dark; it's the fact that surface ice sublimates and can no longer reform atop the leading side that darkens it so severely over time. And that story—only confirmed by observations in the last



few years—is the reason for the one-of-a-kind appearance of Saturn's incredible two-toned moon, Iapetus!

This article is courtesy of Laura Lincoln and NASA's Space Place

## Mars Opportunity Celebrates Ten Years of Exploration

In January 2004, both Mars Spirit and Mars Opportunity successfully landed on the surface of Mars, for what was intended to be only three months of operational life. Spirit lasted over eight years before it finally went dead in 2012. Opportunity is still going strong, having traveled over five miles over the Martian landscape and sent back to Earth over 100,000 high quality images. On January 25, it took a tenth anniversary images of itself looking down (with the camera edited out); the solar panels are dusty (JPL scientists hope that another dust devil comes along and blows them clean), and the wheels are showing some signs of wear and tear, but indications are that, as long as funding for the project is forthcoming, the hardy little rover may last three to four more years. So, here's to Opportunity, still chugging away, and showing American enterprise and knowhow at its best.

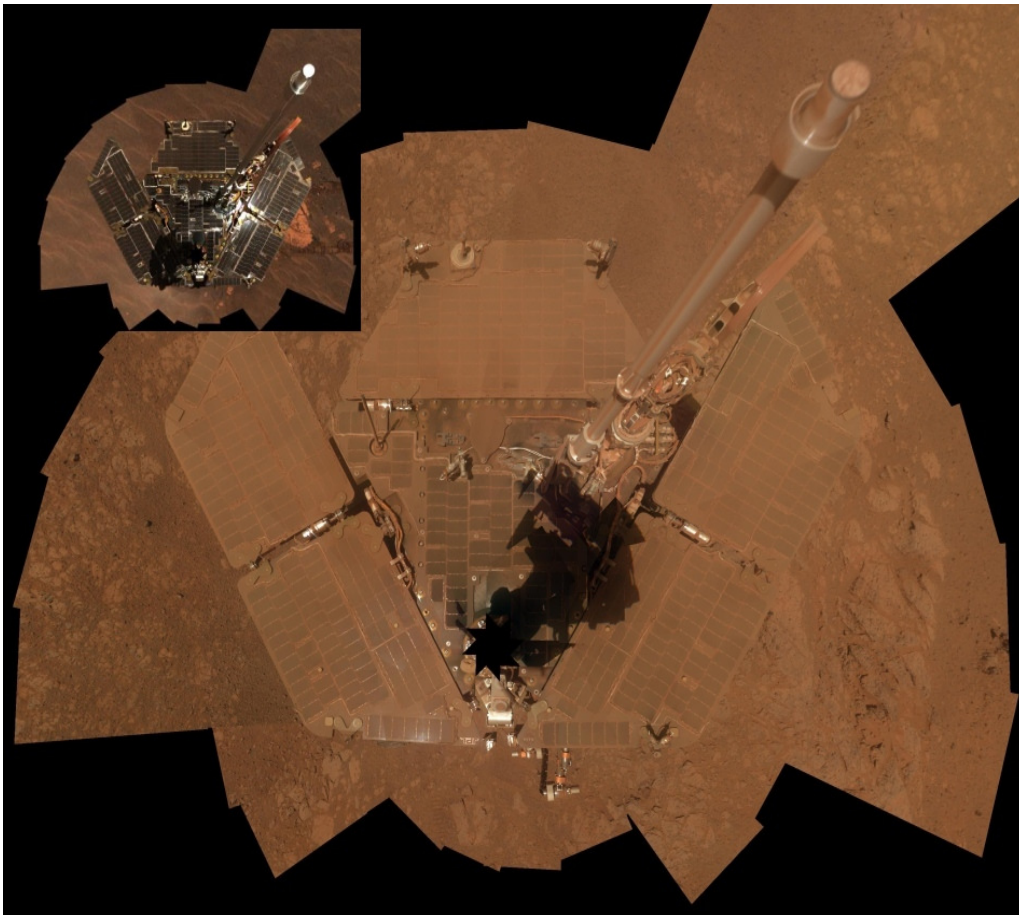


Image-Opportunity/NASA/JPL

---

**The number of extra-solar planets found as of February 2014-1,071\*  
How many more are out there-thousands? tens of thousands?**

