

The SPECTROGRAM

Newsletter for the Society of Telescopy, Astronomy, and Radio

December, 2002

December's Meeting

The next meeting of S*T*A*R will be Thursday, December 5th. The meeting will begin promptly at 8:00 PM at the King of Kings Lutheran Church, 250 Harmony Street, Middletown.

Our featured speaker will be Dr. Jerry Sellwood of Rutgers University, who will speak about "The Spiral Structure of Galaxies". You can learn more about Dr. Sellwood's research by visiting his website at <http://www.physics.rutgers.edu/~sellwood>.

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From the Editor

Thank you to this month's contributors. The Spectrogram is your newsletter and appreciates your support. Articles may be submitted to Greg Cantrell at monthly meetings or electronically at cantrell@optonline.net.

Calendar

September 5, 2002

Ernie Rossie
STAR Astronomy Club

October 3, 2002

David Segelstein & Gordon Waite
STAR Astronomy Club

November 7, 2002

Dr. Haimin Wang
NJIT

December 5, 2002

Dr. Jerry Sellwood
Rutgers University

January 2, 2003

Dr. Eddie Guerra
Rowan University

February 6, 2003

Bob Sal
ASTRA Astronomy Club

March 6, 2003

Dr. Dale Gary
NJIT

April 3, 2003

TBA

May 1, 2003

TBA

June 5, 2003

Annual Business Meeting

President's Corner

by Greg Cantrell

December's meeting features Dr. Jerry Sellwood, faculty member of Rutgers University's Department of Physics and Astronomy. He will talk with us about "The Spiral Structure of Galaxies", a topic that was featured in the September, 2002 edition of Sky and Telescope Magazine. Dr. Sellwood's website offers information about his research into spiral galaxies and the clues they offer for other fields of study, such as dark matter distribution.

The holiday season is upon us, along with the opportunity for some of us to acquire that first scope, or perhaps upgrade to a larger scope. There are several links on the S*T*A*R website offering advice for that all-important purchase. Find these at

<http://www.starastronomy.org/Links/index.html>.

Are you interested in bringing your scope for "Scope and Tell" at the December meeting? Or, perhaps, you have other ideas for a short presentation. If so, please contact me at cantrell@optonline.net, or give me a call at 732-308-3488 so that we can discuss your plans.

Hope to see everyone at the December meeting!

STAR Meeting Minutes

October 7, 2002

STAR held its third meeting of the 2002/2003 year at the King of Kings Lutheran Church. About 33 people attended the meeting.

Short announcements and discussions:

1. Greg Cantrell brought the meeting to order more-or-less promptly at 8:12 PM.
2. New people attending the meeting introduced themselves and were welcomed.
3. A Cub Scout pack meeting on astronomy was being held on Friday, November 15, at the Village School. Members interested in helping out were encouraged to check the web site for more details.
4. A newsletter discussing the history of astronomy in New Jersey is being prepared. People who are knowledgeable about

STAR's history who want to contribute should talk to Greg to get more details.

5. Andy Zangle is chairing a committee to look into getting an observatory. They are currently investigating several different options, including a mobile observatory, a portable planetarium, or acquiring equipment that can be borrowed by STAR members. He said that although their pace is slow, they are making progress. At some point in the near future, he will report on their deliberations further.
6. Mike Lindner brought the members attention to the fact that we have a club library, which has been languishing in various people's basements and garages over the years. He asked for volunteers to update the library and act as custodian for a while. Jay Respler rose to the bait, er, opportunity, and is now the club librarian.
7. Greg asked for volunteers to give presentations on their telescopes, for a segment of our meetings called "Scope and Tell", which will take place after our main speakers. Interested members should talk to Greg.
8. Club member Taffy Notarcola gave a beautiful description of seeing the northern lights in New Hampshire this summer. While observing, she saw three lights moving in formation against the sky, and wondered if anyone could explain what these were. Jay Respler, a long-time satellite observer, said that these were probably NOSS (Naval Ocean Surveillance System) satellites launched by the Navy, that travel in groups of three. The program is apparently classified.
9. Randy Walton offered to include purchases of astronomy calendars and handbooks with Astra's orders. These orders were going to be placed soon after the meeting (November 11th?), so it may be too late to place more. But, ask Randy.
10. Steve Fedor has come up with some welcome packets for introducing astronomy and our club to new members. Well done, Steve!

