



SACnews

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An Inside Look At JPL By Steve Dodder

On a recent trip to Pasadena to visit an old friend, Rosie and I decided to take a side trip on our way out. With a contact supplied by the editor of this fine publication, we wrangled a tour of Cal Tech's Jet Propulsion Laboratory, (JPL). Nancy Leon is the person responsible for supplying Rick with the NASA stories in the newsletter, and agreed to our tour. She was unable to conduct it, but set us up with

Global Surveyor, and Mars Odyssey.

Walking the campus of JPL was a real thrill. We headed to the Space Flight Operations Facility where the data comes in and the spacecraft are controlled and monitored. Trent told us that even he wasn't allowed in, and my heart sank. But I got a neat picture of the sign outside. (Oh joy...)



Steve & Rosie Dodder pose in front of a model of the Mars reconnaissance Orbiter (MRO) During their trip to the JPL.

Trent, an intern there. He seemed nervous at first, but after a few jokes he loosened up. One in particular, I'd asked about the Apollo program and he said, "Oh, we don't do any manned stuff here. We're all robotic." To which I said, "Wow! You look really lifelike!" He said, "Yeah, we're getting' pretty good at it."

As we walked down the street, Trent pointed out the Infrared Building where data from Spitzer, IRAS and others is analyzed. I was surprised we could see it, and he agreed. Said something about the Sun angle I think.

We began the tour at the main Auditorium, where people like Richard Feynman, Stephen Hawking and others have lectured. Stage right along the wall holds models of some of the spacecraft developed at JPL including Voyager 1, Mars

Across the street was the Spacecraft Assembly Facility. This was another treat, thinking of all the satellites and rovers that had been built there. I pictured SOHO, Spirit and Opportunity, the first Mars rover, Odyssey, Voyager, the Mariners and on and on, all under construc-

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Voices from the Cacophony

By Trudy E. Bell and Dr. Tony Phillips

Around 2015, NASA and the European Space Agency plan to launch one of the biggest and most exacting space experiments ever flown: LISA, the Laser Interferometer Space Antenna.

LISA will consist of three spacecraft flying in a triangular formation behind Earth. Each spacecraft will beam a laser at the other two, continuously measuring their mutual separation. The spacecraft will be a mind-boggling 5 million kilometers apart (12 times the Earth-Moon distance) yet they will monitor their mutual separation to one *billionth* of a centimeter, smaller than an atom's diameter.

LISA's mission is to detect gravitational waves—ripples in space-time caused by the Universe's most violent events: galaxies colliding with other galaxies, supermassive black holes gobbling each other, and even echoes still ricocheting from the Big Bang that created the Universe. By studying the shape, frequency, and timing of gravitational waves, astronomers believe they can learn what's happening deep inside these acts of celestial violence.

The problem is, no one has ever directly detected gravitational waves: they're still a theoretical prediction. So no one truly knows what they "sound" like.

Furthermore, theorists expect the Universe to be booming with thousands of sources of gravitational waves. Unlike a regular telescope that can point to one part of the sky at a time, LISA receives gravitational waves from many directions at once. It's a cacophony. Astronomers must figure how to distinguish one signal

from another. An outburst is detected! Was it caused by two neutron stars colliding *over here* or a pair of supermassive black holes tearing each other apart in colliding galaxies *over there*?

"It's a profound data-analysis problem that ground-based astronomers don't encounter," says E. Sterl Phinney, professor of theoretical physics at the California Institute of Technology in Pasadena.

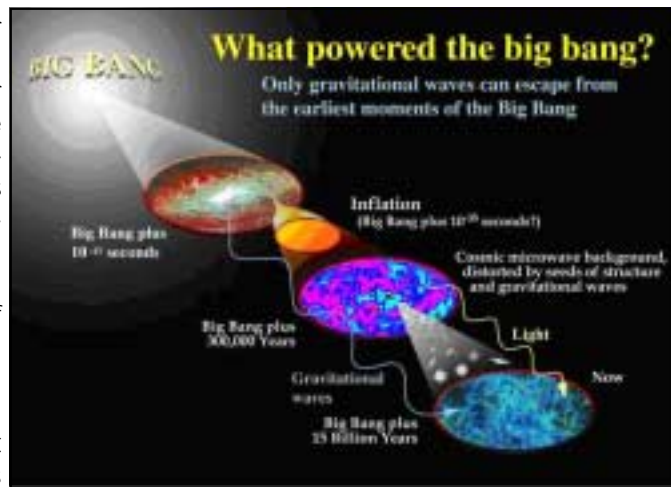
Profound, but not hopeless: "We have lots of good ideas and plans that work—in theory," he says. "The goal now is to prove that they actually work under real conditions, and to make sure we haven't forgotten something."

