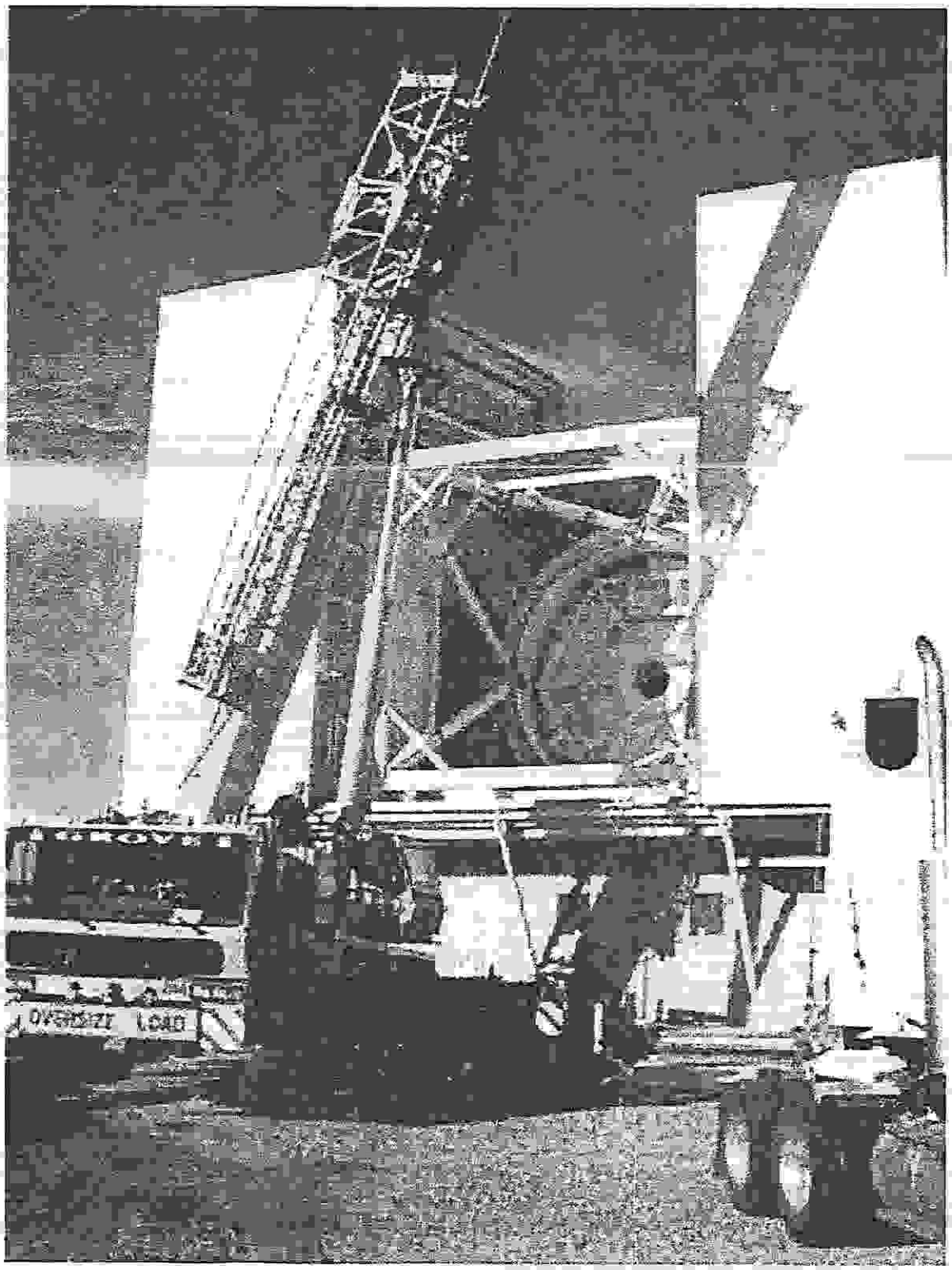
Desert Skies

Tucson Amateur Astronomy Association

Volume XLIV, Number 12 December, 1998



Calendar of Events

BEGINNERS LECTURE: Friday, December 4, 6:30 pm at the Steward Observatory Auditorium - Room N210. This month's topic is ***Telescope Arithmetic*** by Andrew Cooper.

