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# nightwatch

Newsletter of the Pomona Valley Amateur Astronomers

Amateur  
astronomers  
just get better  
looking . . .

Volume 23 Number 5

*nightwatch*

May 2003

## *President's Message*

Well, we are in the middle of spring, the weather is warming, and summer is just around the corner. These are among the most pleasant months to partake of the observational portion of our hobby. And this is the summer of a once in a thousand lifetimes event. While Mars comes to opposition every 26 months and it makes a close approach to Earth every 15 to 17 years, according to some sources Mars, during its opposition this summer will pass closer to Earth than at anytime in the previous 60,000 years. According to scientists at the Jet Propulsion Laboratory on Aug. 27, 2003, at 5:51 a.m. EDT Mars will be within 34,646,418 miles (55,758,006 kilometers) of Earth. I think that it is terribly exciting to realize that this is the closest that we have been to the Red Planet since the dawn of the Neolithic period, when our species first started crafting fine stone tools.

Right now Mars is in Capricornus, rising in the early morning, and its luminosity is greater than magnitude 0. Dazzling, but impressive as this is, soon Mars will move into Aquarius and over the next 3 ½ months steadily become brighter until it is a blazing orange orb, outshining every celestial object except Venus, the Moon, and the Sun.

In September, just days after the closest approach to Mars, PVAA will be returning to

Mount Wilson to observe with the 60-inch telescope. If the seeing is as good as Mount Wilson is known for and the weather on Mars cooperates, this instrument is capable of producing spectacular views of the most likely home to life outside of Earth.

*Ron Hoekwater*

## **Mount Wilson Mars Trip**

On Wednesday, September 3rd, PVAA will be on Mount Wilson observing Mars with the 60-inch telescope. If you wish to be there, in the dome with this historic instrument, for the closest approach of Mars in tens of thousands of years, act now. Mail a check (\$60 for members, \$75 for non-members) to the club's PO box. Or you may make payment personally to our treasurer, Ludd Trozpek. Only the first 25 to pay will be going. Mount Wilson does not allow more than 25 guests in the dome. Don't be left out. Sign up early.

## **PVAA Events Calendar**

Month	Star Party	General Meeting	Board Meeting
May	31	16	8
June	28	13	5
July	26	11	3
August	23	8	July 31

## Why Doesn't Mars Come Around More Often?

### The Apparent Motions of Certain Stars and of the Outer Planets With Respect to the Sun, As Seen From Earth

The fixed stars move across the sky from east to west at the sidereal rate of about 15 degrees per hour. The sun also moves from east to west, but at the solar rate, which is somewhat variable and just a little slower than the sidereal rate. The net effect is that the sun moves, with respect to the stars, from west to east (the opposite direction) at the slow rate of about one degree per day, on average. Conversely, the stars move, with respect to the sun, from east to west at that same rate of one degree per day.

I will confine this discussion to those stars having declinations that fall within the range spanned by the ecliptic. These stars follow paths fairly similar to those of the outer planets, the underlying subject of this article.

For each of these stars there is a portion of every year when it is not visible because it is too close to the sun. The time of year when this occurs is determined mainly by the right ascension of the star, but the duration of the period of non-visibility varies and is determined by several factors. The most important of these are the brightness of the star and the declination of the star, but the latitude of the observer and the transparency of the atmosphere are also factors.

The length of time a star cannot be seen for this reason is between one and two months, depending on which star it is. The mid-point of the period of non-visibility occurs when the star passes the sun, at conjunction, and then begins to move away from it. A typical bright star takes a few weeks to move from conjunction to a point where it is far enough from the sun to be again visible in the sky.

Every year, each of these stars is "reborn" as it emerges from the glare of the sun at that star's heliacal rising. That is the day when it reappears for the first time in the predawn sky for a few minutes until the sky brightens and the star can no longer be seen. It rises just before the sun, because it has moved a short (but sufficient) distance to the west of the sun (or really, the sun has moved that same short distance to the east of the star). We can take 20 degrees as the approximate distance that a star has to move west of the sun before it escapes from the sun's glare and begins to reveal itself. Each day after that, the star rises about 4 minutes earlier because it has moved one more degree further west of the sun. So about ten days after its heliacal rising, and about thirty days after it has passed the sun at conjunction, the star is 30 degrees west of the sun, and it rises about two hours before the sun.