Main Program:

The main program of the evening was an extremely informative and understandable talk on forecasting space weather, by Dr. Haimin Wang, of the New Jersey Institute of Technology, and Associate Director of Big Bear Solar Observatory in Califor-

nia. Space weather forecasting, to the degree and accuracy that is being done now, was not possible 20 years ago. Especially today, with our reliance on space satellites and other systems susceptible to space weather, space weather forecasting is becoming increasingly important.

Space weather is basically what the sun throws off from time to time, from flares and coronal mass ejections (CMEs). They influence the space around the earth in two ways:

1. Changes in the magnetic field around the earth (a "magnetic storm"). This is caused by the charged particles and atoms ejected from the sun carrying a magnetic field with them, and influencing the interplanetary magnetic field. These take about 3-4 days to reach the earth from the sun.
2. Highly energetic charged particles. These are high-energy protons, mostly, and can ionize material in their path. They can reach the earth in about 1-2 days, or sooner.

Most of the effects on earth are due to the magnetic field changes. These changes can affect power grids (as in Quebec in the late 1980s), communication lines, radio communications, satellite transmissions and orbits, etc. Large magnetic storms are even taken into account for airline route selection, to avoid flights around the polar regions during magnetic storms.

Dr. Wang showed some movies of the H-alpha line of the sun (a specific wavelength of light coming from the sun), showing some magnetic field lines breaking about 2,000 km above the photosphere of the sun (what might be called the "surface" of the sun), in what's called the chromosphere of the sun. These lines were shown as filaments, dark lines against a lighter background. He then showed movies taken from the SOHO satellite, which showed the CME and other material sent forth from the sun, associated with these breaking magnetic flux lines. The images and correlation were astonishing, to see the large amounts of material given out in such a brief time.

Dr. Wang explained how their research is attempting to accurately forecast these space weather events.

Their research at Big Bear Solar Observatory is concentrated on the sun (of course). The observa-

tory is on the shore of Big Bear lake, which tends to minimize the temperature variations. NJIT purchased this observatory in 1997 from CalTech for about \$2K, although the CalTech people still have access to the site (still a nice deal). Some of their telescopes have a vacuum between the elements, to minimize distortions due to air currents caused by solar heating. In addition to these studies of solar weather, they also do helioseismology (studying sunquakes) and studies of earthshine (lunar observations of the dark side of the moon, indicating the amount of light reflecting off the earth).

In addition to serving as a source for the research Dr. Wang described, BBSO also puts out daily activity reports and warnings about the sun and its active regions.

Specifically for space weather, they do high resolution and low resolution imaging of the sun. To predict CME and flare events they measure the vector magnetic field every minute. They take four images: light intensity, a circular polarization, and two linear polarizations. Their goal is to correlate changes in the vector magnetic field to the eruption of flares and CMEs. Apparently, at this point in their research, they believe that filaments (dark areas) in the images they see in the sun of a certain size (large) and shape (s-shaped) are associated with CMEs. In order for a magnetic storm carried by a CME to disrupt the "weather" around the earth, the polarity of the magnetic field must be southward. If the field is northward, it just reinforces earth's magnetic field, and little disruption occurs.

At the BBSO, they want to be able to generate warnings of such events automatically, but they have not progressed to that stage yet. At this point, they try to predict the fields emitted from the sun, and verify their predictions with actual measurements made by satellites. Unfortunately, for the purpose of generating a warning, these satellites are fairly close to the earth, and can give only about an hours warning of a magnetic storm. Fortunately, for the purpose of being able to predict the fields, so far their predictions seem to be pretty accurate.

After his illuminating presentation, Dr. Wang graciously answered questions from the audience.

The meeting ended about 9:30 PM, or thereabouts.

Next STAR Meeting:

The next STAR meeting will be held on December 5th, at King of Kings Church.

