



Sacnews

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July 2001

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Profiles: Thad Robosson



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Weapon of Choice: Main 'scope is an 8" f/6, homemade with Meade glass, also 90mm ETX on an alt az mount, and 10x50 'nocs.

Where I get Telescope Money: Guitar Technician/repairman...Constantly working with my hands in exchange for \$.

Interests In Astronomy: Currently working through the SAC 110 NGC, double stars, and ATMing.

Interests Outside Astronomy: Semi-avid movie-goer, hiking, camping, etc. Anything to get away from the everyday stuff.

The following people put up with my obsession: My wife, Marsha. Very understanding.

Quote to live by: "Knowing many languages may be valuable, but knowing when to keep quiet is priceless.", followed very closely by "Stupidity and lack of common sense should be painful".

Astronomy 101

To Goto or Not to Goto, That is the Question

By Rick Tejera

In every endeavor of life we seem to hit a comfort zone in the way we do things. Technology reaches a certain "state of the art" that accomplishes the task at hand at a reasonable cost. The along comes some upstart rogue introducing a new technology. At first everyone is reluctant to accept this new fangled way of doing things because the "we've always done it THIS way" attitude prevails. Those who may see the benefit of this new technology usually can't afford it. Alas, technological progress does not come cheap. Fortunately there those well heeled folks who just have to have the latest and greatest of everything. Their initial acceptance of the technology will usually prove (or disprove) it's worth and show the rouge upstart where improvement can be made. Soon those who at first shunned the new-found widgets will gradually come to try it out. Finally the rogue upstarts competitor (who most likely nay-sayed his idea when it first came out) will make their own version, and before you know it, the cost is now within the reach of the mainstream. However the debate on this somehow always seems to linger.

OK enough of economics 101, this Astronomy 101! Actually I brought up that topic to make a point. Amateur Astronomy has seen several leaps in technology like I've described over the years, Most actually occurred before I was involved in the hobby. The two most recent techno-leaps have been CCD imaging (discussion of which I will leave to more qualified folks, like Chris Schur and Wil Milan) and Goto Computerized Telescopes. The first ones came on the market about 10 years ago, I think. Today you can buy the things at Wal-Mart. Meade in particular has jumped in big, offering a version of it's Autostar on what are best described as glorified department store scopes. The question remains: Is this good for

astronomy or not? Ask around at a club meeting, and I'll lay money that you'll find a pretty even split on opinion. I am probably one of those on the PC wagon who straddles the fence on this issue. On one hand I like star hopping using a Telrad and have found this method key in my learning the night sky. On the other hand I borrowed an ETX at last year's Thanksgiving get together at Sentinel and I must admit, I enjoyed dialing things in and seeing them in the eyepiece. I'm not going to endorse either side of the argument here, I'll merely present some of the pros & cons of each and let you decide which is best suited for you.

Folks on the Pro Goto side say that they spend more time observing and less time searching for objects. They do concede that an accurate alignment is essential to getting the best pointing accuracy (I'll back this up with experience with the ETX). An argument can also be made that identifying objects is easier with Goto. No trying to match star fields. Most Goto's also have a identify feature which will tell you what the object you accidentally found is. At the very least it'll give you RA & Dec which you can plot on your star atlas later. The Goto's also do not need to be Polar aligned in order to track well. The software available today is very capable of driving an alt-az mount, freeing up space, and easing set up.

On the Con side you'll hear the argument that the Goto is a crutch that will hinder your learning your way around the sky. These folks are just waiting for your battery to die, so they can say "I told you so". There are those who say they enjoy the hunt for a dim fuzzy and by using Goto, your cheating yourself out of some

(Continued on page 8)

Chile's Stargazers Protect 'World's Clearest Sky'

Reprinted from cnn.com

VICUNA, Chile (Reuters) -- Under a crystalline night sky widely touted as the world's best for stargazing, Sergio Pizarro peered over the edge of the cliff, right into the face of every astronomer's worst nightmare: light.

About seven years ago, Pizarro remembers staring worriedly at his booming Chilean hometown of Vicuna, whose blaring streetlights threatened to blot out the otherwise immaculate view of space treasured by the numerous professional observatories on nearby Andean peaks.

"Our greatest asset, the clearest skies in the world, was in danger because of the light from the city. I think we all realized the problem needed to be confronted," Pizarro, a teacher and astronomer himself, said.

