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# nightwatch

Newsletter of the Pomona Valley Amateur Astronomers

Amateur  
astronomers  
just get better  
looking . . .

Volume 23 Number 2

*nightwatch*

February 2003

## *President's Message*

Everywhere I go I run into people with an interest in astronomy, from those with just a passing interest to the occasional and casual observer to the serious amateur astronomer. Almost everyone (I believe) is curious about the Universe in which we live. And it is a marvelous and fascinating place. Wanting to encourage curiosity and reveal some of its wonders to others is only natural.

At the beginning of this month, I was up in Death Valley to do some observing. Almost immediately upon finishing the setup of my telescope, I was joined by inquisitive fellow campers wishing for a look. We spent a very pleasant evening talking and gazing upon the stars.

Our hobby is an easy sell with the general public. Whenever and wherever we setup our telescopes there will be people eager to see what's up there. If we want support for lighting restrictions to preserve the night sky and resources for exploration of the Universe then we must share with people the beauty and wonder that is up there and all around us all of the time.

We have an opportunity share our interest in astronomy coming up on April 12th. We have been invited by Casey Marcarello in the Community Relations Department of Barnes & Noble Booksellers at . to a public star party at the Rancho Cucamonga store at 11090 Foothill Blvd. I hope that many members of PVAA (along with their telescopes) will attend.

After the Columbia tragedy it is important to help those outside of the scientific community to understand why there are people willing to risk their lives in an effort to expand our knowledge and why it is worth the investment and why it is worth the risk.

*Ron Hoekwater*

## January General Meeting

### Mount Wilson 60-inch

We are now collecting money for the Saturday, March 29<sup>th</sup> trip to Mt. Wilson. Member price is \$60, non-member \$75. The first 20 people to pay will have reserved spots for the trip.

For those of you who have items of interest to share with the Club please be advised we are adding a few regular features to our General Meetings: Equipment Reviews, Book Reports, and Show and Tell. If you have seen, read, or use something you think would be of interest to our group, please let Ron know either prior to our meeting so he can schedule your presentation. We'd all love to hear from you – and don't worry, we're an easy crowd if you aren't an experienced speaker!

Ludd Trozpek gave us just such a presentation – showing several video clips of the effects of gravitational lensing. The effect was shown both in front of a cityscape and as it would be observed moving across the

## PVAA Events Calendar

Month	Star Party	General Meeting	Board Meeting
February	1	14	6
March	1	14	6
April	26	18	10
May	31	16	8

skies, distorting our view of distant stars and galaxies. The lensing is the result of the presence of a massive object in the same line of sight as a more distant object we are observing. Distinctive arcs of light are formed as the gravity of the massive object warps the light coming to us from the far away stars and galaxies.

Ray also had a presentation for us from his trip to Australia to see the solar eclipse. He and his wife, Irene, joined 15 other sky watchers on an eclipse tour. His video of the Australian countryside showed sparsely vegetated red earth and whipping winds which kept the tarp of their planned shelter in the bushes. The eclipse pictures were excellent – 5 seconds of exposure every 5 minutes – and gave us all a bit of the view and the feeling they must have had being there.

### Featured Speaker

Our speaker for the evening was Dr Alma Zook, Department Chair and Professor of Physics at Pomona College. Her lecture covered the daunting topic: Where did the Elements Come From? She began with the ancient understanding of the four elements thought to make up everything we saw on our world: Fire, Water, Air, and Earth. In contrast, the Periodic Table we use today contains about 117 elements. How in the world are such a huge variety of different materials formed? The answer is that their formation comes not on our world but from the various processes which go on inside the stars of our universe.

Theories about the age of our planet have ranged as widely as estimates about the number of elements it contains. The very first estimates were based on biblical accounts and involved adding up all the individual birth times, death times, and begets in between which were told of in the Bible to arrive at the conclusion that the Earth was created in 4004 BC. At this time, the power source driving the sun was thought to be burning coal. Later observation of geologic formations like the Grand Canyon led scientists to conclude they had underestimated a bit and revised their figures to give an age to the Earth of about 3 million years. The power source had to be bumped up a bit now too, as the coal would have been long gone – it was now postulated that the gravitational energy of the sun was converted to kinetic energy, or heat, and that this source would last for the new age given to the Earth.

It was only during the last century that scientists such as Ernest Rutherford helped to revise the estimate upward to a figure close to what is thought today to be the correct age of the Earth. His work with elements, atomic structure, and radioactivity gave him an extensive foundation from which to consider such

issues. He looked to the results of the newly discovered carbon dating technique, which was yielding ages of materials in the billions of years to suggest an age for the Earth of at least 4 Billion years. The proposed energy source which could go on for such an incredibly long period of time came from the atom as well, and was thought to be nuclear energy – from the power of the forces holding the nucleus of the atom together. I'm sure much skepticism greeted this theory at first – how could the atom, too small to even see directly, possibly be the source of such power? I imagine the coal fired furnace made a great deal more sense to many!