Respectfully submitted,
Chris Olszewski

Mirror-Making, Part Two

by *Dave Nelson*

In the first installment, ending early September, I had received the 8" glass disk, ground the rough curve back to center and reduced the disk's thickness variation to 0.002". I was ready to move from #80 to #120 grit. The story continues...

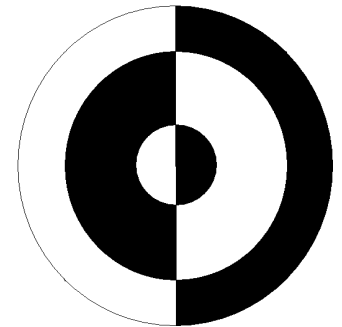
9 September I ground through #120 and #220, progressively smoothing the original rough curve. Using Michael Lindner's homemade "Sag Tester" we measured the depth of the mirror's curve (called the saggitta), plugged the value into Michael's formula and got a 56" focal length - right on track for my 8" f/7 telescope.

The following session saw #320 and #500. By now the once-obvious tool-grit-mirror grinding sounds had given way to a soft swish-swish sound. It was harder to determine when the grit was "worn out" and needed recharging. The mirror showed an obvious curve on a finely frosted glass surface. After four Monday night sessions I was about halfway through the grit series.

Next session I began the "micron grits", an hour with 25 micron then a second hour with 12 micron. In between was talking, eating and beer drinking. The sag test showed the mirror at f/6.5. However an optical test, using the mirror to focus the image of a floodlight, showed the mirror at f/5.8, a significant difference! Something was amiss. We spent the next 2 hours, until 11:30PM, trying alternate measuring techniques but the discrepancy remained. Michael and Gordon Waite suspected the mirror had zones. Instead of a uniform spherical surface the mirror probably contained steep and shallow areas. To be sure required a Foucault test on a fairly reflective mirror. Michael recommended

that next week I "flash polish" the mirror and do a Foucault test.

Through Gordon's Foucault tester the mirror looked like this (A spherical surface would have looked like a single, large, evenly illuminated circle). My mirror had a raised center, normal middle, and steep outer edge. Again Gordon and Mike were somewhat stumped- a central hill AND



a turned-up edge don't normally result from standard grinding. They concluded the original pregenerated curve was off, and I had spent the last two sessions smoothing out a bad curve. The fix- back five grits to #220!

I spent two full sessions, about 3 hours grinding time, on #220 with another perplexing problem. No matter how long worked, I could not "flatten" the mirror's surface to my f/7 target curve. The mirror refused to budge from f/6. More thoughts from Mike, Gordon, and Steve Walters. Mike was having similar problems with one of his lens surfaces, but why was a mystery. Finally midway through the third evening at #220, still at f/6 and feeling worn out, Gordon suddenly said "I can fix your mirror! F/7? I bet I can fix it in 20 minutes!" Mike and Steve were surprised- Gordon was proposing to remove 0.01" of glass, a serious feat.

Steve and Mike set their digital wristwatches, I stood by with grit & water, and Gordon went at it. He used an interesting chordal stroke; it looked as if he was using the tool as a rasp against the mirror's outer area. Gordon worked feverishly, pushing down hard on the tool, working along the edge, walking around the stand. Mike and Steve counted down the minutes as Gordon became covered in sweat. Gordon raised his arms in triumph as Mike and Steve called time. A saggitta test showed 0.071" deep, Gordon had indeed ground away the pledged thickness and the mirror was f/7! All right!

But why couldn't a normal back and forth, center-over-center stroke flatten the mirror?

Gordon and Mike surmised the tool was at fault. It contained full 2" square tiles at it's center, and scattered tiles near the edges. Fitting large square tiles on a circular disk meant lots of un-tiled areas near the edge, and my tool had more bare areas than usual. So the effective grinding diameter of my 8" tool was more like 6". Grinding normal strokes with such a sub-diameter tool would never lengthen the mirror's focal length. Gordon and Mike advised me to use very long center-over-center strokes, and even a "V" stroke to ensure the mirror's edges stayed low. It worked. I went from 220 through 320 and 500 next session. To be continued.

What's Mike Been Up To?

By Michael Lindner

It's been a quiet month in Lake Wobegone. Not so for me. Unfortunately, that meant very little done in the way of ATM.