These days, a solitary telescope amid cactus plants, dust and little else, near that same cliff serves as a peculiar yet fitting monument to Vicuna's triumph over its own progress.

The professional-grade telescope, named the Mamalluca Observatory, and used for academic study and astronomy tourism, was a gift of gratitude to Vicuna from another nearby observatory in return for the town's success in cutting in half the amount of light it sprays into the night sky.

Thanks mostly to a simple cap that Vicuna installed on top of its streetlights, tourists visiting the telescope can ogle at the glittering splendor of the Southern Cross as the town's copper-colored lights twinkle harmlessly in the valley below.

Now this arid region of northern Chile, already boasting a Nobel Prize winner and several renowned wineries, wants to be known as a world-class destination for astronomy aficionados searching for the perfect spot to gaze deep into the heavens.

"The whole city has gone crazy over astronomy," Pizarro said with a grin as he fiddled with the tele-

scope he helps run. "This is my favorite toy. It's been a real jewel for our people."

Places like the "Hotel Halley" near the sleepy town square reflect Vicuna's new starry-eyed identity. But its real pride and joy is the telescope, which boasts a respectable 12-inch (30 cm) mirror and attracts visitors from all over the world.

An estimated 30,000 people have streamed through Vicuna's Mamalluca observatory since it opened in December 1998. On a crisp early autumn night recently, Australian, American and German tourists listened in with locals as a tour guide tried to convey just how awesomely big the universe really is.

"Do you realize how small we are? You are nothing. Our galaxy is just an atom of the universe," whispered Jorge Retamales as the visitors took turns squinting through the telescope at hundreds of stars in an open cluster, which looked like a brilliant dandelion scattering its seeds.

The "Norte Chico" of Chile, about 310 miles (500 km) north of Santiago, is prime real estate for many of the world's top observatories. Frigid currents in the nearby Pacific Ocean keep the air bone-dry, enhancing visibility, while the desert's isolation and 300 clear nights a year make just about any spot a virtual laboratory for sky-watching.

Indeed, while the telescope draws the tourists, most leave awed by the dizzying number of stars visible with the naked eye alone. What appears to be a permanent gray smudge across the sky is in fact the Small Magellanic Cloud, an irregular galaxy in orbit around the Milky Way 200,000 light years away that is one of the most distant objects visible without a telescope.

On this night, the 8:30 p.m. tour is considered the superior one: Jupiter makes a cameo appearance just above the horizon before changing its mind and slipping back out of sight just as vans carrying

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Fuzzy Spot, Libra

By Ken Reeves

Libra, the scales, is the only inanimate constellation in the zodiac. Surprisingly, the celestial scales, goes back quite far in history. An ancient Mesopotamian carving of about 2200 B.C. shows a priest holding a balance-beam scale out over an altar in front of the enthroned sun-god Shamash. Because Shamash was also the god of justice, even at that early date scales symbolized the "weighing of justice" (from "The Night Sky Observer's Guide by George Robert Kepple and Glen W. Sanner). Although at some point the scales were unsuccessfully transformed into the claws of the scorpion, there is still remnants of the transformation in the names of the brightest stars, Zubenelgenubi (the southern claw) and Zubeneschamali (the northern claw).

The constellation is fairly poor in stars, and also in deep sky objects. Galaxies are predominate in this area, but there is a globular cluster and a non-NGC planetary nebula.

NGC 5858 (15h08.8 -11 13) and NGC 5861 (15h09.1 -11 20): These objects form a nice pair of galaxies. In the 10" scope, I see 5858 as a little bright, pretty small, with a faint halo, which slowly then suddenly brightens up to the middle. The middle is pretty bright with a possible non-stellar nucleus. Although it is the smaller of the two, it is much brighter. 5861 is somewhat bright, somewhat large, elongated NW/SE about 2:1, and has a faint halo which gradually brighten up to the middle. There is no visible nucleus. In the 20" scope, 5858 is pretty small, somewhat faint, round, and brighter in the middle with a bright stellar nucleus. 5861 is pretty big, slightly bright, elongated about 2:1 WNW/ESE, and slightly brighter in the middle with no visible nucleus.

