



SJAA EPHemeris

Leonids All Over

Bill Arnett, Redwood City, Daylight:

I spent about a half hour staring in to blue sky looking for bright meteors. This is the deepest blue sky I've seen for a while. Very nice. But no fireballs.

By Nightlight:

I watched for an hour from 2 am to 3 am PST 10/17 from my balcony. The sky was mostly cloudy but there were extensive holes for most of the time. I saw 18 meteors, all Leonids I think, at least half of them brighter than Sirius.

One was so bright I can't estimate its magnitude; it was at least as bright as the brightest Iridium flare I've seen (-6).

Sandra Macika:

We saw some meteors at Mercy Hot Springs near Los Banos. There was some clouds when I arrived, but the sky was gorgeously dark for about midnight to 2 am. We did some recording, but then the clouds came back. We saw quite a few meteors in the -2 range.

Jeff Crilly, Palo Alto

I was treated to some of the most dazzling meteors I had ever seen. These were very bright, brighter than Jupiter. Even with the light polluted skies and cloud cover, these meteors were leaving trails that were visible for up to 5 seconds.

Paul Sterngold, Alameda:

I stood outside for 45 minutes and observed about a dozen bright shooters, several of which left trails for 2-3 seconds.



continued on page 2, see "Leonids"

SJAA Activities Calendar

January

- 1 Happy New Year's day. Start writing wrong date on checks.
- 8 Hoge park star party. Sunset 5:08 pm, 54% moonrise 0:06 am.
- 9 Star party at Fremont Peak. Sunset 5:08 pm, 45% moon sets 0:59 am.
- 16 Star party at Fremont Peak, Coe. Sunset 5:15 pm, 0% moonrise (who cares when?)
- 22 Hoge park star party. Sunset 5:22pm, 32% moonset 10:57pm.
- 23 Observational Astronomy class, Hoge Park, 8 pm.
- 30 General Meeting at Hoge Park, 8 pm. Noted observer Jay Freeman will speak on "Deep Sky Observing." Open board meeting 6:30 pm.

February

- 6 Star party at Fremont Peak. Sunset 5:37 pm, 62% moonrise 11:43 pm.
- 12 Hoge Park star party. Sunset 5:45 pm, 11% moonrise 5:06 am.
- 13 Star parties at Fremont Peak, Coe. Sunset 5:45 pm, 5% moonrise 5:51 am.
- 20 Observational Astronomy class, Hoge Park, 8 pm.
- 26 Hoge Park star party. Sunset 6:00 pm, 89% moon sets 5:03 am.
- 27 General Meeting at Hoge Park, 8 pm. Several members will be presenting information on Observing Plans (Mars, The Moon, Galaxies and other Targets Of Opportunity this time of year). Open board meeting 6:30 pm.

24 hour News and Information:

SJAA Hotline: 408-559-1221

Web Address:<http://www.seds.org/billa/sjaa/sjaa.html>

PLEASE NOTE THAT SJAA INSURANCE COVERS ONLY SJAA MEMBERS AT SJAA SPONSORED EVENTS.

Editor's Extras

David North

This will be my last issue as editor of the Ephemeris, a job I've held for about two years now.

I assure you, this will not be a downgrade for the publication. I'm being replaced by the tag team of Jane Houston and Morris (Mojo) Jones, and we can all expect a much better Ephemeris as a result.

Besides, I'll still be around doing the Mooning column (oh darn, that thang?) and condensing George Zay's meteor notes for the club -- plus maybe an article here and there, a luxury I didn't allow myself as editor unless nobody else covered something important).

I'll also be on board as something of a "publisher" (handling the printing and mailing list generation, and running the product to your able circulation department, Lew Kurtz and Bob Brauer. Old editors never stop, we just move down the food chain...)

It's been an amazing couple of years, an experience I'll never forget.

You get to meet and work with some great people doing this job...



continued on page 8, see "Extras"

Get Your 1999 SJAA "Astronomical Pocket Diary"

A handy appointment calendar and astronomical almanac customized especially for SJAA members. Only \$10.

Please see article on Page 6.

"Leonids"

From Page One

Robert Hoyle, Clayton

...had some nice clear skies here in Clayton, Ca. (LVM for me about 6.0). Saw 10 meteors -- about 4 with nice trails. None terribly bright, though.

William Phelps (PAS) Foothills Park

Arrived at 4 am, and observed roughly 20-30/hour between the clouds. All were fast and bright. One lit up the clouds so brightly at first I thought it might be lightning. Had to take a break around 5:15 for a brief shower of an altogether different (and wet) nature, but resumed observing again at 5:30. All in all a pretty good show considering the weather.

Rod Norden, Santa Cruz

I saw 51 Leonids, with 18 leaving visible trails, one of which was visible for over 2 minutes (from mag -1

meteor). The brightest was only -2 (brighter than Sirius) with a train lasting 45 seconds. I would estimate the average magnitude about 2.

Evan Garber, Marin:

Watched for over an hour and saw 36 - three were very bright, do not know magnitude but they were brighter than Jupiter and left trails that could be seen for 15 to 20 seconds.

Bill Ferris, Arizona:

Was observing at Anderson Mesa (Lowell Observatory) near Flagstaff...The display prompted us to developed our own meteor nomenclature. "Puff Daddies" were the ones that went pfffft over a short distance. The other categories included "Whoas," "Double Whoas," and the "Triple-Double Whoas."

Leonids at Fremont Peak-- All Two Of Them (or "The Wrong Shower")

Mark Taylor

On November 16 I arrived at Fremont Peak at 10:30 pm with high hopes of seeing a Leonid meteor storm.

It was drizzling and the fog was so heavy that I couldn't even see a hint of the tower lights from the workshop parking lot. In fact I could barely even see my hand at arm's length without adding some photons to the equation.

I've never seen the Peak so dark, empty or eerie as it was right then.

But still I held onto my hopes; the satellite imagery seemed to indicate that the clouds would pass through the area by around 2 am -- "prime time" for watching a meteor shower.