To that end, theorists and instrument-designers have been spending time together brainstorming, testing ideas, scrutinizing plans, figuring out how they'll pluck individual voices from the cacophony. And they're making progress on computer codes to do the job.

Says Bonny Schumaker, a member of the LISA team at the Jet Propulsion Laboratory: "It's a challenge more than a problem, and in fact, when overcome, a gift of information from the universe."

For more info about LISA, see lisa.nasa.gov. Kids can learn about black holes and play the new "Black Hole Rescue!" game on The Space Place Web site at <http://spaceplace.nasa.gov/en/kids/blackhole/>.

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LISA will be able to detect gravitational waves from as far back as 10^{-36} second after the Big Bang, far earlier than any telescope can detect.

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tion. The pictures I took with my cheapo camera didn't turn out well, but we saw the assembly floor, which had a duplicate of the descent stage from the Huygens probe mounted on the wall, where all the pictures of satellites during assembly are taken, and in a display case near the lobby were models of most of the probes assembled there. We saw literally dozens of models from the 1960's lunar explorers on up to the current Mars Reconnaissance Orbiter, including some that didn't even fly for one reason or another.

Next was the Microdevices Laboratory building. This is where they do the micro-etching of silicon devices and such. All the names aboard the Voyager and Pluto probes is done here. We saw the actual labs through windows, since you need a bunny suit to get in the clean room. In the lobby was an example of the Pluto name plate shown actual size and how big it has to be to read it. Actual size was about 1/16 inch square. Blown up to 5 ft square, you could make out row after row of names, numbering over a hundred thousand!

Around the corner, up the hill and down the street, we got the next surprise. It was the Mars Rover building, which is not normally on the tour. We seemed to go in the back door and up a concrete stairwell. Trent saying, "Let's see what we find here." What we found was golden-the rover simulator room, where, if something happens to the rovers Spirit or Opportunity, they repro-

duce it and work out ways to fix it. Problems like when Spirit had trouble with a wheel freezing up, or when Opportunity got stuck in the dust. There was a rock covered hill up against one wall and a boulder strewn plain across the floor. At one end still stood the powdered mixture, labeled with a sign containing its composition, that simulated the sand Opportunity was stuck in! Trent told us this was the same room they used to test drop the larger air bags needed for the new rovers, and had appeared on the Nova story about the rover's development. It was really cool! You could smell the brain power in that room.



The Dodder's Guide through JPL: Trent

Back to the gift shop and on to the main entrance. Trent took our picture in front of the Mars Reconnaissance Orbiter and gave us each the current JPL newsletter.

It was a great tour and very informative. Too bad we couldn't meet Nancy Leon, who'd made it all possible, but we had a good time anyway. Thanks to Nancy and Trent and Rick for setting us up.

If you're in the Pasadena neighborhood sometime, I'd highly recommend checking out one of the finest satellite development and operations centers in the world.

(Ed Note: I'd like to personally extend my thanks to Nancy Leon of NASA/JPL for her taking the time to help Steve & Rosie tour JPL. In addition to providing the "Space Place" Column, she has always been there to help send materials for use at our public events. Thanks again Nancy)



Left: Rosie Dodder posing next to a full scale model of Voyager.



Models of some of the many spacecraft that JPL has been involved with.

Last Call For Observations–Pegasus

By A.J. Crayon

Here it is, already, December. The time of year just about everyone says, "I can't believe we are at the end of the year." This time our constellation is the Winged Horse, Pegasus, which comes from Greek mythology. The image of which comes from Babylonia.

For some time I was concerned there wouldn't be enough observations for this month's column and, because of this, I took the liberty of using observations from Ken Reeves and Steve Coe. Then, all of a sudden, in came a number of observations to take care of the space requirement. But I just didn't have the heart to remove any observations. Regardless of this situation, I believe you will enjoy this month's column – have at it.

NGC7042

Our first selection is found in the extreme south west part of the constellation about 3.5° north of delta and gamma Equulei and is a rather faint 12.8 magnitude. If you have a larger telescope look for its companion **NGC7043** a scant 5.5' to the northeast at a magnitude of 14.7.

8"f6, Newtonian, 240X; Charlie Whiting: This was a tricky galaxy to find. The field of nearby stars contained stars of 11th, 12th and 13th mag. Star hopping is difficult with these faint points of light. I could just barely see this object. The 1' core is round and a little brighter than the 2' halo, which is slightly oblong. Its alignment is about 175-degrees. There are two 13th mag stars just to the SE. While I was in the neighborhood, I checked out **NGC7043**. I barely glimpsed it. It was like a fuzzy faint star. [Take note - a 14.7 magnitude galaxy in an 8" telescope, nice going Charlie, aj.]