NGC 5872 (15h11.0 -11 30): This galaxy is pretty small in the 10" scope, pretty faint, contains a slightly brighter middle with a possible nucleus and a star or stellar ring on the ENE side. I was unable to tell if there was any elongation. This is one of those "while I'm in the area, I might as well get it" type of galaxies. In the 20" scope, it was seen as pretty small, pretty faint, round, and with an occasional non-stellar nucleus. The galaxy forms a double with a star to the NE.

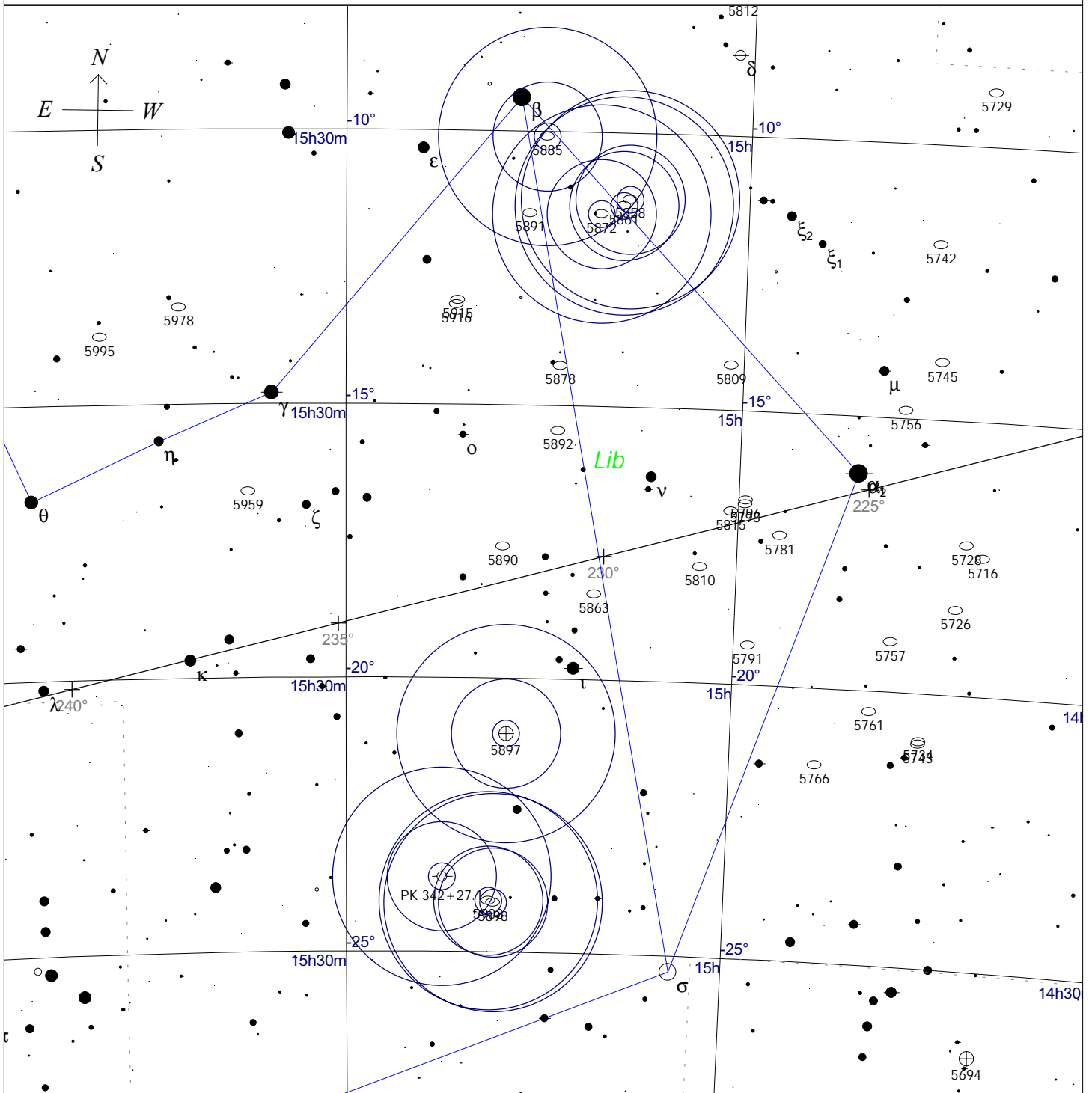
NGC 5885 (15h15.1 -10 04): In the 10" scope, this galaxy is pretty faint, somewhat large, round, and with a halo that brightens up very slightly toward the middle. It is right up against a mag 10 or 11 star, which interferes with the observation. Some mottling was suspected with averted vision. In the 20" scope, it is pretty big, somewhat faint, slightly brighter in the middle without a nucleus, and somewhat mottled. It is possibly elongated N/S about 2:1, but the bright star on the N side may be causing an illusion.