Over the next hour the wind picked up and blew away large gobs of fog.

A few others had arrived in time to see patches of crystal clear sky and some translucent areas showing stars to mag 3. A couple Leonids were seen just by looking up to check conditions. But 30 minutes later the fog was back as dense as before.

By 2 am the rain was pouring and the wind howling so intensely that I expected to see the Edmund Fitzgerald blow past!

I decided to get some sleep, and I set an alarm to wake me occasionally throughout the night. Unfortunately there was never any starry sky to be seen.

When I woke at 6:30 it was still drizzling.

I was ready to leave, but remembering that I hadn't taken the time to pay my fees the evening before, I placed my \$3 day use fee into an envelope, carefully checked the "Boat Use" box, and slipped it into the pay slot.

Just a mile or so down the hill from the park the sky was 50% open and no rain was falling at all. I guess a rain cloud had gotten snagged on the flagpole as it tried to pass over the hilltop.

Hopefully it has since escaped and left the stars visible from Fremont Peak once again.

Leonids From Henry Coe Park: Jack Zeiders

I waited until almost 2:30 AM to leave the house as the weather looked completely closed out due to low clouds and rain.

While listening to Art Bell (okay I admit it) I heard some guy in New Mexico or Arizona start talking about all the great fireballs he was seeing. This sparked my flagging interest and I looked outside to see some holes in the clouds.

I logged off the computer and grabbed my binoculars and camera gear and headed out for Coe Park. I saw a brilliant flash above the clouds while driving down 101.

I pulled off near a truck park and stepped out to look for meteors though some bigger holes. I counted 6 Leonids in 10 minutes, most about 2nd mag. I was looking in the direction of the radiant.

Thus fortified I drove up to Henry Coe as I remembered Jim Van Nuland would be there.

About half way up the clouds obliterated the sky and thickened near the park. Jim had closed up shop, covered his mount and retreated to his campervan.

I tapped on the window and advised him of openings in the clouds at lower altitude and the many meteors seen. Then I beat a retreat back down the road until I came to a nice curve with a wdespot to pull off the road and several openings in the clouds.

Leo's head was clear and crisp with green emteors flashing brightly. I made another 10 minute count of 7 Leonids. After a failed attempt to shoot pictures, I had camera, tripod, film, etc. however the advance lever had come adrift in the camera bag rendering that machine uncooperative for the moment.

I watched a few more bright, -2 to -4 Leonids before the clouds reclaimed the sky from this location.

Backseat Leonids

Bob Garfinkle

I had to go to southeastern Georgia for a business meeting November 16.

The next night I was able to observe the Leonids from the comfort of my new 1998 Mustang convertible, courtesy of Budget Rental Cars.

I drove around the area near my hotel on the outskirts of St. Marys, GA, which was about 15 miles inland from the Atlantic, until I found a dart spot with a wide view of the open sky.

About 11:00 p.m. EST, I parked the car facing east. I put the top down and reclined the seat back. I have to say that this is vastly more comfortable than sitting on a lawn chair on a cold November night looking for streaks in the sky.

The windows protected me from the cool slight breeze. The temperature was about 50 degrees with clear

skies. The Pleiades were clearly visible naked-eyed as individual stars, most of the time.

An occasional faint streak raced upward across the sky from the eastern horizon before Leo's head emerged out of the atmospheric haze about 10 to 15 degrees thick along the tree-topped horizon.

By 1:30 a.m. on the 18th, the meteors were coming at a rate of about one every five to ten minutes. All of these meteors were faint, except for three. The steadiness of the air was very good (about 3 on the scale) at this time.

About 2 a.m. the pace picked up to about one streak per minute. I probably missed some of the fainter ones as a thin mist began to blow across my field of view and the dew built up rapidly on the windshield. The

sudden buildup indicated that my viewing time was rapidly coming to a close.

The temperature was rapidly dropping and I could feel moisture. Zosma was just above the top of the windshield and Denolola was emerging out of the trees. By 2:30, the fog rolled in and put out the starry lights.

I hope that those of you who were on the West Coast had a great show.

Editor's Note: In July, Bob was elected a Fellow of the Royal Astronomical Society of London. The RAS was founded in 1820 with Sir William Herschel serving as the Charter President. Many of the top astronomers of the last 2 centuries have been elected membership in this organization.

Leonids From Mercey Hot Springs

Jane Houston

Once a part of old Monterey County, Mercey Hot Springs is just beyond the southwest San Benito County Border in Fresno County.

The springs were first used by native North Americans. Legend has it, according to a 1916 Evening Freelance, that Indians would travel all the way from San Diego to visit.

On Monday, November 16th six brave souls drove through the heavy clouds after watching dismal weather forecasts on the internet.

Cutting across the Pacheco Pass, rolling down Interstate 5 to Little Panoche Road, on we traveled to Mercey Hot Springs. Humming Jerry Lee Lewis's hit from the past, Great Balls of Fire, we gathered in hopes that the Great Leonid Meteor Storm would sprinkle a little stardust our way to be captured in our cameras, our recording logs and our imaginations.

First to arrive were Chris Angelos and Sandra Macika. Sandra was the coordinator for this site - one of three organized by Dr. Peter Jenniskens,

SJAA Amateur and Meteor guy Mike Koop and Chris Angelos, who were hoping to put some organization and observing methods into place.

Those guys were preparing to fly over the clouds in the far east with the Leonid Multi-Instrument Aircraft Campaign, an airborne astrobiology mission to observe the Leonids over Okinawa.

From midnight till 4 am our weather ran the gamut from clear and warm to cold and wet. We couldn't even keep our charts from dewing over. It was THAT wet.

I crawled into my sleeping bag, flashlight in hand, just like I did at summer camp oh so many years ago, and read my charts in the warm enclosed air. Dainty raindrops soon were tap tap tapping on the outside of the sleeping bag. They made such a racket!