GENERAL MEETING: Friday, December 4, 7:30 pm at the Steward Observatory Auditorium - Room N210. This month's topic is ***The Multiple Mirror Telescope Conversion*** by Craig B. Foltz, Ph.D.

BOARD OF DIRECTORS MEETING: Thursday, December 10, 7:00 pm at Steward Observatory Conference Room N305.

STAR PARTIES & EVENTS:
Dec. 5 - TAAA Holiday Party (Don't miss it)
Dec. 12 - TAAA Beginners Star Party at TIMPA (NEW Check it out)
Dec. 15 - Wilson K thru 8 School Star Party
Dec. 17 - Esperero Canyon Middle School Star Party
Dec. 19 - TAAA Star Party at Empire Ranch

Newsletter Schedule: Deadline for articles: Monday, Dec. 21. Printing: Monday, Dec. 28. Folding Party: Tuesday, Dec. 29. Mailing: Wednesday, Dec. 30. The newsletter is scheduled to be in the mail at least one week prior to the following month's General Meeting.

Cover: November 18, 1998 - The MMT Telescope pointed at the horizon in preparation for a "test fit" of the vacuum chamber to the top of the mirror cell. The dummy mirror is visible in the mirror cell. Photo from the MMT website linked from the University of Arizona's website www.as.arizona.edu.

TAAA Home Page: http://www.primenet.com/~lwilson/taaa/taaa.html

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President	John Kalas	620-6502	jckalas@aol.com
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Star Parties	Karen Allen	749-5744	tildenkall@aol.com

TAAA Mission Statement:
We are a resource for anyone interested in astronomy. It is our mission to nurture a person's natural curiosity about the night sky. By giving people a knowledge and understanding of astronomy, we enhance their enjoyment of the solar system and beyond. Through our public activities and school evening observing sessions, we bring astronomy to persons of all ages. Our regular meetings and observing sessions offer members a forum to meet others with similar interests and experiences and to learn from one another.

Membership in the TAAA:

Regular membership	$ 23
Senior (over 60) membership	$ 21
Add for Family membership	$ 5
Add for Astronomical League (optional)	$ 3
Add for contribution to Southern Arizona Section of I.D.A. (optional)	$ 3 (recommended minimum)
Add for Sky & Telescope	$ 27
Add for Astronomy Magazine	$ 29

Rates for membership are given above. Family Membership includes two adults plus minor children. Members may subscribe to Sky & Telescope or Astronomy magazine (or both) at the time of membership renewal, saving substantially over the regular subscription rates. To assure we understand what you are paying for, please identify which class of membership and what options you want. Send one check made payable to *TAAA* to cover membership dues, magazine subscription(s) and any contributions to:

Tucson Amateur Astronomy Association
P.O. BOX 41254
Tucson, AZ 85717

4 Easy Steps to Membership Renewal:
1. Pay your dues 2-3 months early. Your month of membership expiration is listed on your newsletter mailing label.
2. Find your membership class and its rate. Add the Family Membership rate to this, if applicable.
3. If you desire membership in the Astronomical League or magazine subscription(s) or wish to make a donation, add the appropriate amounts to your membership rate. If a magazine subscription renewal is desired, include the magazine renewal notice, if possible. Be sure to identify which options you are paying for.
4. Write one check, payable to *TAAA*, and send it to the address given above.

Call the Treasurer if you have any problems.

Send address changes to the above address.