NGC 5897 (15h17.4 -21 01): This is the globular cluster in Libra. In the 10", it is pretty large, somewhat faint, and hard to tell its shape. Using averted vision helps bright it out. I counted about 10 stars over a very faint and coarse granular haze, barely resolvable. Using averted vision in moments of good seeing may possibly show 20 stars. There really isn't much to this globular, although I just finished observing M-5 so I am a little biased. In the 20" scope, it is very large, somewhat faint, and irregularly round. There are 2 levels of stars over an extremely granular haze with about 30 stars counted and many more on threshold of seeing.

NGC 5898 (15h18.2 -24 06) and NGC 5903 (15h18.6 -24 01): Seen in the 10" scope, 5898 is pretty small, very faint, round, and slightly brighter in the middle with a faint stellar nucleus. There is a star to the SW of the galaxy. The other half of the pair, 5903, is pretty small, very faint, round, and very slightly brighter in the middle. It is slightly brighter than 5898. In the 20" scope, 5898 is pretty small, a little faint, round, and has a slightly brighter middle. 5903 is essentially the same as 5898 except the middle may be a little brighter. Between the two galaxies and slightly S is MCG-04-36-07, a very small galaxy, pretty faint, slightly brighter in the middle, and elongated slightly NW/SE.

Me2-1 (15h22.3 -23 38): Is a planetary nebula also known as PK 342+27.1. In the 10" scope it is pretty bright, extremely small, and has a possible but uncertain haze around the center. There is a star to W which is brighter than the planetary. Using the UHC filter really doesn't help much except to assist in finding the object. I have not yet observed it in the 20" scope.

Fuzzy Spot Libra



STARS

- <3
- 4
- 5
- 6
- 7
- >8

SYMBOLS

- Multiple star
- Variable star
- ☄ Comet
- ☉ Galaxy
- ☐ Bright nebula
- ☁ Dark nebula
- ⊕ Globular cluster
- ⊙ Open cluster
- ☉ Planetary nebula
- ☉ Quasar
- △ Radio source
- × X-ray source
- Other object

Herchel 400 Object:5897

Local Time: 10:31:03 26-May-2001

UTC: 17:31:03 26-May-2001

Sidereal Time: 02:17:09

Location: 33° 39' 56" N 112° 49' 10" WRA: 15h14m52s Dec: -17° 39' Field: 19.9°

Julian Day: 2452056.2299

Seeing Double

By Thad Robosson

Despite my new equatorial mount being just shy of finished, I finally got the opportunity to work with my filar micrometer. I was also able to dial in my Celestron MicroGuide eyepiece and directly compare how the 2 units worked in the field. Here are the results of my couple night's worth of tinkering.

The first thing involved in dialing in any type of measurement device is to take lots of timings or measures of objects subtending a known distance. For the filar micrometer, you will need to be accurately aligned on the pole, and ideally have a permanent mount. Choose a fairly bright star as practically close to between 65 and 75 degrees in declination. You then need to orient the filar wire so that the star will trace exactly over it when the drive is turned off. You then set the bisecting wires any convenient (i.e. mathematically non challenging such as .1" or .05" etc.) distance apart and take the times it takes for your target star to go from one wire to the other. It helps to slightly defocus the star so that you can see when the exact center of the star touches the wires. I chose the timing method, and lined up on the pole as accurately as possible. After taking what seems like bajillion times, I was able to reduce the data into actual distances per unit.

Filar w/o Barlow...Avg. times (10 meas. each)	.1"	.05"	.025"
Time	60.66s	30.03s	15.00s
Reduces to:	4 . 3 2 " per .001"	4 . 2 8 " per .001"	4 . 2 7 " per .001"
Filar with Barlow...Avg. times (20 meas. Each)	.1"	.05"	
Time	28.49"	14.41s	
Reduces to:	2 . 0 2 " per .001"	2 . 0 5 " per .001"	

Without the Barlow this gives an average of .429" per .0001" on my dial, .204" per .0001 with the Barlow

The math to figure this out is fairly simple with a scientific calculator....