We never were able to do much more than plot a few of the brighter meteors, holler "oh wow" into our tape recorders, when the cloudy sky

brightened from a magnitude -8 fireball.

On the way down the road, we began seeing a really nice clearing, and many meteors.

At 12:55 a double flash split by one degree changed color from yellow to orange. 15 degrees from Corvus - 12:59 UTC - yellow to orange to red a whopper. A huge audible WOW emanated from my cassette recorder in three part harmony - three happy meteor observers in awe of the unfolding spectacle. 10 degrees above Corvus a horizontal meteor a split second later. Then another. And another.

We saw a couple dozen leonids within a span of about 15 minutes, capped with the brilliant Zodiacal Light, a cone of light pointing toward the milky way above.

It was time for the drive home, after a surprising and thrilling ending to a meteorically challenged night.

Hawking The Future

Jay Freeman

On 15 November, I attended a San Jose public lecture by Steven W. Hawking on science in the next millennium.

Hawking is perhaps the most celebrated physicist of the late twentieth century.

His scholarly achievements and decades-long battle with amyotrophic lateral sclerosis ("Lou Gherig's Disease") have captured public imagination and enthusiasm: The lecture was sold out, and Hawking got a standing ovation on entrance.

My professional training is mostly in physics. For years, my substitute for a life was general relativity and quantum field theory.

I therefore have had the great honor of being able to understand some of Hawking's work, and thereby to appreciate the intellectual ability it took to establish that "black holes are not forever".

I remember videotapes of Hawking, made when he could still speak in a manner some could understand. Those days are gone.

During his hour and a half on stage, I am not certain I saw him move a muscle. His communication with the audience was via speech synthesis, under control of a personal computer, with some subtle interface that remained unknown to me.

His presentation seemed much the equivalent of reading from a prepared text -- he cued sentences and phrases sequentially, and used a screen behind him to present graphs, stills and video sequences.

Hawking's literary style featured parsimonious use of precisely correct words. He was a superb speaker, reading the audience well and cuing his synthesizer with excellent timing.

He kept us attentive and wide awake, and made us laugh at his jokes.

He challenged several popular conceptions of the future, notably that it would be peopled with folks just like us, who had achieved a level of science, culture, and politics that was notably better than ours, but that remained essentially static -- though he did say that getting political organization better than ours would not be difficult.

Describing the exponential rise of human population during the last several hundred years, he asserted that it clearly could not go on indefinitely without big changes.

Noting that the rate of modification of the human genome had probably been about one bit per year during the existence of Homo sapiens, he suggested that genetic engineering

would permit more rapid changes and a more complex genome, so that what might in some sense be described as our biological descendants would not necessarily be anything like us -- certainly, not in the manner in which we resemble the human beings of a thousand years ago.

He was careful to state that he did not necessarily advocate genetic engineering, rather that he merely thought it unavoidable that someone would try it out.

Hawking also suggested that electronic systems would also be subject to increasingly rapid changes and enlargements of complexity.

After a brief review of the history of physics, he asserted that physicists would probably achieve a successful unified field theory, based on supersymmetry principles, some time during the next century: He offered 50/50 odds of that happening during the next twenty years, though only after pointing out that he seemed on the verge of losing the same bet as made originally in 1980.

He described one of the big issues of this theory -- subtracting two infinities in the calculation of the vacuum-state energy of the universe, in such a way that the result is sensible -- as rather like balancing the federal budget, in which an enormous tax return cancels out an equally enormous gross expenditure so as to leave a small surplus, at least until the next election.

On the ever popular subject of alien encounters, Hawking -- an admitted "Star Trek" fan and one-time guest actor on a "Next Generation" show -- rapidly developed the Fermi paradox, which may be summed up as "If life is common in the universe, why aren't there aliens already here?"

He suggested that maybe they already were here, and there was a government conspiracy to keep things hush-hush, but commented that if so, the conspirators were doing a better job than with most other matters.

Hawking's explanation for the Fermi Paradox was either that life itself was uncommon, or that intelligence had less survival value than we supposed, and therefore did not occur often.

After the end of the main talk, Hawking took questions, passed up from the audience and read by an assistant.

Asked whether time-travel was impossible, he did not say it was, but suggested that history had to be consistent.

For the consequences of neutrinos having

mass, he speculated that the universe would be found to be closed, so as to end in a "big crunch", tens of billions of years in the future.

The next question may have made him smile. Could he recommend a science-fiction movie that showed the future developing as he anticipated?

His answer was "Dark Star", which surely startled the half of the audience that had heard of it. He elaborated, that the movie featured a smart bomb that started asking existential questions, and that was exactly what he was afraid of -- machines taking over.

The last question was more philosophical.

Sir Isaac Newton was once asked whether he believed in god, and replied that he believed in a first cause. Did Hawking believe in a first cause, and if so, what did he call it?

His reply, paraphrased, was that in the higher dimensional space of supersymmetry and general relativity, the universe did not have a beginning and an end, it merely was; therefore it did not require a first cause, because it had no first point.

Yet I have saved one of the best parts of the evening for last. Earlier that same day, Hawking had met with disabled youngsters, some of whom were as restricted in physical abilities as he himself, for conversation and discussion.

Before his evening lecture, we were shown some video footage from this encounter.

The kids all knew who he was, and the screen dumps and voice synthesizer audio of their interaction made it unforgettable clear that behind the expressionless faces and distorted postures that stem from neuromuscular dysfunction, were minds the equal of any bright teenager's.

One youth asked if Hawking had ever encountered any prejudice based on his own disability, and by the way, which came first, the chicken or the egg?

Hawking replied that yes, he had encountered prejudice based on his disability, but when he did, he always made sure it didn't happen again, and as for the chicken and the egg, it was definitely the egg.

Such meetings and such dialog go far to make sure that indeed, it won't happen again. Nor should it.

After all, it is no longer true that if you are disabled, you have to be put with a bowl to beg.