When a star is 30 degrees west of the sun it rises before the sun and then leads it through the dawn and across the blue daytime sky; although the star cannot be seen in daylight, it always stays 30 degrees ahead of the sun, and sets two hours before it. We only get to see the star during the period when

it is in the pre-dawn, morning sky, when the sun has not yet risen, the sky is still sufficiently dark, and the star is above the horizon.

But there is another way to think about the position of a star, relative to the sun. When a star is 30 degrees west of the sun, it is also 330 degrees east of the sun in its circular path. When you consider it this way, the star is trailing behind the sun, following it around the sky at the great distance of 330 degrees. But since 30 degrees is a much smaller distance than 330 degrees, when a star is 30 degrees west of the sun we tend to focus on that fact, and to think of it only as being ahead of the sun, and leading it across the sky.

As the year progresses, the star moves further and further west of the sun, increasing its distance in degrees west of the sun. But at the same time, the number of degrees that the star is located east of the sun is diminishing. As the star moves westward, away from the sun, it is also approaching the sun from the east.

About 6 months after it passes the sun at conjunction, and a

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Get the latest news on the star party, club meetings, special events and astronomy happenings.call  
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Visit or website at

<http://www.cyberg8t.com/patrick/PVAA.htm>

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few weeks less than 6 months after its heliacal rising, the star arrives at a point 180 degrees west of (ahead of) the sun, which is also 180 degrees east of (behind) the sun. It is now at opposition; it is opposite the sun in the sky. It rises at sunset and sets at sunrise, and is above the horizon and visible in the sky for the entire night. It transits the meridian at midnight, when the sun is below our feet.

I realize that the terms “conjunction” and “opposition” are properly used only for the planets. By analogy, I am using them to describe the changing position of a star, relative to the sun, for the sake of this discussion.

Up until now, the star has been in the morning sky, leading the sun. When it moves a little further, past opposition, it crosses over into the evening sky. Now its distance in degrees east of the sun has become smaller than its distance in degrees west of the sun. Now we can more easily begin to think of it as following the sun across the sky, on the east side of the sun. Instead of being visible ahead of the sun, before the sun rises, in the morning sky, the star will be visible behind the sun, after the sun sets, in the evening sky.

When a star is in the morning sky it rises sometime before dawn but after sunset. It does not set, but rather disappears from visibility when the sun rises and the sky brightens at dawn. When a star is in the evening sky, it does not rise because it is already somewhere in the sky above the horizon at sunset, and it becomes visible as the sky darkens during evening twilight. It sets before dawn.

When a star is in the morning sky, it tends to spend more of its visible time in the eastern part of the sky; when a star is in the evening sky it tends to spend more of its visible time in the western part of the sky.

As the year continues on, the star moves further and further to the west of the sun and approaches the sun from its east side, following it more and more closely. It is somewhat paradoxical that by moving further and further away from the sun toward the west, a star can approach closer and closer to the sun on its opposite side, the east side. This is because both the sun and the star each follow a similar closed circular path.

As the star gets closer and closer to the east side of the sun, it will be visible for a progressively briefer interval in the evening sky, after the sun has set and the sky has darkened, and before the star itself has set. After almost one year has passed, the star moves so close to the east side of the sun that it is lost in the bright sky of the sunset. It sets so soon after the sun that the sky does not have enough time to darken before the star sets too. The star disappears into the glare of the sun on its east side. It will spend some time lost “with” the sun until it re-emerges one or two months later, reborn again at its next heliacal rising on the west side of the sun.