Dist.(arcsec)=T(time) x15 x cosDec x 1.002738. The 1.002738 is to convert your stopwatch time to sidereal time.

The Celestron MicroGuide (CMG) is fairly similar to dial in. Align the long scale so that your star traces down it exactly and time how long it takes for the star to travel from one end of the scale to the other. You don't need an Equatorial mount for this (but it helps). I got this data...

CMG w/o Barlow...(10 measures) Avg. time 143.777s reduces to 17.059" per division.

CMG with Barlow...(20 measures) Avg. time 89.82s reduces to 10.6571" per division.

The math for this is: Scale constant (x" per div.)=T (seconds) x 1.002738 x .25 x cosDec

So now that I've dialed in my tools, I potentially can measure double stars down to an accuracy of .2" with the filar and 1.07" with the CMG by estimating to the nearest .1 division on it's scale. The main differences, besides accuracy are...The CMG is much easier to use. You don't need to align it EW every time you use it, and you don't necessarily need an Eq mount to be able to do decent measures with it. The trade off for this ease of use is in accuracy. The filar is roughly 5 times more accurate, but this potential may not be realized until the user gains a lot of experience. But no matter which device you use, it's not a bad idea to keep doing timings to further refine your averages, and with practice, your own accuracy in the measures will improve. None of this will come fast or easy. I spent nearly 8 hours in gaining this much data. But once you gain the experience and can say for certainty that your measures are accurate to within 5%, it will be worth it. Next month, actually measuring some stars.

If you'd like to know more or need some help with this, please contact me at 602-527-0455 or starstar-cracker@qwest.net

July 2001

SUN	MON	TUE	WED	THU	FRI	SAT
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Schedule of Events for July 2001

July 4th	Pathfinder lands on Mars in the Ares Vallis Region in 1997.
July 5th	Moon is full at 1504mst
July 6th	SAC General Meeting at Grand Canyon University 1930, Speaker: Tom Polakis, SAC, 'Observing the southern skies'
July 13th	Moon at last Quarter at 1845 mst
July 14th	SAC Star Party at Flat Iron, Sunset 1943, Ast Twilight ends 2123, Moonrise 0109
July 16th	Surveyor 4 crashes onto the moon near Sinus Medii in 1967, No data was returned
July 17th	Georges Lemaitre born in 1894. A Belgian priest & mathematician he publish a paper in 1927, which led to the Big Bang Theory of the creation of the universe. He Died in 1966
July 19th	Edward Charles Pickering born in 1846. Director of the Harvard college observatory for 43 years. Made outstanding contributions in the study of stellar spectra Brother of W.H. Pickering. He died in 1919
July 20th	Moon is new at 1944
July 20th	Viking 1 lands on mars near Chyrse
July 27th	Moon at 1st Quarter at 1008

Future Planning

Sept 14th-15th Northern Arizona Star Party. For more info see <http://www.pacorg.net/nasp.htm>

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the 10:30 tour snake up the mountain.

All of these astral wonders might literally have faded from view if Vicuna had not decided to turn down its lights, said Oscar Saa, telescope operations supervisor for the nearby Cerro Tololo Inter-American Observatory.

"There was a bit of worry on our part at the time that the city's growth would interfere with our operations, but Vicuna's efforts have been a model for the region," Saa said.

Like most great innovations, Vicuna's campaign to reduce its light output was bred of necessity. An energy crisis brought on by drought forced the city to reduce its electricity use around 1994, Saa said.

The city switched its light source from mercury to sodium, which operates with less electricity but produces more light. At the urging of the observatories, it fitted the new fixtures with special shields that focused the lights downward, keeping glare from shining up into the heavens.

"It was perfect. It protected the sky, people spent less money, and it protected animals and plants as well," said Saa. "Animals have a natural cycle of day and night, and birds, for example, it helps them sleep. Everybody's happier."

Following Vicuna's lead, the Chilean government has passed several laws in recent years requiring cities in the northern regions to cap their ambient light output. To show their gratitude, the Association of Universities for Research in Astronomy, an international organization to which Saa's Tololo observatory belongs, donated the Mamalluca telescope and equipment worth a total estimated at \$6,000.