Desert Skies Publishing Guidelines
All articles, announcements, news, etc. must be submitted by the newsletter deadline noted above. Materials received after that date will appear in the next issue. All submissions are retained by the editor unless prior arrangements are made. Partial page article submissions should be submitted in Word compatible files via e-mail or on a floppy disk. Full page articles, artwork, and photos should be camera ready. We will not publish slanderous or libelous material! Send articles, announcements, etc. to:

TAAA - Desert Skies
c/o John Kalas
3470 W. Red Bird Court
Tucson, AZ 85745

or e-mail: jckalas@aol.com

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President's Message

Chalk up another great month! Lots of activities and good progress. The Whipple Observatory star party on 11/14 was the busiest I've seen. There were many telescopes set up and lines at each one. It was a fantastic event. And then there was the Leonid Meteor Shower. Incredible!!! I hope everyone had a chance to experience this astounding display. There are several reports later in this newsletter.

There were several important decisions made at the 11/12 Board of Directors meeting that are worthy of special comment. A reduced-rate student level membership was adopted. Details of this membership are included later in this newsletter in the **Club News** section. The TAAA is very close to establishing a permanent club phone number that will have informational messages as well as capacity for people to leave messages. Currently, Dean and Vicki Ketelsen generously offer their home phone and answering machine as the official TAAA phone number. As you can imagine, the inconvenience to Dean and Vicki at times can be significant. We appreciate their sacrifice and will rectify the situation very soon. Details will be included in next month's newsletter. The last decision involves establishing a periodic star party dedicated to supporting the new members in the club who are beginners to amateur astronomy. I think the TAAA does an outstanding job in nurturing novice members through the Beginners Lectures offered at each monthly meeting. But there have been no specific regular events scheduled to assist beginners with observing questions or telescope equipment problems. Recently, I noticed in their newsletter that the Saguaro Astronomy Club of Phoenix, AZ held a Novice Star Party for their beginner members back in October. From an e-mail message I received after the activity, it appeared that the event was a great success. Therefore, I proposed that the TAAA do something similar. On Saturday, 12/12, there will be a Beginners Star Party at the TIMPA site. See the notice later in this newsletter under **Star Parties and Events.** We will try this activity out and see if there is an interest. Hopefully, it will be well attended and will become a regular event.

John Kalas

Meeting Information

Beginners Lecture
Telescope Arithmetic
By Andrew Cooper

Telescope Arithmetic: Focal length, focal ratio, magnification, exit pupil, and other telescope basics, and what they mean to your observing.

Main Lecture
The Multiple Mirror Telescope Conversion
Craig B. Foltz, Ph.D.

The conversion of the Multiple Mirror Telescope from a 6-primary mirror, 4.5 meter effective aperture telescope to a 6.5 meter, single primary is a $20M project funded by the Smithsonian Institution and the University of Arizona. Nine months have passed since the 4.5 meter telescope was decommissioned and dismantled. The installation and check-out of the new telescope continues at a fast pace. Details of the new telescope and the project's schedule and progress will be discussed.

Dr. Foltz is currently the Director of the Multiple Mirror Telescope Observatory on Mount Hopkins in Amado, south of Green Valley. His professional activities include studies of quasi-stellar objects and the intergalactic medium, astronomical instrumentation, degenerate stars and X-ray binary systems. He received an A.B. Physics degree in 1974 from Dartmouth College and a Ph.D. in Astronomy in 1979 from Ohio State University.

Club News

1999 Calendars Available

Get your calendars now! The 1999 Exploring the Universe calendars, produced by the publishers of Astronomy magazine, are available for purchase at the December and January TAAA meetings. They sell for $10 each ($9 each if you purchase more than one). This wall calendar has a different astronomical image for each month. There's plenty of room for noting family events, and there are notes about what's going on in the night sky.

Member News

We welcome the most recent members who have joined the TAAA: Maureen Babcock, Bill and Lorraine Boyko, Patricia Canterbury, Gary Cargill, Jay and Laura Cody, Paul Kintner III, Charles and Helen Longshore, Gary Steffens, Margaret and James Tuttle. Let's introduce ourselves and get to know each other.