20" F5 Dobsonian, 160X; Ken Reeves: 7042 is the brighter than 7043. It is somewhat faint, pretty small, and slightly brighter towards the middle. No nucleus was seen, no detail. If any elongation it is N/S 1.25:1. **NGC7043** is fainter than **NGC7042**. This one is very faint, pretty small, and slightly brighter toward the middle. No detail or elongation seen. A few stars separate the galaxies.

Messier 15

This is a grand globular cluster, which needs little or no introduction. There is a planetary nebula located within the confines of this gem and is named, among others, Pease 1. If you have time and want extra credit see if you can observe this challenge. To do so I suggest getting a finder chart. One that I have used can be found on Doug Snyder's site at <http://www.blackskies.org/peasefc.htm>. It will also help if you

have an OIII filter – and use it!

8" f6, Newtonian, various; Charlie Whiting: In my **9x50** finder scope M 15 looks like a fuzzy star. In the 8" telescope, at 47X, Wow! Bright core, granular halo, pretty large, and a few stars resolved. At **60X**, Double Wow! There are dozens of bright sparkling diamonds on a velvet carpet. At **120X**, Triple Wow! In moments of good seeing, there are hundreds of stars resolved, right to the bright core.

8"f6 Newtonian; AJ Crayon: 8X50 finder is round, bright and between 2 stars. From a number of observations over the years, notice that as the power increases more detail become evident. At **80X** it has a bright middle with faint outer regions. At **100X** the core is small, bright and compressed, is well resolved with long streamers in all directions but to the south. At **120X** it is estimated to be 10' in diameter and 8th magnitude. At **160X**; it is gradually much brighter in the 2' middle with many stars resolved to the center; the west side has streamers that extend farther than those on other sides. With averted vision 100's of stars are resolved from outer edges to the center. At **175X**, it is round with many stars out around a larger outer annulus, has a gradually brighter middle with a blazing central core, of seemingly 1000's of stars. If you haven't got it yet, this is a magnificent globular cluster!

10" F4.5 Dobsonian, 100X; Ken Reeves: Very large, pretty bright, many stars in the halo, gradually brightening towards the middle, then suddenly very much brighter and denser in the nucleus. There is somewhat of a dark lane on the SE. Estimate at least 200 stars resolved. This is an absolutely beautiful cluster with so many stars.

13" F4.5 Dobsonian, various powers; Charlie Whiting: This GC was so bright that it was visible in my 80mm "finder scope" at **12X** from my Glendale backyard! In the 13" telescope it was very bright. Surrounded by 6th, 7th and 8th mag stars at **47X**. At **150X** it was much brighter in the middle, and seemed to gradually fade into the background towards its edge. The edge swelled and shrank with averted vision. There were moments when M 15 almost appeared granular, but I did not resolve any of its stars.

14.5" f5.2 Dobsonian, 220X; AJ Crayon: Very large, very very bright, irregularly round magnificent globular cluster! Stars in the outer halo are very loose and has extension to the northeast, southeast, southwest and Northwest that contain many nice chains and lines. The stars condense towards the brighter center until they become involved in a glow of unresolved stars in the even brighter V shaped middle. At higher powers the

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stars were somewhat bloated and it was difficult to find one point of focus!

20" F5 Dobsonian, 180X; Ken Reeves: Very bright, pretty large, very well resolved, halo slowly condensing to a bright, small, dense core which is unresolved. A mag 10 star to N, mag 11 star to E, and a very bright (mag 6) star further E, keep this star out of the field of view. Several strings extend away from the core. I estimate 220 stars by counting 55 in one quadrant.

NGC7137

This is a 12.4 magnitude barred galaxy located just under 1° southeast from 5th magnitude 12 Pegasi.

13.1" f5.6, Newtonian, 135X; Steve Coe: faint, small and round.

20" F5 Dobsonian, 180X; Ken Reeves: Pretty faint, somewhat large, round, faint star on the W edge, in the middle of an E/W string of mag 10 stars. There is a mag 7 star to the N and SW just out of the field. There is a very slight brightening toward the middle, but no nucleus.

NGC7177

This is a barred spiral galaxy at an 11.2 magnitude and is located 2.5° east of northeast from 5th magnitude 13 Pegasi.

8" f6, Newtonian, 80X; AJ Crayon: this galaxy is 11th magnitude and a small 3'X2'. Essentially it can be called very faint, little elongated and has a small brighter middle.

13.1" f5.6, Newtonian, 135X; Steve Coe: Pretty bright, pretty large, somewhat elongated, and much brighter in the middle.