The reactions which take place in the stars are thought to be fusion, or the fusing together of light atomic nuclei and fission, which is the breaking apart of heavier nuclei. Many forces are at play within the tiny atom. The electrostatic force is a familiar one to us. This force pushes like ends of a magnet apart and also repels the like forces of the protons within the nucleus. The strong force is one that overcomes the electrostatic force but only at the very small distances within the nucleus. The

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

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reason heavier elements high in atomic weight tend to be unstable, or radioactive, is that their atomic nuclei are simply so large that the strong force cannot exert its force as well at the outer reaches of the large nuclei – electrostatic force takes over and these atoms decay. At extremely short distances, a third force, the weak force, takes over.

Theories about the reactions that take place within the stars are, of course, can be tested only remotely. Even on our next door neighbor, the sun, conditions are too extreme for us to send a probe to directly observe its chemistry. Every other star has this handicap in addition to being so far away. At least for now, we are limited to theories that support remote observations, detecting any byproducts in space or on Earth, and attempting replication in the lab. It is sort of like figuring out what a car looks like by seeing only the gaskets, bolts, hoses, and other parts spread out all over your back yard; good luck in putting it back together correctly, and hopefully you even have all the parts. Some theories of solar reactions, for example, relied on a certain quantity of neutrinos to be produced as by products of the chemical reactions. Detectors on Earth, that consist of 100,000 gallons of cleaning fluid (tetra-ethyl fluoride) buried deep underground found only 1/3 of the neutrinos expected for the theories to be correct. It is now thought that there are 3 types of neutrinos created in equal amounts and current detection methods are able to find only one of the types.

It appears then, that all the elements are created within stars, lighter ones from stars the type of our sun – heavier ones from red giants, and heavier still from reactions within both nova and super nova explosions. It remains a fascinating field as scientists try to research from afar how the building blocks of life, which we find on the Earth, came to be. Thank you to Dr. Zook for her interesting physics lesson.

*Claire Stover*

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### Public Star Part

Barnes & Noble Booksellers, Community Relations person, Casey Marcarello has invited PVAA to participate in a star party for the general public. Events are planned for the evening of April 12th at the Barnes & Noble store on Foothill Blvd. in Rancho Cucamonga. We hope to promote both the book store and our club to the science minded public. If you can attend, plan on being there in time to be setup soon after sunset. This is a great chance to attract interest in astronomy and draw new members to PVAA.

### Joint RAS / PVAA Star Party

On January 3rd, 4th, and 5th PVAA members joined Riverside Astronomical members at the RAS's new observing site in Landers. Besides ample parking and space to setup telescopes, there is a house on the new site with a bathroom, shower, cooking, and sleeping facilities. We have been invited to join them anytime.

I was only at the site on the evening of the 4th morning of the 5th and we were plagued by clouds much of the night. (I understand it was better on Friday night.) But we were still able to do some observing through the clear patches.

For me the highlight of the evening was observing a quasar (that Bob Akers had found on one of his internet searches) in the 13th magnitude galaxy Markarian 421. Bob had brought along his prepared charts with the listed coordinates for this active galaxy in the constellation Ursa Major. Markarian 421 is thought to be about 400 million light years away and is what is known as a gamma ray blazar. Gamma ray blazars emit short intense bursts (lasting from minutes to about a day) of high energy gamma rays which at present cannot be completely explained. It is believed that the energy engine powering Markarian 421 is a super-massive black hole at the core of the galaxy, but exactly how it works is a mystery. During one flare high energy gamma rays were detected at 10 times as high a rate as is observed from the Crab Nebula, a strong gamma ray source nearby in our own Milky Way Galaxy. It was exciting to see for ourselves a distant galaxy which is right now an object of intense scrutiny by observatories all over the world and in space.

*Ron Hoekwater*

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### February Star Party

It has been a couple of years since I have had the pleasure of observing from Mesquite Spring Campground in Death Valley. And I was quite looking forward to it. It is a long drive, but Joe Hillberg told me of a shortcut that reduces the travel distance by about 40 miles. There are many interesting sights to see along the way. And in any case the pristine skies above this observing site at the far north end of Death Valley make it well worth the hours spent in transit.

I had hoped to arrive earlier, but as it was I arrived in time to unpack and setup while there was still some daylight. The sky was cloudy all the way up and the forecast I heard was for conditions to become worse. But, thankfully it cleared as the evening began. Apart from a few occasional clouds along the horizon, the transparency was surprisingly good. In fact I would say excellent.