New Student Membership

At the November 12th Board of Directors meeting, a motion was proposed and passed creating a new level of membership within the TAAA. The new membership is for full-time students from grade school through college. At the college level, it requires a minimum of 15 credit hours per semester and will require proof of enrollment, i.e. student I.D card or semester bill. The student membership retains all privileges of a regular membership and will cost $15. per year. The only concern that was raised was the club's liability regarding minors at club functions and whether parental consent is required. Terri Lappin will investigate this issue.

Help Wanted

Mark and Susan Chambers have been coordinating the refreshments for our monthly meetings and have been doing an outstanding job. Susan has requested that we find

Club News (cont.)

Help Wanted (cont.)

a person to backup the responsibility for the rare times when the Chambers may be unable to attend a meeting. If anyone would like to volunteer as a backup refreshment person, please call John Kalas at 620-6502.

Reminder about Construction on Campus

The intersection at Cherry Avenue and University Blvd is closed and will remain so for quite some time as a new underground building is under construction. Access to the Visitor's Center parking lot is now from 6th Ave, north on Warren, which winds around to Cherry and eventually the entrance to the lot.

30-inch Mirror Project Report

by Gary Rosenbaum

The 30" telescope mirror cell was discussed at a recent meeting. Those in attendance were Gary Rosenbaum, Dean Ketelsen, Bob Goff and Roger Tanner. The backside of the mirror has an open honeycomb structure (no backplate). The six support points for the mirror cell will be the rib junctures between complete hexagonal cells. We discussed mounting the mirror with RTV. Roger will calculate the compression and stresses of the RTV under the weight of the mirror. We will provide passive cooling inside each of the honeycomb cells so the entire mirror can cool to ambient temperature. Dean has located a Steward Mirror Lab drawing of the mirror blank so accurate dimensions of the substrate are now available.

Tucson Astronomical League Vote

Within the Tucson Amateur Astronomy Association there is a group of individuals who have chosen to belong to the newly formed Tucson Astronomical League (TAL).

This group is the official Tucson society of the nationally recognized Astronomical League. Membership in this organization affords individuals a wealth of benefits including, full voting privileges, 10% discount on nearly all Astronomy books currently in print, Observing awards to work toward, promoting observing and the study of the sky, subscription to the Reflector published quarterly by the Astronomical League, where member societies may submit articles for National publication. Suffice it to say, the membership benefits are many, at this bargain rate.

For TAAA members who have paid their $3 additional dues to the TAL, we will be having a vote on some upcoming changes to the Astronomical League's Bylaws, at the December meeting. Three amendments are being considered for changes.

The first deals with adding a few duties to the Vice-president of the League regarding several of the new awards programs. (Some of you may recall that this position is held by our own Bob Gent. He was elected to a 2 yr. term of office at the AL Convention this past July.)

The second item deals with changing the numeric notation of Article VII to accurately reflect changes that were voted on in the past.

The third item repeals section 5, under Article VII ACTIVITIES AND SERVICE SECTIONS. Essentially, this repeals the Consumer Affairs/Testing Committee, since it has been inactive for some time. Active service committees are currently included as Standing Resolutions, which are easier to change, as growth and need arises, than bylaws.

For those Tucson Astronomical League members who wish to review the Astronomical League Bylaws, and these changes, I will have them available at the December meeting. A complete rendering of the Bylaws can be viewed at the following website:
http://astroleague.org/al/bylaws/bylawsrs.html The TAL will vote, by a showing of hands, during the second half of the Dec. meeting. For those TAL members who know that they will not be able to attend the meeting, and wish their vote to be known, you may contact me by phone 520-544-7780, or via e-mail to laurus@earthlink.net

Respectfully submitted,
Laurel Dunlap
ALCorrespondent for the Tucson Astronomical League/TAAA

Call for Photos for TAAA Website

If show-biz is in your blood and you decide to burn some of your 15 minutes of fame, send your masterpiece(s) to lwilson@primenet.com as an attached file or give a disk to one of the folks-in-charge at the next meeting. Try to keep your files as small as possible. If you have ever had to wait for a 700k file to download through a 28.8k phone connection, you know that not many people will wait to look at your picture no matter how good it is. If you can format your image as a .gif or .jpg file under 75k in size, that would be great. If you only have regular prints or slides, let me or someone on the board know and we can get them scanned for you. Don't forget to include a caption telling us what we are looking at and how you took it. If you want, include a short bio of yourself as well.