20" F5 Dobsonian, 180X; Ken Reeves: Pretty bright, somewhat small, looks like the middle is elongated NNE/SSW, but the faint halo is elongated E/W especially with averted vision. The middle is much brighter and there is an occasional non-stellar nucleus. Stars are nearby to the W and SW but not involved.

NGC7210

This is a non-existent galaxy located at RA 22 06.4 Dec +27 07 or about 30' northeast from 6th magnitude SAO90241. There is a grouping of stars making a nice right triangle and is just to the northwest. Since no one turned in an observation, or reported attempt to locate this selection or a reason why it wasn't found, I'll then post my findings on why it doesn't exist. Here's the story, according to the NGC/IC Project - this galaxy is lost. It does appear in the General Catalog listed by John Herschel, but its position then was even in doubt. The description reads, "eF, R, bM, ill-defined; a vF double star 45 deg np 4 arcmin dist points just to it."

Plates scanned by Dr. Harold Corwin for several degrees around this position did not turn up any likely candidates. It is still at large and if you have an idea for its location I suggest you contact Dr. Corwin.

No observations submitted. Hum?

NGC7217

This 10th magnitude galaxy is located almost 2° south and slightly west of pi Pegasi. It is a mid-life spiral that should display some nice detail – look for it! This galaxy is also a Herschel 400 object.

8" f6, Newtonian, 160X; AJ Crayon: this galaxy is a pretty nice 10' and 11th magnitude with a gradually brighter middle, round halo and round middle.

8" f6 Newtonian, various powers; Charlie Whiting: From my Glendale backyard I was surprised to be able to see this visual magnitude 10.2, surface brightness 12.9 mag/sq arc-min galaxy (online data from SEDS). I use the word "see" loosely. I had to go all the way up to **320X** and do the "monk" trick (black hood over the head) in order to confirm that the ghostly apparition that I thought I saw at lower power was indeed there and that it was indeed an extended object. I think that I only detected its core, maybe 1' -2' in diameter. I stared at it for a long time with averted vision. It would appear to swirl and fade. I wasn't sure of its shape or size. The final consensus of collected images in my mind was that it was shaped like a fried egg rotated about 45-degrees. Its axis seemed to point in the direction of a 10.6m star located about 3' from its center, a little south of east.

10" F4.5 Dobsonian, 140X; Ken Reeves: Fairly small, round, fairly bright star to SE. Averted vision makes halo pop out, fairly bright middle with bright sub-stellar nucleus, which comes and goes with seeing. Fairly basic galaxy.

13.1" f5.6, Newtonian, 100X; Steve Coe: Pretty bright, pretty large, elongated, and very bright in the middle. On a good night it has a mottled halo surrounding the bright core.

14.5", f5.2, Dobsonian, 290X; AJ Crayon: this 11th magnitude galaxy is very nice, is located in the middle of a isosceles triangle of stars. It is large, round and a little brighter towards the middle then much brighter in the middle. This galaxy deserves another look - sometimes.

16" f4.4 Newtonian, Rick Rotramel: G - fS, pB, face-on spiral galaxy, grad. br. to a brighter, large nucleus.

20" F5 Dobsonian, 160X; Ken Reeves: Pretty bright, somewhat small, slightly elongated 1.2:1 ENE/WSW. Brighter middle, prominent non-stellar nucleus. Mottling suspected in halo. A few field stars nearby.

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President's Message(s)

By Thad Robosson & Rick Tejera



I can't believe it's been two years since I accepted to duty to lead the Saguro Astronomy Club as president. So many things have happened, not just in the club, but life in general.

This board's term started out very smoothly, with simple issues. But that was simply a slow introduction to what challenges lay ahead. This board didn't have many issues to contend with, but the ones we did deal with were major! We managed to see the club through some very heavy debate and into a future that has been quite literally been over a decade in the making. Soon, SAC will

be an incorporated entity, with all the benefits being incorporated has to offer. While the board did have a lot to do with steering the club in this direction, it still is the club membership that gets the power to the wheels, so to speak. I am quite proud to say that the membership was quite active in many discussions the past several months! It is this participation that moves organizations forward, even through tough controversial issues. And even as the current board's term is closing, a full month before the board changes hands, our incoming president is already taking initiative that will serve SAC quite well. As much as I enjoyed serving SAC, I am also looking forward to being part of SAC as the new board pushes even further into our future.