The mania set off by the telescope has spurred the city and federal governments to undertake a \$2 million expansion plan that should include a visitor's center and another large telescope by 2003. Other attractions will include a sound stage featuring music from the region's Inca heritage.

"They didn't really see a difference between astronomy and life in general, and their music was very connected to the stars," Pizarro explained. Not since 1945, when local poet Gabriela Mistral won the Nobel Prize for literature, has the region had so much attention, he said.

But prosperity does bring its share of hangers-on. "That used to be a just a house and a couple of orange trees," Pizarro said, pointing down the hill from the observatory. "Now it's some kind of resort. People are coming in and out of there all the time. But that's OK -- as long as they keep their lights down." *copyright 2001 Reuters. All rights reserved. This material may not be published, broadcast, rewritten, or redistributed. May 22, 2001 Posted: 9:46 AM EDT (1346 GMT).*

(Continued from page 2)

of the fun that is astronomy. Then there is the old, did you really get 110 at the Messier Marathon or did the Computer?

So is Goto an indescribable evil or is it something positive. My opinion (OK, I lied, I will give an Opinion!) is that if it can help get more folks interested in astronomy, the it can't be all bad. I think that learning the Sky is an important part of the hobby and I encourage new folks to take the time to do so, but at the same time I see folks with minimal knowledge and experience, not getting frustrated with fruitless searches for objects they can't find. The cost of entry has be-

come quite affordable (take the Meade LX 90 as an example) and the technology is only getting better, so why not just Goto?

Till next time,
Clear Skies
Rick

P.S. One technical note. Although not intended as a review of any particular product, Most of the feedback I've read or heard about from users indicates that Meade's Autostar performs better than the Celestron Nexstar software. I have also read that Celestron is working on improving the software, so this may soon be a

Bits & Pieces

Minutes from the May 4th, 2001 General Meeting

By A. J. Crayon

Our President Jack Jones opened the meeting around 7:30pm with the standard Call to Order and meeting title. First order was to request first time visitors to stand up, introduce themselves and tell how they found out about the meeting. Five people did so.

The treasurer indicated there were many receipts on a table up front for members and they should come pick them up for their records. Name tags for a few people were also announced. The name of a recipient selected by the scholarship committee was announced and that the monies will be used to purchase technical books. It is expected that at some time in the future the recipient would make a presentation to SAC about the work and studies being performed.

A detailed report was difficult as the bank statement is well out of synch with our meetings, but that the books did balance.

A call for donations for scholarships and grants was issued and all interested in participating in the worthwhile process are encouraged to donate when practical.

There will be a committee meeting next month, watch for the announcement. All SAC members are invited to attend.

The two trips to Mt. Graham are still on for some time in July and September but the exact dates have not yet been determined as we are waiting on the officials at Discovery Park to get back with us. There will only be room for 13 people to make the trip up to the Large Binocular Telescope as that is all the bus will seat; plus one for the driver. It is expected that SAC participants will caravan and or car pool to the site.

Rick Tejera discussed the upcoming electronic mailing of the SAC newsletter. The June issue will be the last one to be distributed in only print form. The last issue describes the process to determine who will receive the letter via electronic mail and who will receive a printed version. The choice is up to each individual but the officers recommend electronic versions if possible. This version will have very clear color pictures instead of the fuzzy black and white

ones we now enjoy. To learn more about the conversion process read the feature article on page one of the newsletter by Rick Tejera.

The members also voted on allotting \$250.00 for the purchase of Adobe Acrobat for producing the newsletter electronically.

While voting on expenditures the members also voted for appropriating \$300.00 for SAC to host a Sunday bar-b-que at the June Grand Canyon Star Party. Last year was great and this year promises to be better.

The Messier Marathon awards for SAC members were next and the presenters were AJ Crayon and Jack Jones. To make a long story short there were eight certificates for 50 or more, four third place, three second place and 10 first place winners! Certainly, this was the most successful marathon on the planet to date.

Jack Jones made a short presentation on simple telescope math showing how to determine power, field of view, eyepiece projection.

For the last show and tell Richard Andresson showed some pictures of the recent auroral display visible from Phoenix, and spectacular they were. Great pictures Richard. He also showed some slides taken from our Cherry Rd. west site. There were some videos of the site, Christmas eclipse, Venus, Jupiter and Saturn.