**\*Just as this issue was being finished, NASA announced on February 26 that the Kepler Space Telescope had discovered 715 new planets, bringing the actual total up to close to 1,800**

Larry Parmeter is the editor of  
*The Observer*

phone # 559-276-8753

E-mail lanparmeter3@hotmail.com

Deadline for articles submission for the  
April-May 2014 issue  
March 20

Please submit articles in Microsoft Word format

---

## The Purple Mountain Observatory

The Purple Mountain Observatory, also known as the Zijinshan Observatory, is located near Nanjing in China, and is administered by the Chinese Academy of Sciences. It is at a fairly low elevation for observatories, 875 feet above sea level. It was established in 1934, but was heavily damaged during World War II. After the war, it was rebuilt, and today has active programs in planetary astronomy, solar physics, radio astronomy, comet and asteroid studies, and theoretical astronomy. As of 2013, it was responsible for discovering 147 asteroids and several comets.

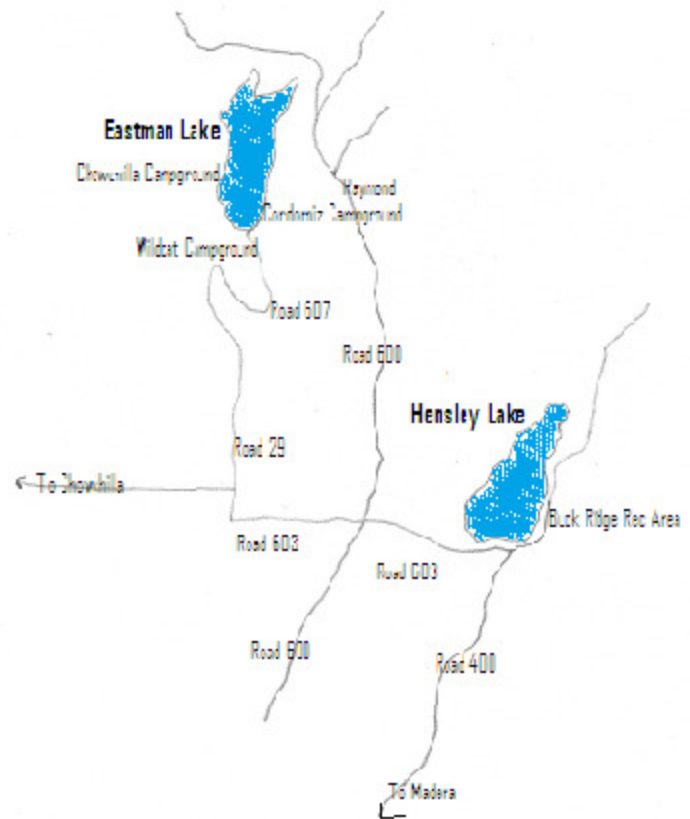
The main instrument at Purple Mountain is a 24" reflector telescope. The facility also has a 16" double refractor, a 17" Schmitt camera, a 16" helioscope, a 4" photoelectric transit telescope, a 5.5" chromospheric telescope, and a millimeter wave radio telescope. It publishes its researches and discoveries in an in-house periodical, *Reports on Scientific Researches*, and also edits a second journal, *The Astronomical Bulletin* of the Chinese Astronomical Society.

The observatory administration has recently been holding discussions concerning moving instruments off the mountain to more remote areas, due to both the uncertain weather (an average of only about 100 good viewing nights a year), and also the increasing light pollution from Nanjing and other nearby cities.

Sources and images-

Wikipedia, "Purple Mountain Observatory"

*International Encyclopedia of Astronomy*, Orion Books, 1987



To Hensley and Eastman Lakes-Star party sites. The Eastman Lake starwatching site is at the boat ramp at the end of Road 29, just past the Cardinez campground.

Two views of the Purple Mountain Observatory-