Today, there is another choice.

Today, you can be Steven Hawking.

The Celestial Tourist Speaks

Jay Freeman

The Many Faces Of Dr. Jay

"Count Jay" is for when I wear my heavy black wool cape and do my Martin Landau as Bela Lugosi impersonation. "Home? I haff no home! Hunted! Despised! Leeveng like an animal! ..."

"Broadway Jay" is for when I burst into "Photometric evening / You may see some photons / Come to your detector / Across the cosmic void ..."

"Elwood P. Dowd Jay" is a friend of Harvey's.

"Ph.D. Jay" is when I am caught lecturing.

At work, I have many other titles. They include:

Jay Reynolds Freeman,
Kludgemeister

Jay Reynolds Freeman,
Hackmaestro Furioso

and Jay "Cassandra" Freeman -- which is the one I use when I am the bearer of bad news that everyone would rather ignore.

And speaking of which -- naw, nobody'd believe it anyway...

On Peaks And Valleys:

We all have to keep reminding ourselves to be really careful on this one. The idea is indeed to use the wavelength of light as a scale for measuring errors in optical fabrication, but there are two different places to do the measurement -- on the mirror and on the reflected wavefront. There are at least three common things to measure -- maximum height variation from high point to low point (called "peak to valley"), maximum departure of

any point from the average (often called "plus or minus"), and a statistical average (called "root mean square" or "RMS"). And there are many wavelengths of light -- of course there are, but many measuring devices use the common red light that you see in diodes and laser pointers, but what is best representative of what the eye does would use green light.

The problem is, that if you do the test the way that is kindest to the mirror -- that is, that gives the smallest numerical answer -- you get a number that is the better part of ten times smaller than if you do the test the way that is least kind to the mirror. That is, the same mirror will give test results that differ by a good chunk of a factor of ten, depending on where and how you do the test, and on what wavelength of light you use.

The most demanding combination of the things I have listed would be to test peak-to-valley, on the wavefront, in green light. The least demanding would be RMS, on the mirror, in red light. A mirror that tested one-eighth wave RMS on the mirror in red light could be almost a wave off when tested peak-to-valley, on the wavefront, in green light.

Let me give another example to make sure things are clear. A standard for optics that most of us would consider to be good but not great is one-quarter wave, peak-to-valley, on the wavefront, in green. But if someone sells you a "quarter wave mirror", and that result is on the basis of testing via RMS, on the mirror, in red,

then it might be almost ten times worse than the actual standard that I just cited.

You have to know the details of how a mirror is tested to interpret the results.

On Observing Mountain Lions:

I have seen a wild Mountain Lion once, and wouldn't have missed it for the world. I am glad they are still around. What fun would observing be if all you had to worry about was Lyme disease, serial murderers, and feral pigs?

On Big Time Column Writing:

For
those
of
you
who
would
like
to
read
a
column
by
me
I
thought
it
would
be
only
polite
to
oblige...
:-)

Activities Through Other Clubs

TAC has reserved the Montebello site Wednesdays more or less indefinitely (weather permitting). It's a good idea to check TAC's web-page at <http://www.rahal.net/resource/TAC/> (mailing list archives) before going. There must be a permit holder present to use the facility. To get there, take Page Mill Road off 280 (or get to it via El Monte Road) until you're near the top.

Montebello's sign will be visible on the left.

PAS opens Foothill Observatory for public viewing every clear Friday evening from 8:30 p.m. until 11:00 p.m. PAS operates a 16-inch reflector and a 6-inch refractor. Solar viewing is also held every clear Saturday morning from 10:00 a.m. until noon with a special solar prominence scope.

Both of these programs are outstanding, and all SJAA members are encouraged to check them out.

January

- 8 PAS General Meeting "Little Black Holes" with Dr. Mario Rabinowitz 7:30 pm at Foothill College
- 13 PAS Board Meeting 7:30 pm Foothill College Observatory

The Shallow Sky

Akkana Peck

Mercury is still in the morning sky, but by month's end it will be getting closer to the sun and therefore more difficult to spot. It will become an even more difficult target over the next few months.

Venus shines in the evening sky, setting later as the month progresses. It will present a small, bright, gibbous disk to the telescopic observer.

Mars will be visible in the nighttime sky all through 1999. In January, it rises a bit after midnight, and reaches quadrature on the 16th. Its disk grows to 7.9" by month's end; over the next few months it will grow rapidly as it nears its upcoming opposition.

Not much detail will be visible on its surface yet -- but it might be worth a look, especially on nights of good seeing.

Jupiter is still well up at sunset and is well placed for observing in the early evening. There's been a wealth of detail visible on Jupiter this year, especially around the region of the Great Spot Formerly Known as Red; it's a great view in any telescope.

There will be a double shadow transit, of Io and Ganymede, on January 14 from 9:30 until 11:30; and another, also Io and Ganymede, on the 22nd from 12:30am until 2:30 (while the two satellites involved make a close pass themselves, closest an hour or two after Ganymede's shadow leaves the planet's limb).

Can you see a difference in size or character between the shadows of these two moons? As always, you can get Jovian moon and shadow

predictions from <http://www.shallowsky.com/jupiter.html>

Saturn is high in the sky at sunset and will be observable until around midnight. Quadrature occurs on January 17th; look for the shadow of the planet on the rings, since it will be most noticeable at quadrature.

Uranus, Neptune and Pluto are all very close to the sun and difficult to observe, though by the end of the month Pluto becomes a possible target in the morning sky.

Don't forget about the lunar occultation of Aldebaran, on January 26 from 11:35 to 12:37. Binoculars or a small rich-field telescope are ideal for watching Aldebaran occultations.

Astronomical Pocket Diary

This handy appointment calendar and astronomical almanac customized especially for SJAA members is only \$10 and all the profits go to our equipment loaner program.