Thad

After the November meeting, I was reminded of this story I once heard. Back in the old west, in a rough & tumble cattle town, an old man comes running into the saloon yelling "Big Don's Comin', Big Don's Comin'" and runs out. The saloon suddenly goes quiet and sure enough on the horizon a cloud of dust can be seen growing larger by the minute. Soon it's obvious that a HUGE man is riding into town. As he slowly rides into the town, the streets go empty, Mothers pull their children into the houses and shopkeepers close their doors. The man pulls up to the saloon and dismounts. He grabs his horse by the neck and ties the horse to the hitching post using it's tongue. He goes into the saloon, ripping the doors off their hinges. The only sound is his spurs as he saunters up to the bar. The bartender slowly goes over to him and asks "Wwwwhat'll ya have mister?" The man asks for a shot of whiskey, which the bartender can barely pour without spilling due to his fright at this monster of a man. The man drinks it down in one gulp and wipes his mouth on his sleeve and slams the glass down on the bar breaking it. The bartender asks "Wwwwould ya like another?" The man looks around and says in a real quiet voice " Actually pardner, I love another, but I gotta get outa town, don't know if they told ya, but Big Don's acomin.

So it was with our guest speaker at November's meeting. We were privileged to have Don Machholz come to our meeting and present a talk about his experiences and discoveries. Given his reputation I was thinking to myself, what can I talk about with this man? I seen comets, but I've never even come remotely close to discovering anything, let alone ten comets. Turn's out

"Big Don" was not only a great guest speaker, but a true gentleman as well. As the meeting room filled, I noticed he took the time to speak with many members, myself included, and genuinely enjoyed his time with us. I think all who were there felt honored when he told us how much he admires our club and what we've accomplished, I know I felt that way. Turns out "Big Don" was just another guy who loves astronomy. I want to thank him for making the November meeting one of the best we've had, and I look forward to doing the Messier Marathon with him.

Now on to other topics. As you probably know by now, I will be taking the helm as President of the club beginning in January. As usual, I'd like thank Thad & the outgoing board members for their efforts the past two years. There were some significant events during this time that was handled in a professional manner that kept things in control. Also a round of applause is due to Jennifer Polakis for the fine job she did of getting some great speakers for our meetings. Made sitting through the club business part worth it.

I didn't accept this nomination without some thought, After all, I still will hold the job of Newsletter Editor. But on reflection, I thought about how much I enjoy being a member of the Saguro Astronomy Club. I don't think I'd be as active in astronomy or enjoy it as much without the comraderie, friendship, and mentoring I've had since I joined 9 years ago. So after realizing how much I've gotten from the club, it was time to give some back to the club that means so much to me. That and no one else wanted the job ☺.

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January 2006

<i>SUN</i>	<i>MON</i>	<i>TUE</i>	<i>WED</i>	<i>THU</i>	<i>FRI</i>	<i>SAT</i>
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 January 2006

Jan. 4th	Earth at perihelion at 0829mst, 0.9833 AU from the Sun
Jan. 6th	Moon at first quarter at 1157mst
Jan. 10th	ATM & Astro Imaging Subgroup Meetings at Thad's Shop 1930
Jan. 13th	SAC General Meeting at Grand Canyon University at 1930, Speaker TBA.
Jan. 14th	Moon is full at 0248mst.
Jan. 21st	SAC Star Party at Flat Iron Sunset 1752, End Ast. Twilight 1919, Moonrise 0044
Jan. 22nd	Moon at last Quarter at 0814 mst.
Jan. 29th	Moon is new at 0615 mst.

Future Planning

Mar. 25th, 2006	2006 All Arizona Messier Marathon at Arizona City
May 26th-28th	Riverside Astronomy Expo

Bits & Pisces-Minutes of the Nov. 18th General Meeting

Recorded by Susan Pritchard

The November 18, 2005 meeting was held at Grand Canyon University in Phoenix in the Williams Building and was opened at 7:40 pm by President Thad Robosson, who welcomed all new visitors and members. He invited the visitors to introduce themselves and sign the guest book to receive a copy of the SAC newsletter. As Treasurer, Al Stiewing said that we now have \$3829.81 in the treasury and reminded members that their 2006 membership renewals were now due, as well as renewals for Astronomy and Sky and Telescope magazines; also he only had a few Astronomy 2006 calendars left on sale for \$8.

President Thad Robosson thanked everyone who had worked so hard this last year—especially Jennifer as Vice-President in charge of programming. He presented the slate of officer candidates to the membership and invited any additional nominations for election. There were no other members added to the proposed slate of names and a motion was proposed to accept the slate as nominated; it was seconded and there was no discussion. A vote was taken and the members were unanimous in accepting the slate of candidates. The new officers for 2006 were as follows: President; Rick Tejera; Vice-President; Paul Lind; Treasurer; Paul Dickson; Properties Manager; Jennifer and Tom Polakis (*Ed. Note; for the purpose of voting on board issues the Properties director is Tom Polakis*) Susan V. Pritchard will remain as Secretary.