Halloween was a blast, followed by a rather disappointing observing session (the nadir of which consisted of me dropping a Nagler 31 onto gravel – fortunately without damage). However, the incident set the tone for November.

The rest of my grinding table components have arrived. They are sitting in the garage, mocking me every time I pass them. No progress there. In fact, perhaps some negative progress. A garage cleanup prompted me to put most of the tools that had migrated to the garage for the purpose of assembling the table back down in the basement. My spherometer remains unfixed. The ball bearings I was to use for the feet arrived, but believe it or not, I haven't been able to find the time to glue them to the spherometer!

Without a spherometer, I've had no way to measure the convex side of the lens I am grinding. I didn't let that stop me from grinding, however. I finished 320, 500, and 12 micron, and began polishing one side of the lens. Unless I've been very unlucky (and we know that I have) the radius should be unchanged (more on that later).

Unfortunately, my zeal for grinding caused me to overdo it this week, and I think it (along with vigorous mousing at work) helped aggravate an old RSI (repetitive stress injury) on my right forearm. I've been sitting with hot and cold packs for a few days, hitting the pain killers and

anti-inflammatories. In the meantime, I bought some padded gloves for future grinding, and some weights to lessen the amount of pressure I have to apply by hand.

I guess the best solution might be to grind only by machine. However, that means I have to wait until I finish the machine, then complete a couple of mirrors to make sure I have the bugs out before I take up this project again. I'd hate to work out the bugs in the machine by ruining a piece of glass that's already been hard to get and has had a lot of work put into it.

The worst of it is, as I mentioned before, I'm up to polishing. In the meantime, the Mid-Atlantic Mirror Grinding Seminar was announced. I'd like to go, and make a bigger primary for my Lurie Anastigmat while I'm there. However, I discovered some good but terrible news. With the bigger primary, the lens prescription can be optimized further. This leads to better performance of the scope, but also means I have to change the radius of the lens I've already been working on by 4 inches (well, I don't *have* to, but the temptation is there). Perhaps finishing that machine isn't such a bad idea....

So, why have I been so lazy as to not do any telescope making for a month? One word: "Relatives". My wife's aunt was visiting us for 3 weeks, and during that time she offered to help us with some projects. So, we took down wall-paper, painted, raked leaves, cleaned, reorganized things. These are all noble goals, but one mustn't lose sight of the important things (like making telescopes)!

In the middle of November, even more relatives arrived. My wife's family is spread all over the country (from Florida to Alaska). We like to get together once a year, and rather than have everybody travel on the highest traffic weekend of the year (Thanksgiving), we hold our own "Thanksgiving" a week or two before the national event.

So, in the middle of November, thousands of relative (at least it *seemed* like thousands) began arriving over the course of several days. Trips were made to airports, beds were set up in spare rooms, hotels were booked with our overflow, enormous quantities of food were purchased, cooked, eaten, (and eventually) flushed. Presents were exchanged with people who have birthday

close enough to the event so as not to be insulting to celebrate them then...in short, bedlam ensued.

Now things have quieted again, and in fact soccer season is over as well, so I'm looking forward to eating leftover turkey and getting more ATM stuff done – but WAIT! Christmas is coming!

A Taste, or Two, of the Tropics

by John Heidema

On two occasions this year, I have been fortunate enough to be armed with telescope and star map as my wife Karen and I visited locations just slightly south of the Tropic of Cancer. Although we had other tourist "responsibilities," both sites offered dark skies that I was able to take some advantage of. This is a brief report on those visits, mostly focused on the amateur astronomy opportunities.

The first location was the southwest slopes of Maui in Hawaii. The second was near to Cabo San Lucas at the south tip of the Baja Peninsula in Mexico. We visited Maui in late February (19-28) and south Baja in early November (6-13). I fought (with fair success) a waxing moon in Hawaii, but we arrived in Mexico at very near to the new moon. These were somewhat complementary times for viewing southern skies -- using the whole night at both times could give near to complete RA coverage. More later on the depth of declination available.