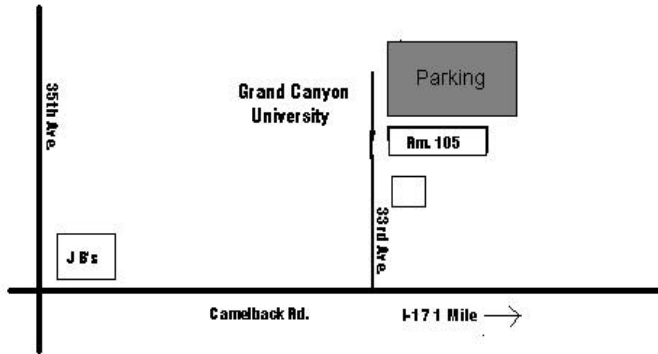
After a short break AJ Crayon discussed making pencil drawings of deep sky objects as seen through a telescope. After the discussion there was a short slide presentation showing examples that also included solar system objects. The presentation was followed by an excellent question and answer session that included other members who have also been making drawing.

After all the fuss was over, including the meeting, we adjourned to JB's at 35th Ave and Northern for food and more gastronomical discussions.

SAC Meeting and Observing Sites

General Meetings

7:30 p.m. at Grand Canyon University, Fleming Building, Room 105: 1 mile west of I-17 on Camelback Rd., North on 33rd Ave., Second building on the right.



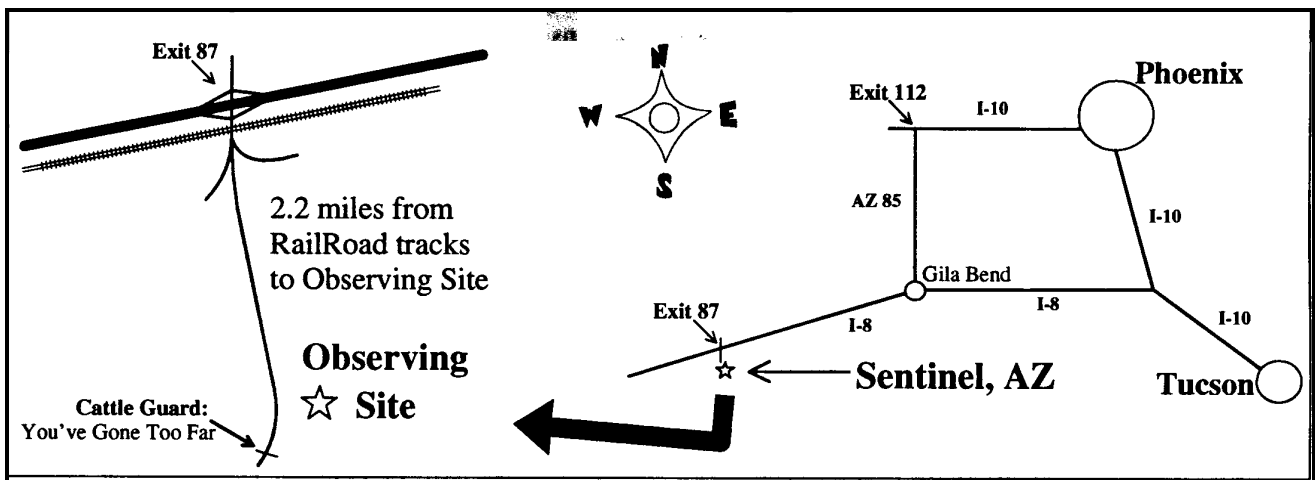
Flatiron Star Parties



Sentinel Schwaar Star Gaze

This years Sentinel Schwaar Star gaze will be held April 20-21 at the Sentinel observing sight. To get there take I-10 west to exit 112; SR 85. Take SR85 south 30 miles through Gila bend to I-8 westbound. Stay on I-8 for 29 miles to exit 87; Sentinel. There is a lighted tower at the exit. Turn left and go under the over pass and continue straight ahead. Cross the railroad tracks and take the dirt road 2.2 miles to the site (see map below).