The Astronomical Pocket Diary is a pocket-sized "week at a glance" style appointment calendar and astronomical reference. Standard features include:

- Daily rise and set times
- Lunar phase and transit info
- Lunar occultations and eclipses
- Major meteor showers
- Notable astronomical anniversaries
- A weekly orrery with flip-book animation
- Weekly dusk and dawn star charts (also with animation)
- Notable anniversaries and birthdays, both in and out of the sciences
- And much more!

The San Jose Astronomical Association has created a Custom Edition of the APD for 1999 which includes:

- SJAA general meeting dates
- Observational astronomy class dates
- Public in-town star party dates at Hough Park
- "Dark sky" star party dates and locations
- Notable club anniversaries and history
- SJAA logo and contact information on the cover

SJAA is making copies of this custom edition available for \$10 each.

All transactions will be treated as tax-deductible donations to the club's Equipment Loaner Program.

All proceeds (beyond the cost of production) will go directly into the equipment fund to help with maintenance and new equipment purchases.

The calendars will be available at SJAA General Meetings and Public Star Parties from early-to-mid November until they are gone.

If you would like to be notified when they become available, just send an email to Mark Taylor and your address will be added to a one-time announcement list.

When you get the announcement come join us at one of our in-town Public Star Parties or General Meetings and pick up your APD!

In addition to getting an APD for yourself, consider getting some extras to give as gifts or sell at the office!

The \$10 is for a very worthy cause, and you end up with an extremely functional pocket astro-calender for the year.



Mooning

David North

The lunar event of the month will no doubt be the occultation of Aldebaran at about 11:35 pm on the 26th.

It's a very favorable night; the main event will take place in the southwest with the moon still about 40 degrees up, so it will be very easy to see.

There's no reason to wait until that late to start your run, though, since Luna will be wandering through the Hyades from sunset on, and several other occultations will take place (including at least one possible graze of the mag 7 SAO 93981 at around 9:20 pm).

Further, it's one of those wonderful just-past-first quarter nights that are starting to be very good about this time of year; the declination will max out at around +16 degrees a bit after 8 pm. That means with any kind of seeing you'll have steady views of some spectacular sights to keep you from getting bored between timings.

In fact, it's a good idea to keep an eye out after first quarter for quite a few months -- this isn't as high as this moon will get (highest point is just about at full this month) but it will be up there pretty well, which means much better detail is available.

Plato will be well placed for "crater counting" if the seeing is good.

Sinus Iridum will be just starting to come into the light -- if you're lucky you'll get to see it "hanging off" into space about the time of the Aldebaran

occultation. It's at times like this that we understand why it's called the "Bay of Rainbows."

Above all, it's Copernicus night. The entire crater will be at almost ideal light when the moon is at its highest, making this the perfect time to contemplate the incredible collection of impact crater chains, visible in almost any scope when the sky is even moderately steady.

This massive impact site also offers domes, cracks, rays, and just about any other feature you can hope for on the moon.

A little further south, plan on visiting Fra Mauro, Bonpland and Perry (they make a sort of "Mickey Mouse" not too far from the terminator for the wonderful rille complex that riddles the entire area.

As the light crosses Palus Epidemarium, you'll also get to trace the obvious Rima Hesiodus. Late in the morning, or the next night, revisit this area and you'll get a look at one of the best "Rillevilles": the Palus also has the Rimae Ramsden, a striking crosshatch filigree that I have seen quite clearly in even my 4.5-inch newt.

Last but not least, the monstrous Clavius will be perfectly illuminated. Be sure to drop down to see the exquisite arc of craters inside; they increase in size with a perfection that somehow seems too unlikely to actually exist.

Overall, I'd have to say this will be a night to remember if the sky

cooperates at all.

A couple of interesting notes about the 28th: first, the somewhat difficult Rima Sharp will be ideally placed from early evening on; it's near Mairan in Sinus Roris. This will be one of the best nights of the year to try for this elusive target.

Also, the terminator will be creeping across the Aristarchus plateau, making this an exceptional time to check out the remarkable Schröter's Valley.

For the masochistic, Rima Marius will be right on the terminator and possibly showing well; don't count on it being dark, though. Sometimes it actually shows as a bright line! You may even get a glimpse of the Rima Suess a bit further south.

Of course, all of Mare Humorum will be lit, and the collection of rilles and fascinating craters in this area is probably the best on the moon: it's difficult to understand why this area is so neglected.

The next night, most of the curious Rima Sirsalis will be extremely favorable.

For those who are interested in lunar geology, Sirsalis is a standout: most rilles are near the edge of maria, or in them. This one cuts across highlands almost exclusively, and seems to go in places where such a formation would be impossible.

It offers a great deal of fascinating speculation as "the exception that disproves the rule."

Meteor Watch

David North

maximum can produce rates in excess of 100 meteors per hour for those lucky observers in the right place at the right time.

Begin your Quadrantid observations at midnight. The shower must be expected to peak near 5 am local time in order to see it at its best. Observing only 6 hours on either side of maximum often will produce rates no better than 20-30 meteors per hour.

The Quadrantids produce abundant fireballs at maximum.

However, this year it will be whitewashed only two days after a full moon.

Due to this, expect to see about 10-20 meteors/hour just before dawn.

1999 Max: Jan 3/4 at 23 hr UT.

Thanks to George Zay for his unrelenting research.

Mainly Europa

Jane Houston

Dr. Jeff Moore of the NASA AMES Research Center Galileo Imaging Team and a planetary geologist spoke to the SJAA Saturday December 5th.

Dr. Moore shared some incredible images of the Jovian satellites from four successful passes of Europa.

His remarks were sprinkled with humor about the patience and endurance required to work on these cross generational NASA Projects (where the young gunning scientists, wheeling their elderly leaders who were the forerunners, have now aged and are entering their own dotage.)

He recommended exercise and a good diet to live long enough to see the results of your own research.

The focus was on the evidence for plate tectonics and liquid sub-ice

ocean on Europa.

(Well also on Ganymede, and he is ready to return for a talk about Callisto, once thought to be the most boring object in the shallow sky).