This description is somewhat correct for most of the stars,

except for the circumpolar stars that never set, and for those far to the south that rise late and set early, only briefly showing themselves above the southern horizon. But it is most accurate and easiest to visualize for stars located somewhere near the celestial equator and the ecliptic, because these stars have a declination similar to that of the sun and it is easier to think of them leading or following the sun around the sky. This is more difficult to visualize for stars located further to the north or south of the sun’s path across the sky. This is another reason why I have limited my discussion to stars with declinations within the range of the ecliptic.

In summary, a star passes through conjunction and is born into the morning sky from the west side of the sun at its heliacal rising. It moves westward away from the sun at a rate of one degree per day, and leads the sun around the sky. After about six months, this slow westward motion carries it to opposition. It passes through opposition, leaving the morning sky and entering the evening sky. Its continued westward motion causes it to approach the sun from its east side. Now it is trailing the sun around the sky. After almost a year, the cycle nears its end as the star draws close to the sun and finally disappears into the sunset glare on the east side of the sun on the day after its final heliacal setting. When the star returns to conjunction, the cycle is completed.

This is the first part of a two part article by **Jeff Felton**. The second part will be in next month’s Nightwatch.

### **April’s Star Party**

In April our star party weekend coincided with the Coachella Music Festival, causing camping spaces in Joshua Tree National Park to be

### **Public Star Party**

On Thursday, May 15<sup>th</sup> after sunset, PVAA in conjunction with Barnes & Noble Booksellers will be having a public star party. This date was selected to coincide with the total lunar eclipse. Barnes and Noble has presented us with a fine opportunity to educate and introduce the public to astronomy and to attract new members to our club. In our area the eclipse will be well under way at moonrise. But for many young and some not so young people it will be their first glimpse through a telescope. In some cases this may lead to lifetime of involvement in astronomy.

Barnes & Noble is located in Rancho Cucamonga on the north side of Foothill Blvd. Between Haven and Milliken Avenues. It is next to Best Buy and Starbuck’s. I hope that many of our member’s (with their telescopes or binoculars) will be able to attend.

**Ron Hoekwater**

at a premium. Fortunately Frank Busutil learned of the conflict and called telling me that he and Barbara would be going out to the site early. Forewarned, I went out on Friday afternoon and arrived a little before dark. I was able to find a space (before the campground filled) near Frank and Barbara who, having arrived Thursday, were already camped. As it turned out, in the campsite next to mine was a fellow amateur astronomer from the Los Angeles Astronomical Society, James Neff. On Saturday, we were joined by Bob Akers, Joe Hillberg, and Ludd Trozpek. Later a reporter, Lafayette Hite, covering our club activities for the Highlander in Walnut/Diamond Bar, arrived along with his sister. Having saved one extra space and by sharing spaces, even though the campground was filled, everyone was accommodated.

Friday night the seeing was pretty good most of the night, except for a few clouds after midnight. On Saturday night the clouds pretty much closed down the observing by 1:00 AM, although it cleared again about 3:00 AM and stayed good the rest of night. However I did not get back up to observe.

With so many people in Cottonwood Springs, we spent most of our time showing old familiar objects to the throngs of curious fellow campers. Everyone was kept busy, but it was great fun, introducing the hordes to the night sky.

Bob Akers, I know did have an observing program planned, but with all the interested bystanders, I don't know if he was able to carry much of it out. He mentioned perusing the galaxies of Leo (including M95, M96, and M105). He also spoke of visiting the "Realm of Galaxies" in Virgo (including M104, the Sombrero). In particular, I know that he was intending to search for Comet C/2001/RX14 (Linear).

After packing up on Sunday, it was off to the traditional breakfast buffet in Indio at the Travel America truck stop. Good conversation and good food capped off a very enjoyable weekend.

(If anybody has a copy of the news article

about PVAA that was published in the Highlander on May 1<sup>st</sup>, please bring it to the general meeting.)

The next star party will be May 31<sup>st</sup> at the heli-pad above Angelus Oaks. Take Highway 10 east to Highway 38. Take Highway 38 through Redlands and Mentone towards Big Bear. When you reach Angelus Oaks you will see a restaurant, real estate office, post office, and some other businesses. Turn left into the parking lot and keep going until you reach the dirt road. Follow the dirt road always staying to the left when the road forks. The road will end after a short distance (no more than a mile or so) on top of a big hill, which has been leveled and cleared. This is the star party site. I hope to see many of you there.