Head west on I-10 to the 339th Ave exit (exit 103). Turn North (right) and go two miles to Indian School Rd. Turn West (left) on Indian School and go 1 mile to 355th Ave. Turn North (right). This will turn into Wickenburg Rd. Follow this road for about 12 miles. Just after mile marker 12 you will go through Jackrabbit wash and pass a cattle guard sign. There is a dirt road just after the sign, marked by white painted rocks. Turn on to this road and follow it about .9 miles. Just after you pass through a wash, you'll see the field on your left. If you hit the cattle guard, or the dirt road your on is next to a fence, you've missed the correct road. Go back and look for the white rocks. (see detail map above).



Bits & Pieces

Minutes of the May 4th Board Meeting

By A. J. Crayon

The quarterly Board of Directors meeting was called to order by President Jack Jones.

Rick Tejera discussed first order of business, electronic newsletter distribution. The method for allowing members to select paper or electronic copy was discussed and is published in the June newsletter. Once started issues back to 2000 will be posted to the SAC web site. The current issue will be posted approximately two months after distribution. This way we can be pretty certain no one will get a jump on this excellent source of information.

Currently Jack Jones has the newsletter printed and folded by his employer for a nominal fee. This fee is far cheaper than local professional copy services - thanks Honeywell!

The treasurer, Peggy Kain, discussed the awards process of the Grants Committee and that they have a total of \$700.00 for allocation. But there has to be a procedure to replenish funds so there is always something for distribution to worthy students or individuals.

Steve Coe presented a bill for continuing the registration of the SAC web site, namely saguaroastro.org.

Peggy continued with a discussion of club insurance. Basically it was a chore to track down the company that holds the policy. The next chore, which is still in progress, is to have them determine our exact insurance status. As of the writing we have not yet had a clear answer and it is possible we may be better off seeking another company for our business.

We are waiting for word from Grand Canyon University Provost to finish speaking with their lawyer to determine our insurance status.

The trips to Mt. Graham are still waiting word from Discovery Park on our schedule requests for July and September.

Steve Coe brought up the question about our Holiday Party or to just have a regular combination star party and holiday party.

Thad Robosson discussed the possibility of SAC Adopting a Highway. This program, sponsored by Arizona Department of Transportation, is for cleaning up a one-mile segment of an Arizona highway by interested organizations. We get to select where, they post a sign and we go clean up that part of the highway every six months.

Such A Deal

1) Heavy Duty Pier. About 65 lbs, but still portable. Has removable wheels and is rock solid with very quick damping of vibrations. Leveling legs with self leveling feet. Accessory tray with holders for 8 EP's. Perfect for ETX, Nextstar, etc \$50. Will consider trades for ????

2) Pair of laser cut stainless steel annular rings. 1/8" thick, 19 1/8" inside dia, 23 1/8" outside dia. Making a split ring mount or a tangent arm friction drive? You'll want these. \$25 each or \$40 for pair. Will consider trades for ????

Contact Thad at 602-527-0455 or at starstar-cracker@qwest.net

3) Orion 10" f/5.6 Premium Dob with 2" crayford focuser and Telrad. Pyrex mirroe shows concentric rings inside and outside of focus. No longer available, this NOT the black metal tube scope. \$900.00 firm. Call Doug Allen 623-856-5027



To place your ad here, e-mail or send your copy and photos to me two weeks prior to the issue you'd like to have ad appear. Remember the issue comes out the month prior to the date, e.g July is issued in June.

SAGUARO ASTRONOMY CLUB

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Fax: 623-572-8575
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Videmus Stellae

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

SAC Schedule of Events

SAC Meetings

January 12, 2001	July 6, 2001
Feb 9, 2001	August 3, 2001
March 9, 2001	September 28, 2001
April 6, 2001	October 26, 2001
May 4, 2001	November 30, 2001
Jun 8, 2001	December :TBA (Holiday Party)

Deep Sky Group Meetings

February 15, 2001	August 9, 2001
April 12, 2001	November 1, 2001
June 14, 2001	

SAC Star Parties

Date	Sunset	Astronomical Twilight Ends	Moonrise
1/20	1751	1918	0525
2/17	1818	1941	0431
3/17	1841	2004	0258
4/14	1902	2029	0139
5/19	1928	2106	0410
6/16	1944	2127	0239
7/14	1943	2123	0109
8/11	1922	2053	2341
9/15	1837	2001	0513
10/13	1800	1933	0401
11/10	1731	1857	0254
12/8	1723	1852	0151