The scope I used on these trips is a traveler's compromise, an Orion ShortTube (RF) 90mm that came with an equatorial mount. Since the mount was a slightly bulky Hawaii travel problem, I resorted to a compact \$45 camera tripod as the mount for the Baja trip. Slightly disassembled, this \$250 tube assembly fit nicely in a carry-on duffle bag -- not a problem with airport security, even with the recently heightened concerns. However, the large steel counterweight of the EQ-2 mount in its box did cause minor confusion during the trip back from Hawaii, as they were X-ray scanning all checked baggage. This scope works best at low power (not more than 50x), and I used it mostly at 33x.

I also carried some inexpensive 10x50 binoculars on both trips, great for rapid scanning (and spotting perhaps half of the Messiers) -- and handy for daytime bird and whale watching as well.

Maui:

West and South Maui is a great place for astronomers, and then there is the 10,000 foot Haleakala right in the middle. And most all of it has very dark skies at only 20.7 degrees N latitude. Andy Z. and Stephen O'Meara have already told many of you about that part of the world; but with minimal duplication, I will try to add some individual details and ideas.

This nine day trip involved only my wife and me; and it involved only Maui, not a variety of other Hawaiian locations. We rented a mid-sized car for the duration. Karen watched the excursion itineraries by the nature groups, then searched the Web and called the Silver Cloud Ranch for our nine-day bed & breakfast reservations. It was an excellent choice, off the Kula Hwy, 5 miles N of Tedeschi Winery, 8 miles N of the desolate south shore highway, and 10 miles S of the access road to the Haleakala National Park and summit/observatories. Our B&B was at 3000 ft on the SW slope of the (dormant) volcano, in a rural area with good (> mag 6.0) dark skies. I noted one other interesting lodging site nearby, called Star Lookout.

We certainly sampled the variety of Maui tourist and nature options, helped greatly by the rental car (waterfalls, wine, food, whales, flora, birds and other fauna, lava desert, rainforests, etc.) but those are not the concern here. And while we spent considerable money for this trip, it was much less because we made our own reservations rather than buying a tour package.

Maui, like most of Hawaii, has good support for astro-tourists. At least two of the resort hotels have big telescopes and observing sessions, there are paid star parties (www.starparty.net) and paid individual guides (majmay@maui.net). But I avoided that. The open grass and broad N, S, & W vistas at the B&B were excellent at 3 AM. The shape of the big mountain removed the eastern and low southern visibility, so one clear morning I drove around to a deserted pull-off along the south-side highway. And then there

were those three early mornings at 10,000 ft atop Haleakala, about 55 minutes of mountain curves away. On the mountain, I preferred being very near the summit, in the lava gravel about 100 yards S of the observation hut. A ridge provided some wind shelter, and there was always my warm car in the big lot only 150 feet away. The flow of sunrise watchers was zero til near dawn, and only modest after that.

Maui weather in February was about 80F daytime, 50F at night; but sometimes down to freezing with occasional frost and flurries on the mountaintop at 5 AM. February can be rainy, but on the SW side we got good starry nights about 2/3 of the time. Sunrise on Haleakala can be nice -- I saw it three times, but it is overrated. (A pleasant addition is the binocular view of snowy Mauna Kea and its observatory domes.) With a waxing moon, my evening viewing was mostly soon after arrival or late at night, but AM viewing was fine.

What could I see? Lots of new stuff for a Michigan/NJ person. I had a Wil Tirion Star Atlas book, O'Meara's Messier book and a few magazine clip-out maps available, though I missed my computer support at home. The main southern evening star was Canopus. And the last star I was typically seeing in the morning twilight was our "near neighbor" alpha-Centauri. Cloud banks often removed visibility near the south horizon, but the big mountain added a few degrees; and at 10,000 feet one morning, I was able to starhop down SE of alpha-Centauri to slightly below 68 degrees south. Of course for us Northerners, all the southern constellations are about 20 degrees higher in Maui. This is a great help for spotting those southerly Messiers you aren't real familiar with yet, many of which can now be seen very clearly in binoculars (M80, M62, M6, M7, M8, M4, M20, etc.).