First of the three lines of evidence we learned about was minor crust extension versus total crust separation. Vigorous warm ice convection broke the surface, and tilted it into a matrix of fine material. 10 meter pixel images showed individual pieces of rotated plate!

Those images were incredible, and the wind and rain whipping around Hogue Park, shaking the ground and the trees made a nice orchestral accompaniment to the whole lotta shaking that went on within Europa, which we saw thru the eyes of Galileo,

the spacecraft.

The Case of the bunny head is the second line of geologic evidence.

The bunny head is where an ice pond rose up and flooded the surface, which in turn froze. This ice layer could protect ocean life from the radiation of the Van Allen belt.

We all imagined along with Jeff as he described squid flopping themselves up for image capture on these Jovian moons.

After paying tribute to the late great planetary geologist Gene Shoemaker, we concluded the discussion of evidence by showing three distinct craters, Pwill, Callanish Macula and Tyre as flooded craters.

A lively discussion occurred afterwards.

Editor's Extras

From Page One

...particularly Don Machholz and Richard Stanton (with their regular columns) and other retired editors (such as the tireless John Gleason).

But enough about the old. It's time to ring in the new year, and the new editors, from whom we can all expect nothing but the best.

This is, of course, my last opportunity to stand on the soap box, a practice I think I've generally avoided. But hey, one last shot....

When I started this job, the club was in something of a crisis, and several board members resigned. Since that time things have stabilized somewhat, and we've helped rebuild the observatory at Fremont Peak, a contribution we can all take pride in. So things are okay, but this could be a much better club.

It was built by people who are now legends in the amateur community, and we have quite a history to live up to. Perhaps we can.

Overall, it's an exciting time, and I hope to see more folks getting involved and taking up the banner.

The most shocking thing to happen recently was the sudden death of Alan Nelms.

We could dwell on his accomplishments as an observer (he was motivated, diligent and highly skilled) and how that is a loss to the community. We could dwell on his excellent equipment, and how we'll miss the views he offered so freely.

But that was not the important thing about Alan.

Foremost, he was a good and gentle person whose presence, conversation, jokes and smile added a glow to any place he happened to be, observing or not. Mix in unflagging enthusiasm for the night sky, and you have the recipe for the ideal amateur astronomer, expressed as a human being.

Nothing could be more important.

Alan's funeral was standing room only, and Rashad made a stirring speech that spoke eloquently for all astronomers everywhere -- helping give Alan the sendoff he deserves.

Alan may be gone, but the memory of his light remains with all of us in the darkness we so love.

The new year brings a new round of "Beginning" Astronomy classes, and this year we have a new instructor: Doug Davis, who has run similar programs for years down south and we're quite fortunate to have him as an active new member. He'll be replacing Jack Zeiders, who did such an excellent job for the last two years; a tough act to follow, but Doug is up to it.

Though it's referred to as a "Beginning" class, usually there are things for everyone to learn, so don't feel like you have to stay away because you know it all...

Welcome, Doug, and thanks!

Kevin Medlock tells me the new steel roof blew off the observatory at Fremont Peak during high December winds. It's not yet known what caused the failure so soon (the attachment screws are suspected), but it will be replaced posthaste.

Weather has been something of a curse again this year, but we're used to that. With resolve and an eye to the future, we'll do just fine.

December Board Notes

Bill Arnett

The meeting was called to order by President Ed Erbeck at 6:45 pm December 4 at Hough Park. All directors were present (eventually).

Jim had sent the calendar earlier by email; it was approved.

The minutes of the last meeting were approved.

The AANC forgot to bill us for our dues this year. So we're paying them \$40 for this year and next.

Bill Arnett brought up the issue of an official presence at Fremont Peak again. We had yet another incident where someone read our newsletter, when to the Peak, but was unable to find anyone from SJAA. Lots of ideas were kicked around but we couldn't come up with anything better than simply changing the WWW page and other notices to make it more clear that the events are "no host".

Nevertheless, we should all try to keep our eyes peeled for visitors who might be looking for us.

Bill Arnett reported that the Nominating Committee now has six candidates for the six board seats to be vacated in January.

They are: Dave North (returning incumbent) Bill O'Shaughnessy (returning incumbent) Jim Van Nuland (returning incumbent) Akkana Peck (new) Morris Jones (new) Jim Bartolini (new).

It looks like another uncontested election.

The other three directors are in the middle of their two year terms: Bill Arnett, Mark Taylor, and Mike Koop

The board unanimously approved \$400 to Bob Brauer to cover Ephemeris mailing costs.

Bob Elsberry has decided not to continue as Treasurer. He has done a fine job over the last few years and we thank him for all his effort. We desperately need a replacement!

Bob graciously agreed to continue until a replacement is found and to help in the transition but we need to do it as quickly as possible.

If you are interested please contact any of the board members.

The meeting was adjourned at 7:25.

Candidates For Next Year

The nominating committee for the next SJAA board of directors election is Mark Taylor, Terry Kahl and Bill Arnett. So far, the following people have indicated a desire to run in the next election for the SJAA board of directors.

David North, Akkana Peck, Jim Bartolini, Jim Van Nuland, Morris Jones and Bill O'Shaughnessy.

If you know of anyone else who should be considered please let the committee know.

Any SJAA member is qualified to be a candidate provided that either he/she has been an SJAA member for at least one year prior to the election or has attended six board meetings.

For the record, the seats up for election this year are the ones currently held by Ed Erbeck, Jim Van Nuland, Bob Elsberry, Bill O'Shaughnessy and Dave North. In addition, Terry Kahl will resign her seat.

The election takes place during the February meeting; the new board is seated and selects new officers at the following meeting (in March).

Finally, of course, nominations can be made from the floor immediately prior to the election.