Don Maccholz, Our Guest Speaker for November

Announcements: A.J. Crayon mentioned that the Sentinel Schwaar Star Gaze was set for Dec. 3rd and directions would be on the website. Steve Coe has set up a challenge for the Star Gaze—there would be 15 objects in the Challenge, but only 10 were needed to receive a certificate. The objects would include planets, meteor showers, comets, etc. A.J. has set the date for the All-Arizona Messier Marathon for March 25, 2006 and Jack Jones volunteered to help. A.J. mentioned that the November Newsletter had the Observations article and encouraged everyone to read it. Rick Tejera said that the November Newsletter was now available on line or in print. Steve Dodder reported that pot-luck on October 22 at his observatory, Stonehaven, was very successful; 35 people attended and Joe Orman provided information on his list of naked-eye objects. The next pot-luck would be April 7, 2006.

Susan Pritchard volunteered to host the Christmas party at her house on Saturday, December 17, at 7:00 pm. Her address is 6955 W. Sierra Vista Drive, Glendale, AZ, 85303, and the phone is 623/934-7496. Announcements with details will be sent via the mailing lists or for those who receive printed editions of the NL a flyer will be mailed.

Because of the speaker, there was no "Show 'n Tell" and after the break, Jennifer Polakis introduced the
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The first order of business that the new board will need to attend to is finalizing our incorporation. I will get a status report from Jennifer and then we'll see what needs to get done and set a timetable. I'll keep you all posted on the progress.

It looks like AJ & Jack are pretty much in the home stretch preparing for the 2006 Messier Marathon. It looks like this will be another good year for 110 objects, I plan on being among those completing a perfect marathon, I hope you be there as well.

I'd also like to begin the search for an alternative sight to Sentinel for dark sky events. The site happens to be

along a known route for human smugglers, as a result the local law enforcement & Border Patrol have advised that we may not be safe there. While we have had no problems as yet, I'd like to keep it that way. While I'm not advocating abandoning the site altogether, I think a search for a reasonable alternative north of I-8 is a prudent course of action. A few locations have been mentioned and we'll probably organize a few scouting parties after the new year. If you have any ideas along these lines let the board know, so we can check it out.

With that, I'll leave you for now with my best wishes for a safe & happy holiday season and a great New Year.

Rick

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NGC7303

8" f6, Newtonian, 160X; Charlie Whiting: This galaxy was not as hard to find as **NGC7042**. There is a 6.6 mag star to its NW. And, a rectangle of 9th and 10th mag stars to its SE. The galaxy is on a line about 1/3 the way from the rectangle to the bright star. However, it was not easy to see. Using my shortest focal length eyepiece, 7.5mm, I could barely detect it. When I tried using my 2x Barlow, it became invisible. It is small, 1-2", round and uniformly faint across its extent. While in the neighborhood, I checked out **NGC7304**. It was actually easier to see. I assumed that it was another galaxy, but when I checked it the next day, I found out that it is 3 stars. Now that Charlie has brought it up, there's an interesting story here from the NGC/IC Project. Actually **NGC7304** doesn't exist! "It was seen only once by d'Arrest who put it 137 arc-sec away from NGC 7303. He looked for it the second time that he observed N7303, but could not find it again. There are no objects, not even single stars, in the area where d'Arrest put it that one night." Dr. Harold Corwin. Regardless, the 3 stars are listed as **NGC7304**. Also d'Arrest has some 300 objects in the NGC to his credit.

Stephan's Quintet

Stephan's Quintet is made up of five galaxies, namely NGC 7320; NGC7317, NGC7318A, NGC7318B, and NGC7319.

10" & 20", Dobsonian; Ken Reeves: Although tough, I was able to see three smudges in the 10" scope using a hood and a lot of averted vision. I noted them as extremely faint with only 2 certain, one other suspected. They sit in a triangle of fairly faint stars. Best described as lumpy darkness. Increasing the aperture to 20" allowed me to see all 5. NGC7320, the brightest of the quintet, is somewhat small, somewhat faint, elongated NW/SE 2:1. A star is involved, but is probably not the nucleus. NGC7318 A/B is to NW. Seen as very small and pretty faint, the two are split as much brighter middles sharing the same halo. To the N of NGC7320 is NGC7319, which is very small, pretty faint, and very slightly brighter in the middle. Finally to W of NGC7320 is NGC7317. It is very small, very faint, and slightly brighter in the middle. There is a bright star to NW, which interferes slightly.