My logs list lots of southern Messiers and NGC objects seen, though the small scope made some targets impossible and others less satisfying. Omega-Centauri was nice, just another (bit fuzzy) star in an unfamiliar sky pattern visually, but a clear star cluster in binocs and a very impressive object at 33X in the small scope. The area south of CMa was full of objects not viewable further north, and there are lots of neat fuzzies in southern Scorpio (the NGC's 6242,

6231, 6268, 6281, and H12, etc.) Crux was a pretty, far south constellation at Maui, and it had double stars and several interesting deep sky objects nearby, like the Jewel Box (4755) and NGC 4349. Alpha-Centauri could be split (barely) with my ST90 at 33x; and I also found NGC 5617 just west of there. All the action in Sagittarius, very high here, became visible just before dawn. Crisp mornings on the mountain gave unusually clear skies, with many more stars in common constellations than one is accustomed to, so many that the familiar patterns were sometimes hard to recognize at first

A few southern favorites proving impossible at this latitude and time were: the LMC (too early in evening and too low, at 66-73 degrees S); the SMC and 47 Tucanae, both too far south (~72 degrees S) and setting before dark; eta-Carina, no view of 60 degrees S at the required 11 PM to 2 AM (i.e., bad planning).

Oh yes, and that sunset on Wednesday Feb 27th. We were looking southwest from the Silver Cloud veranda at 3000 feet, watching the Sun sink toward the ocean horizon between two islands to the west with a smattering of low clouds. Though there were partially obscuring clouds, we watched as the Sun became a half-dome as it dropped into the ocean. I began playing with my binocs to see it better, but avoiding harsh eye-damage. As it sunk even lower, I could view it comfortably at 10x. There was a green tint at the upper edges, yellow-orange below; then as it sunk even lower (perhaps 5% of the disk still visible), it became a wider yellow-orange horizontal band in contact with the ocean with a narrower green horizontal band above that. Then the orangish band disappeared leaving only the even narrower green band still visible -- and then even that disappeared. Very interesting; not sure it was the fabled "green flash"; not sure the binocs didn't contribute to the color effects. The others present weren't watching as intently and didn't note what I saw, but it "sure was a real pretty sunset." Yes, it was!

Baja:

I had family responsibilities and distractions in Mexico; however, the Baja desert below the Tropic of Cancer (about 22.9 degrees N latitude)

seemed like too promising skies not to take my portable scope along. But while the Web mentions many astronomy resources in Maui, it mentions none (except for the 1991 eclipse hotels) for the Baja California Sur (BCS) area.

The BCS cape (Cabo) area has considerable resort development, especially near the south tip; and the resort hotels and timeshare apartment buildings and the resort town of Cabo San Lucas (population ~40,000) also puts out some light. While the countryside scrub desert is desolate, with few people or roads or lights, I had minor security concerns (probably not justified) about rural areas in Baja, Mexico. So I located a bare upland rocky area about two blocks from our resort for most of my stargazing. In the resort on our 4th floor balcony, you could see stars down to about mag 4.5, but my rocky plateau (about 500 feet from the ocean and at 150 feet above it) was much better -- with clear Milky Way and stars below mag 6.0, although there was a small light dome from Cabo San Lucas 8 miles to the WSW. Perhaps 20 miles away on a dirt road into the low mountains, you could improve on these viewing conditions, but my very nearby site met most of my needs and meshed well with my family responsibilities -- and it also worked well for giving several interested family members brief guided tours of the local night stars.

The Cabo weather was pretty delightful near the ocean, with daytime highs near 80 F and nighttime lows of about 55F. And there were clear skies every single night! You just needed to take along a heavy shirt or a sweater, and a big soft beach towel as a pad for your rock/chair.

Cloud banks low along the horizon were typical minor complications in south Baja, much as in Hawaii, for nighttime viewing and at dawn. But sunrises and sunsets were really very nice at Cabo as well. I saw at least three sunrises, each a little different depending upon if and how many low clouds needed to be penetrated. And the early red glow was always preceded by the rising of the very bright crescent of Venus. We needed to be on a boat to get a clear view of sunset, and we did that once. A pod of Gray whales diving near the boat provided a nice prelude. And the sunset we saw was very pleasant, with few interfering clouds and a distorted teardrop of

orange Sun sinking below the ocean horizon -- with no observed greenish tints.