Celestial Calendar

Richard Stanton

Lunar Phase	time (pdt)	date	rise	trans	set
FM	18:50	01	17:05	00:24	06:42
LQ	06:22	09	00:07	06:09	12:06
NM	07:46	17	07:15	12:26	17:40
FQ	11:15	24	11:45	18:24	00:03
FM	08:07	31	17:55	00:56	07:09

Mercury	Dist:	1.38 AU	Mag:	+1.4
07	06:20	11:05	15:49	18:01.6
17	06:47	11:32	16:17	19:08.0
27	07:09	12:02	16:55	20:17.0

Venus	Dist	1.58 AU	Mag	4.1
07	08:30	13:27	18:23	20:24.0
17	08:30	13:38	18:46	21:15.2
27	08:26	13:48	19:10	22:04.2

Mars	Dist	1.32 AU	Mag	+0.1
07	00:41	06:24	12:06	13:22.3
17	00:24	06:02	11:39	13:39.7
27	00:05	05:38	11:11	13:55.9

Jupiter	Dist:	5.40 AU	Mag:	-2.2
07	10:44	16:36	22:27	23:36.0
17	10:09	16:02	21:56	23:42.2
27	09:34	15:30	21:26	23:49.1

Saturn	Dist:	9.20 AU	Mag:	+0.8
07	12:38	18:42	01:14	01:43.3
17	11:35	18:04	00:36	01:44.2
27	10:57	17:26	23:56	01:45.8

SOL Type G2V Intelligent Life in System ?				
Hours of Darkness:				
07	07:23	12:14	17:05	19:11.9
17	07:21	12:18	17:15	19:55.2
27	07:15	12:20	17:26	20:37.3

Astronomical Twilight	Begin	End
JD 2,451,185	07	05:50
195	17	05:49
205	27	05:45

Sidereal Time	Ascension at Local Midnight
07	00:00 =06:58
17	00:00 =07:37
27	00:00 =08:16

Darkest Saturday	Night:	16 JAN
Sunset		17:14
Twilight End		18:46
Moon Set		16:42
Dawn Begin		05:50
Hours Dark		11:04

Comet Comments

Don Machholz

With a moderate-sized telescope, you could view a half-dozen comets on most nights during the next few months.

As predicted here last month, Comet Linear (1998 U5) outburst by nearly three magnitudes. It, and Comet Linear (1998 M5), both pass north of the sun and from the evening to the morning sky. Periodic Comet Giacobini-Zinner fades in the evening sky while Comet Williams fades in the morning sky. Comet Jager and Periodic Comet Harrington-Abell remain within fifteen degrees of each other as they pass through opposition

on favorable visits through our part of the solar system.

C/1998 W1 (Spahr): Found on Nov. 16 by Timothy Spahr using a 16-inch Schmidt as part of the Catalina Sky Survey, this faint comet will be closest to the sun next month at 1.7 AU and orbits the sun every 6.7 years.

C/1998 W2 (Hergenrother): The same Catalina equipment was used to find this comet on Nov. 21. It remains faint.

C/1998 W3 (LINEAR): The LINEAR program found this faint comet on Nov. 25. It has a retrograde orbit and will be closest to the sun in

Feb. 1999 at a distant 4.9 AU.

C/1939 TN (Vaisala-Oterma): A strange case of an object being discovered in 1939 which was treated as an asteroid but long suspected of being a comet. Recent observations show it is diffuse with a short tail; it is now classified as a comet. It orbits the sun every 9.5 years with a perihelion distance of 3.4 AU.

COMET HUNTING NOTES:
Father Leo Boethin of the Philippines passed away on Sept. 15. He was the discoverer of Periodic Comet Boethin (85P/) on Jan. 4, 1975. It orbits the sun every eleven years.

Ephemerides -- Epoch 2000, 0h UTC

21P/Giacobini-Zinner

Date	R.A.	Dec	EL	Sky	Mag
01-02	00h14.3m	-23d55'	74d	E	10.1
01-07	00h38.0m	-23d33'	74d	E	10.4
01-12	01h00.5m	-22d58'	75d	E	10.7
01-17	01h21.8m	-22d11'	75d	E	11.0
01-22	01h41.8m	-21d16'	76d	E	11.2
01-27	02h00.8m	-20d13'	76d	E	11.5
02-01	02h18.8m	-19d06'	76d	E	11.8
02-06	02h35.8m	-17d56'	76d	E	12.1

C/1998 U3 (Jager)

Date	R.A.	Dec	EL	Sky	Mag
01-02	06h37.8m	+37d42'	165d	M	10.5
01-07	06h33.4m	+36d46'	164d	E	10.5
01-12	06h29.3m	+35d44'	160d	E	10.5
01-17	06h25.7m	+34d38'	156d	E	10.5
01-22	06h22.8m	+33d28'	152d	E	10.5
01-27	06h20.6m	+32d17'	147d	E	10.5
02-01	06h19.3m	+31d05'	142d	E	10.5
02-06	06h19.0m	+29d53'	137d	E	10.5

C/1998 P1 (Williams)

Date	R.A.	Dec	EL	Sky	Mag
01-02	12h45.7m	-03d59'	89d	M	9.3
01-07	12h34.7m	-00d30'	98d	M	9.3
01-12	12h21.2m	+03d34'	108d	M	9.3
01-17	12h04.7m	+08d13'	118d	M	9.3
01-22	11h44.9m	+13d22'	130d	M	9.4
01-27	11h21.7m	+18d49'	141d	M	9.4
02-01	10h55.4m	+24d13'	151d	M	9.6
02-06	10h26.8m	+29d08'	159d	M	9.7

C/1998 M5 (Linear)

Date	R.A.	Dec	EL	Sky	Mag
01-02	18h57.1m	+41d34'	65d	E	9.4
01-07	18h59.9m	+43d03'	65d	M	9.3
01-12	19h02.9m	+44d45'	67d	M	9.3
01-17	19h06.2m	+46d41'	68d	M	9.2
01-22	19h09.6m	+48d53'	70d	M	9.2
01-27	19h13.1m	+51d21'	72d	M	9.1
02-01	19h16.9m	+54d07'	75d	M	9.1
02-06	19h20.7m	+57d12'	77d	M	9.0