Call for Observations

I'm going to go out on a limb for January and picking Aries. There isn't a Messier object in here, only a number of pretty bright to faint galaxies. Never the less, let's give it a try and take on the challenge. We'll start with **NGC691** located about 30' south and about 10' east of 6th magnitude 1 Arietis. This 11th magnitude galaxy is located in the same field as our next selection, **NGC678**, a quite elongated 12th magnitude galaxy. This field also contains four more galaxies down to about 14th magnitude in a 1° field – have fun with this one! Next is **NGC677** and is 3° northeast of pi Piscium. One and a half degrees east of southeast from gamma Arietis you'll find a Herschel 400 object, spiral galaxy **NGC772** at a bright 10th magnitude; but see if you can ferret out **NGC770**, a 14th magnitude spiral galaxy at 4' south preceding. Next is **NGC821** another pretty bright galaxy, at almost 11th magnitude. Finally, we come to **NGC972** that should have some detail to be seen. Take a look at these nice galaxies and report your findings to us.

February, my birth month, we will try the southerly Lepus. In addition to a very nice globular cluster in the Messier catalog it has a nice assortment of 10th and 11th magnitude galaxies. For starters try your hand at **NGC1744** a barred spiral galaxy about 34' northwest of a 5th magnitude star. Another barred spiral with a ring is **NGC1832**, located about 34' north of northwest from mu Leporis. Next is **M79**, finally. It is located about 36' northeast from a 5th magnitude double star. A little known planetary, **IC 418** is a very nice treat. It forms a nice triangle with 6.5 and 7th magnitude stars. **NGC1964** is in the Herschel 400 list, is an elongated barred spiral that can be found about 1° 40' southeast from beta Leporis. Finally is the open cluster **NGC2017**, also known as h3780 a most beautiful multiple star. So the question here is what criteria is there for defining a grouping of related stars as a multiple star or an open cluster? No, I don't know but I'm hoping someone can come up with something! All of the galaxies are brighter than 12th magnitude so we shouldn't have troubles seeing them in any size telescope.

(Continued from page 8)

main speaker—Don Machholz from California—one of the premier American comet discoverers. He presented a highly interesting slide show detailing his long successful career as a comet hunter—including 3 in one year! Our thanks go out to Jennifer Polakis for

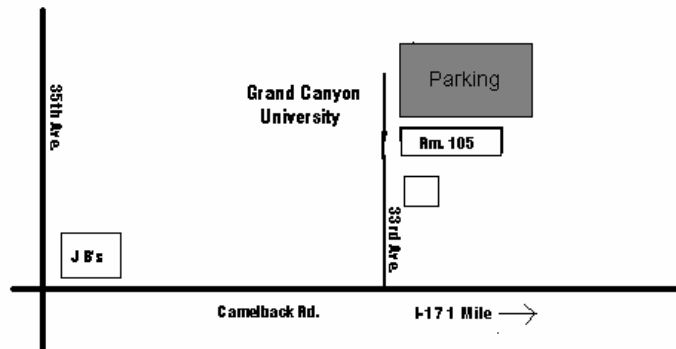
successfully securing him as our speaker.

After the meeting ended, all were invited to come to JB's on the southwest corner of Northern Avenue and 35th Avenue food and fellowship.

SAC Meeting and Observing Sites

General Meetings

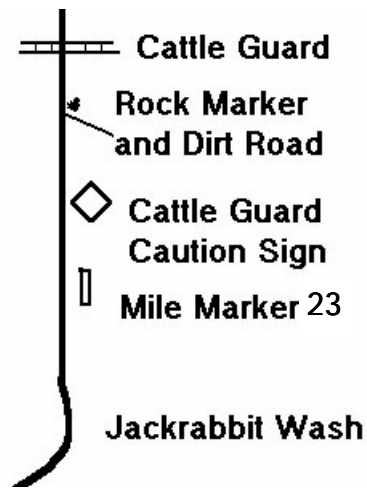
7:30 p.m. at Grand Canyon University, Fleming Building, Room 105: 1 mile west of I-17 on Camelback Rd., North on 33rd Ave., Second building on the right.



Such A Deal

For Sale: Orion 120mm EQ Refractor, 1000mm, f/8.3, red dot finder, and V-Block filter, telescope only, \$175.00 or choice of two mounts, Orion EQ-3 \$250.00 or Orion SkyView mount with dual axis motorized drive \$450.00 Call Damion at 602-240-5421 damionbow@aol.com

Flatiron Star Parties



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 2 miles to 355th Ave. Turn North (right). This will turn into Wickenburg Rd. Follow this road for about 12 miles. Just after mile marker 23 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).

Such A Deal

For Sale: 9.25 inch Celestron XLT Schmidt-Cassegrain Telescope Starbright XLT coatings; Televue 1.25 inch diagonal; 9X50 finder; Flexible dew shield; AS-GT Goto mount with latest firmware update Polar scope for alignment.