So what could I see at night at Cabo? Notable stars were Formalhaut high in the sky early, then Achernar and then Canopus lower and Sirius very high up. I could see 20 or more stars visible to the naked eye in CMi, and 9 or 10 separate stars naked eye (with effort) in the Pleades. Mere binoculars showed a striking amount of visible nebula in Orion's sword, and I thought I was seeing hints of M78 (a difficult Messier for me) above the belt. The ST90 at 33x confirmed M78, though it was not impressive with the small scope. Two inexperienced family members could spot M31 naked eye, and it was very nice in binocs.

My list of southerly objects spotted with just binoculars (about 12 total hours of poorly organized PM and AM viewing over the 7 days) includes: M78, M42, M43, M46, M47, M41, M93, N2477, N2451, N2546, N2516, N2423, N2547, N3372, I2391. All of these were also viewed in the scope at 33x, as were N2467 nebula and I2602 (64.2 deg S). Numerous more familiar northern objects were also viewed easily, and we did spend a little time with Jupiter and Saturn and some double and multiple stars. N3372 is the eta-Carina nebula area, which was only visible just before dawn. It showed a nice cluster of stars and some nebular fuzziness, but I would like to have seen it under darker conditions.

Nine days was not enough time in Maui; not for all the scenery or all the wildlife or all the stars. Maps and resources and currency and the language were all convenient. I would go back to Cabo as well. But its maps and astronomy (and other) resources and currency and language were all minor problems. Cabo costs were also like U.S. tourist areas, though all prices tended to be negotiable and "opportunists" were hard to avoid. Nevertheless, the south Baja landscape, the sea, the birds and flowers, and the dark southerly skies definitely make it worthwhile.

Messier Objects - November

by Greg Cantrell

This month's Messier list is shorter than most and could be easily accomplished, even with the cold December nights and the several competing demands placed on each of us during this holiday season.

M 36, 37, and 38 (NGC 1960, 2099, and 1912) – These wonderful open clusters, found in Auriga, are easily visible to the naked eye from a dark location. Binoculars reveal a line of fuzzy patches, while low power telescope views resolve rich open clusters.

M 41 (NGC 2287) – This 4.5 magnitude open cluster in Canis Major is visible as a hazy patch near the bright star Sirius. Best viewed through binoculars or telescopes under low powers.

M 42 and 43 (NGC 1976 and 1982) – Known as the great Orion Nebula, M42 is easily visible to the naked eye in the sword of Orion. M43 is a small area of nebulosity near M42 that requires telescopic views to resolve.

M 78 (NGC 2068) – A small emission nebula in Orion, this 8.0 magnitude object is a difficult binocular object, and is best view telescopically.

Upcoming Events

Star parties are an important part of the amateur astronomy experience. Listed below are several events offering dark skies and astronomical fellowship.

January 29 – February 2, 2003 The **Orange Blossom Special Star Party** will be hosted by the St. Petersburg Astronomy Club. Visit <http://home1.gte.net/hoffmanc/index.html>.

February 3 – 8, 2003 The **Winter Star Party** will be hosted by the Southern Cross Astronomical Society. For more information, visit <http://www.scas.org/wsp.html>.

February 23 – March 1, 2003 The **Cedar Key Star Party** will be hosted by the Cedar Key State Museum. For more information, visit

<http://members.aol.com/bemusabord/cedarkey.html>.

February 27 – March 2, 2003 The **Mid-Florida Stargaze** will be hosted by Astronomical Society of the Palm Beaches. For more information, visit <http://www.palmbeachastro.org>.

February 28 – March 2, 2003 The 3rd annual Mid-Atlantic Mirror Grinding Seminar hosted by the Delmarva Stargazers. For more information, visit <http://www.delmarvastargazers.org/>.

April 27 – May 4, 2003 The 25th annual **Texas Star Party** will be hosted by the Southwestern Region of the Astronomical League. Visit <http://www.texasstarparty.org/>.



Are You a S*T*A*R Member?

Memberships: () Individual...\$25
() Family...\$35 () Institutional \$25

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Make checks payable to: STAR Astronomy Society, Inc and send to P.O. Box 863, Red Bank, NJ 07701