The first target that I trained binoculars and then the telescope on was Comet, C/2002 V1. It was discovered by NEAT (Near Earth Asteroid Tracking program) run by NASA and the Jet Propulsion Laboratory. I was alerted to its existence by Bob Akers in a phone conversation just before I left home. The comet was easily visible in binoculars, but not

to the unaided eye. It clearly has a tail of more than 1/2 degree (perhaps about a degree). I did not see a second tail. I don't know if the tail that I was seeing was a dust tail, ion tail, or both.

Almost as soon as it was dark I heard, "What are ya looking at?" A retired gentlemen named Tom introduced himself. He had been observing the sky, but without the benefit of a telescope. After a while we were joined by his son who is also Tom. The three of us spent an enjoyable early evening together. After they left I was joined by my neighbors in the campsite just to the west. Mark and (I have unfortunately forgotten the other man's name) came over for a look. They are from Orange County and were testing out a new Meade refractor that one them had just purchased. So I showed them some of the sights that require more than 4 inches of aperture.

About 9:00 PM my two fellow amateur astronomers headed back over to their own campsite. Soon afterwards the wind started to pick up. Because of the increasingly strong gusts of wind I tried observing objects that allowed pointing the telescope the same direction in which the wind was blowing. Fortunately Leo was rising in the perfect position and it is strewn with interesting galaxies. I started looking at little groupings of galaxies in the head (which looks like a backwards question mark) of Leo. First I looked at NGC 3222, 3226, and 3227. These 12th, 11th, and 10th magnitude galaxies respectively, form a compact little group just east of the 2nd magnitude double star, ( Leonis, also known as Algeiba (meaning the "Lion's Mane"). Next, about half way between ( Leonis and ( Leonis there is a group of four galaxies, NGC 3185, 3187, 3190, and 3193. These range in brightness from magnitude 10.9 to 13.4, but the dark clear skies made them very easy to see.

Turning to Leo Minor, I aimed the telescope at a number of individual galaxies (including NGC 3294, 3430, and 3432) located in this often over looked constellation. There exists, in Leo Minor a tightly packed group of eight galaxies, the brightest of which is the 11.9 magnitude NGC 3158. The others are 13th - 15th magnitudes. This I would dearly like to see, however by the time I got around to looking for it the wind was becoming a serious problem. I shall have to try again next time I'm in Death Valley. By about 11:30 PM the wind had become impossible and I started to secure things for the night. Everything that I easily could, I put back inside of the van. I took the top ring and shroud off of the telescope to keep them from acting as sails. And I laid the wheel barrel handles across the dust cover for the primary mirror. My goal was to prevent the dust cover from blowing away, but I didn't want to weight it down or block it with anything which might fall through and on to the 22 inch mirror. I didn't have to lay the ladder down, the wind blew it over while I was working on making the telescope safe for the night.

Even though it was only possible to observe for about half the night the early evening conditions were so good that I thought it was worth the trip. I will go back up to Mesquite Spring at the next opportunity.

*Ron Hoekwater*

## Comet C/2002

During the last few weeks I've been observing a comet in the western sky. The comet is officially known as , C/2002 V1, is getting brighter and remarkably large. Easily visible with binoculars, it is located about 10 degrees ( a fist's width, at an arm's length ) below and slightly to the south of Markab. Markab, located in Pegasus, is one of the 4 main stars that form the "Great Square". Current orientation of Pegasus' Great Square, makes Markab, the star closest to the horizon. Scan that area and you'll spot a "large fuzzy star", containing a bright core. There are indications of a tail, even in the city, but in darker sites this tail may be up to 1 degree and growing.

It is suggested that this comet , AKA, "NEAT V1" ( discovered by prject NEAT), may brighten to naked eye viewing slightly before and after it's sweep around the Sun.

By approximately February 10 it will be sinking low in the west, well on it's journey toward the Sun. With this in mind, the best time to see it is immediately after sunset and definitely no later than 7 PM.

This comet is, yet again, another wonderful find by JPL's (Near Earth Asteroid Tracking) program. However, after seeing it, I'm amzed that a comet this large was only discovered on November 6, 2002... it makes you think! The NEAT project primarily uses a 1.2 meter (4 foot) diameter telescope located in Hawaii to conduct it's studies.

The comet's closest path around the sun (perihelion) will bring it to around 9.2 million miles of the surface of the sun, (1/10 AU) on February 18, 2003.

If you're a comet watcher, this one is a must see. Unfortunately you have only about a week to enjoy it. More information, plus continued "neat" views of V! be found at:

[HTTP://www.space.com/spacewatch/comet\\_neat\\_030131.html](http://www.space.com/spacewatch/comet_neat_030131.html)

*Bob Akers*

## MARCH 1st STAR PARTY

The March star party will be at Joshua Tree National Park, Cottonwood Springs campground, half way around loop B. This is about 7 miles north of I10, and 25 miles east of Indio. If you go over Chiraco pass, ( Patton Museum ), you have gone 4 miles too far.