*Ron Hoekwater*

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### May's Speaker

At the May general meeting the speaker will be our own Alper Ates. Alper is a very busy man. He is a graduate student, father, and husband. Alper is also the staff astronomer at Pomona College. In addition he is a past president of Pomona Valley Amateur Astronomers and has been working on a new club website. He will be speaking to us about his recent trip to Chile and his work at the Cerro Tololo observatory near La Serena.

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### Riverside Telescope Makers Conference 2003

The 35th annual Riverside Telescope Makers Conference will be held Friday through Sunday on Memorial Day weekend. It is one of the highlights of the astronomical year. This will be my 10th year to attend the conference, which every year keeps getting better and better.

**RTMC** is a great place to try out and buy astronomical equipment. (A few years ago I bought a Speers Waler 7mm eyepiece. The price was good and I have been very impressed

with the optical quality.) If you have all the equipment you need (that's hard to imagine) there are books, back issues of magazines, tee shirts, meteorites, fossils, astro

-photos, paintings, jewelry, chess sets, and anything might turn up at the swap meet on Saturday morning.

Every year RTMC has legions of interesting speakers and presentations to hear and see and this year (I'm sure) will be no exception. This year's theme is "Building Your Own Observatory." Starting this year RTMC will host the Robert Goff Invitational Lecture on optics and optical design. There will be lectures and demonstrations for everyone from the beginner to the advanced observer.

But, what we all love to do is look at the sky and RTMC is one giant star party. In fact if it isn't the biggest in the world it must be very close. There are hundreds of telescopes and binoculars out on Friday and Saturday nights. And this year (for those of us interested in deep sky observing) the moon will not rise until well after midnight. A few years ago I looked through a pair of 13-inch binoculars someone had constructed. What a thrill! During the day there are solar telescopes set up, often with H-Alpha filters.

Another great thing about RTMC is getting to visit during the day and observe the heavens at night with old and new friends. Each of the last several years up at Camp Oakes, I have met up and camped with Joe Hillberg, Bob Akers and Ludd Trozpek. It will be a chance to catch up with some people I haven't seen for a year and some that I have seen more recently.

I would strongly encourage anyone with any interest in astronomy to attend the Riverside Telescope Makers Conference, May 23-25. It truly is a wonderful experience!

*Ron Hoekwater*

### April General Meeting

At our April General Meeting we were visited by a reporter for the Walnut / Diamond Bar Highlander, Lafayette Hite. He spent quite a bit of time visiting with our members for an article he is writing about PVAA.

Lee Collins gave his usual stellar performance informing us about the stars in his "What's Up" feature. This month the Virgo-Coma galaxy clusters were covered. This area is sometimes referred to as the "Realm of Galaxies."

The April Meeting brought out the remarkable talent and knowledge we have every month in our midst. Due to an as yet undetermined snafu, our scheduled speaker did not appear. Fortunately Larry Pall was ready with a highly informative presentation on The Astronomical League. Then David Kary gave a very interesting talk on Walter Baade, an observer of the highest ranking who made a major contribution to 20<sup>th</sup> century science, yet he is scarcely known outside of astronomical circles.

We will be having a second public star party at Barnes & Noble in Rancho Cucamonga on May 15<sup>th</sup>, the same day as the lunar eclipse.

*Ron Hoekwater*

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### Telescope for Sale

Maker.....Discovery  
Type.....Dobsonian  
Size.....12 1/2 inch primary mirror  
Primary.....Pyrex glass  
Focal ratio.....f5.4  
Secondary.....Spider mount  
Focuser.....2 inch with 1 1/4 inch adapter  
Eyepieces.....24mm and 10mm, 1 1/4 inch dia.  
Finder.....Telrad

Price.....\$800

Call **John Jacobs** at (909) 593-5855

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