52P/Harrington-Abell

Date	R.A.	Dec	EL	Sky	Mag
01-02	07h18.6m	+40d45'	161d	M	10.6
01-07	07h15.3m	+40d20'	162d	M	10.6
01-12	07h12.0m	+39d46'	162d	E	10.5
01-17	07h09.0m	+39d03'	159d	E	10.5
01-22	07h06.4m	+38d13'	156d	E	10.5
01-27	07h04.6m	+37d16'	153d	E	10.6
02-01	07h03.7m	+36d13'	149d	E	10.6
02-06	07h03.8m	+35d07'	145d	E	10.7

C/1998 U5 (Linear)

Date	R.A.	Dec	EL	Sky	Mag
01-02	21h11.1m	+17d34'	53d	E	9.9
01-07	21h09.7m	+16d33'	48d	M	10.1
01-12	21h08.7m	+15d46'	44d	M	10.3
01-17	21h08.1m	+15d07'	40d	M	10.5
01-22	21h07.6m	+14d37'	37d	M	10.7
01-27	21h07.3m	+14d14'	34d	M	10.9
02-01	21h07.1m	+13d57'	31d	M	11.1
02-06	21h06.9m	+13d44'	30d	E	11.2

Orbital Elements -- Epoch 2000.0

Object:	Giacobini-Zinner	Jager	Williams	LINEAR (M5)	Harrington-Abell	Linear (U5)
Peri. Date:	199811 21.32107	1999 03 07.7714	1998 10 17.836	1999 01 24.5733	1999 01 27.8772	1998 12 21.8912
Peri. Dist (AU):	1.0337095 AU	2.152631 AU	1.14674 AU	1.742213 AU	1.755993 AU	1.235763 AU
Arg/Peri (2000):	172.54569°	179.4942°	294.473°	101.2873°	138.8996°	051.2248°
Asc. Node (2000):	195.39930°	303.8178°	156.379°	333.3766°	337.2882°	066.6346°
Incl (2000):	031.85856°	019.0944°	145.730°	082.2285°	010.2186°	131.7425°
Eccen:	0.7064344	0.652672	1.0	1.0	0.542909	0.983362
Orbital Period:	6.61 years	15.4 years	Long Period	Long Period	7.53 years	Long Period
Ref:	NK 629	MPC 32866	MPEC 32410	MPEC 32410	MPC 32595	MPEC 1998-W45
Epoch:	1998 11 21	1999 03 08	1998 10 17	1999 01 22	1999 01 22	1999 01 22
Absol. Mag."/n":	9.0/6.0	6.5/4.0	6.5/4.0	5.5/4.0	8.6/4.0	8.0/4.0

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Web Page
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Submit

Members are encouraged to submit articles for publication in the SJAA Ephemeris. Send articles to Dave North (via e-mail to Timocharis @aol.com).

Astro Ads

Meade 8" LX3, Schmidt-Cassegrain, digital setting circles, 3 EPs, etc. perfect, \$750 obo, 510 624 5706

"No Host" Star Parties

Please note that SJAA Star Parties do not necessarily have a "host" or other persons present to greet members who attend, and if weather is inclement, there may be no SJAA members at the sites listed in the schedule.

The listed parties should be considered good places to go to look at the stars, and likely times that other enthusiasts will be present.

Telescope Loaner Program Status

Mike Koop

Available to any SJAA member; contact Mike Koop at (408) 473-6315.

Current Scope Loans

These are scopes that have been recently loaned out. If you are interested in borrowing one of these scopes, you will be placed on the waiting list till the scope becomes available after the due date.

#	Scope Description	Borrower	Due Date	Note
3	4" Quantum S/C	Manoj Khambete	3/5/99	
6	8" Celestron S/C	Bud Wittlin	11/28/98	
15	8" Dobson	Al Case	1/16/99	
16	Solar Scope	Bill Arnett		
18	8" Newt/ P Mount	Mike Rupe	1/4/99	
21	10" Dobson	Eric Anderson	3/5/99	
23	6" Newt/ P Mount	Monica Patterson	2/13/99	
28	13" Dobson	Ramin Ghafouri	12/12/98	

Extended Scope Loans

These are scopes that have had their loan period extended. If you are interested in borrowing one of these scopes, we will contact the current borrower and try to work out a reasonable transfer time for both parties.

#	Scope Description	Borrower	Due Date	Note
2	"6" f9 Dob	John Paul De Silva,?		
4	60mm Refractor	Del Johnson		Indefinite
9	C-11 Compustar	Paul Barton		Indefinite
19	6" Newt/P Mount	Ran Talbott	1/31/99	
26	11" Dobson	Raymond Brinson	/11/99	
29	C8 Astrophotography	Alexander Koczur	3/1/99	

Available Scopes

These scopes are available for immediate loan, stored at other SJAA members homes. If you are interested in borrowing one, please contact Mike Koop at (408) 473-6315 for a scope pickup at any listed SJAA events.

#	Scope Description	Stored At
1	4.5" Newt/ P Mount	Mark Cousins
7	12.5" Dobson	Morris Jones
8	14" Dobson	Ralph Seguin
24	60mm Refractor	Akkana Peck
27	13" Dobson	George Cooper
30	7" f/9 Newt/Pipe Mount	David Manley
31	8" f/8 Dobson	Mark Taylor

Waiting List

16	Solar Scope	Dave North
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Notes: Do you have some space to store a scope or two? Please call Mike Koop at 408/473-6315 (work) or 408/446-0310 or koopm@best.com

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5380 Pebbletree Way

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Membership - \$15

Junior (younger than 18 years old) - \$6

Sky and Telescope - add \$27 to membership
(Sky & Tel will not accept multiyear subscriptions)

Make checks payable to "SJAA"

Bring this form to any SJAA Meeting
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