The only thing that I do not have is a tripod, I have never had one for this scope because I traded the tripod away when I realized it was going to be placed in my backyard observatory and never moved. So, if you would like a portable scope, you will need to provide a tripod.

This telescope provides excellent images and once I got trained the GOTO system works very well. I am considering a move to darker skies and am planning on putting my Nexstar 11 into a backyard observatory. If you would like to use the scope, it is in my backyard observatory at 7th Street and Thunderbird, you can see for yourself.



Brand new this scope is available for \$2300 (with a tripod), I will let this one go for \$1400 if I don't have to ship it.

Contact Steve Coe at stevecoe@ngcic.org for details.

SAC Membership Services

Membership– Memberships are for the calendar year and are pro-rated for new members as follows: Jan– Mar: 100%; Apr– Jun: 75%; Jul-Sep: 50%; Oct-Dec; 25%.

- \$28.00 Individual Membership
- \$42.00 Family Membership
- \$14.00 Newsletter Membership
- \$ 7.50 Nametag for members
(will be mailed to address below)

Magazine Subscription Services

The following magazines are available at a discount to club members. Check the magazines you wish to subscribe to or renew, and pay the club treasurer. Please allow 3-4 months for the order to be processed.

- Sky & Telescope \$33.00/yr
- Astronomy \$34.00/yr

Please Print

Make Check Payable to : SAC

Name: _____

Bring completed form to a meeting or
mail it with your remittance to:

Address: _____

**SAC Treasurer
c/o Paul Dickson
7714 N 36th Ave
Phoenix, AZ 85051-6401**

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Check here if this is an update of information
already on file.

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Mail: _____

SAC on the Internet

SAC has several E-mail mailing lists. To subscribe, send an email to the email address and put **Subscribe** in the subject box.

SAC-Announce@freelists.org: SAC-Announce is a mailing list for just club announcements, Typically 3-5 messages per month.

SAC-Forum@freelists.org: SAC-Forum is a general discussion mailing list. Topics should be related to Astronomy or SAC

SAC-Board@freelists.org: SAC-Board is a mailing list for discussions of club business. If you'd like to see how the club is run (or not run), or have a question about the club, this is the list to read. Typically month to month matters are discussed.

AZ-Observing@freelists.org: AZ-Observing while not a Sac list, is well attended by SAC members. This is the list to with observing places around Arizona. Find out where people are going and what they saw.

Printed Newsletter

Sac can save a lot of money if you download the PDF version of the newsletter. PDF files are readable by both PC's and Macs. When the newsletter is published, a message will be sent to the address indicated above with the URL of the newsletter. Check the box below if you don't have access to the internet or if your prefer a printed copy.

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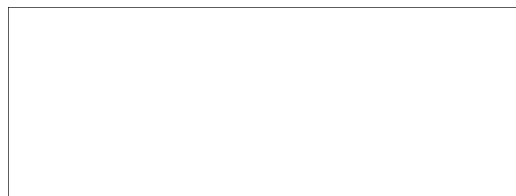
December 2005

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Email: newsletter@saguaroastro.org



Videmus Stellae



SAC Schedule of Events 2006

SAC Meetings

January 13th, 2006	July 14th, 2006
February 10th, 2006	August 11th, 2006
March 10th, 2006	September 8th, 2006
April 14th, 2006	October 6th, 2006
May 12th, 2006	November 10th, 2006
June 9th, 2006	December: TBA

ATM & Astro-Imaging Group Meetings

January 10th, 2006	July 11th, 2006
February 7th, 2006	August 8th, 2006
March 7th, 2006	September 5th, 2006
April 11th, 2006	October 3rd, 2006
May 9th, 2006	November 7th, 2006
June 6th, 2006	December 5th, 2006

SAC Star Parties

Date	Sunset	Astronomical Twilight Ends	Moonrise	Site
Jan 21st, 2006	1752	1919	0044	F
Feb 18th, 2006	1818	1942	2335	F
Mar 18th, 2006	1842	2005	2230	F
Apr 22nd, 2006	1908	2037	0347	F
May 20th, 2006	1928	2108	0157	C
Jun 17th, 2006	1943	2129	0029	C
Jul 22nd, 2006	1938	2117	0346	C
Aug 19th, 2006	1911	2042	0240	C
Sep 16th, 2006	1854	1958	0135	C
Oct 14th, 2006	1759	1921	0033	F
Nov 11th, 2006	1723	1850	2316	F
Dec 16th, 2006	1725	1854	0449	F

F = Flat Iron; C = Cherry Road