Larry Wilson
TAAA Webmaster

TAAA-Forum E-Mail Listserver

On another subject, there has been 1(!) message sent through the TAAA-Forum e-mail listserver since it was started in April, and that was by someone that wasn't even a member. There are about 30 people subscribed, so best we can figure is that everyone has forgotten about it. If you don't know what I'm talking about, check the TAAA webpage for the full explanation and instructions. It's just another one of those little conveniences that seemed like a good idea once. Might as well use it.

Larry Wilson

Lost & Found

Several items were left at the September 19th joint TIMPA and TAAA barbecue and star party. They include: an old, wooden handled barbecue fork, an aluminum Marie

Club News (cont.)

Lost & Found (cont.)

Calendars pie plate, two wicker paper plate holders and a green plastic insulated Coca-Cola drinking mug with lid. If any of these items sound familiar to you, please call John Kalas at 620-6502 to claim them.

Steward Observatory Public Evening Lectures

Steward Observatory has been hosting public evening lectures in astronomy for 70 years. The last lecture for the Fall 98 semester will be held on Monday, Dec 7th at 7:30pm in room N210 of Steward Observatory. Following the talk, the 21-inch telescope will be available for viewing the night sky (weather permitting). This lecture and the use of the telescope are free of charge and open to the public. The December 7th lecture, titled "The Solar-Stellar Connection", will be given by Dr. Mark Giampapa of Steward Observatory.

Star Parties & Events

TAAA Holiday Party
December 5 (Saturday)

The club will hold its holiday party at the China Rose Restaurant starting at 7:00 pm. Dress will be casual. The menu will include fried chicken and vegetarian plates along with outstanding Chinese cuisine. Cost per person is $12.00 that includes all food and non-alcoholic beverages and gratuity. There will be several brief presentations at the dinner. Deadline for reservations is Wednesday, 12/2. Call event chairperson, John Polacheck, at 743-1362. The China Rose Restaurant is located at 5101 East Speedway Blvd. on the northeast corner of Speedway and Rosemont Ave.

TAAA Beginners Star Party at TIMPA
December 12 (Saturday)

This is a new, additional activity designed for all TAAA members but especially for those who are new to the hobby or would like to learn more about observing. The event will concentrate on helping anyone who has questions about amateur astronomy or who have problems using their telescope equipment. At this star party, John Kalas and Andrew Cooper will discuss the designs and advantages/disadvantages of various types of telescopes. With the holiday season fast approaching, some people may be considering a telescope as a gift. If you are not sure about the type of telescope you want or need, this event may help you to make a more informed decision. Be sure to dress warmly. Try to arrive before dark around 5:00 pm. All TAAA members, novice and experienced, are welcome. See the directions to the TIMPA site on the outside flap of this newsletter.

Wilson K-8 School
December 15 (Tuesday)

Setup time is 5:30 pm; observing starts at 6:00 pm. The eighth graders at this school are getting a several month exposure to astronomy, including independent lunar observing assignments and several star parties. Over 60 students are expected and will bring family members. At least 5 telescopes are needed. Laurel Dunlap is the Star Party Leader for this event (home phone 544-7780). Her son is a student at Wilson and will operate a telescope for the event, providing a good peer model of beginning amateur astronomy for these students. The school is located at 2330 W. Glover Rd. Go north on La Cholla Blvd. to Glover Rd. (1 block south of Tangerine). West on Glover. The school is on north side of Glover.

Esperero Canyon Middle School
December 17 (Thursday)

The 6th grade science classes of this school are studying astronomy, but the star party is open to the entire school, so the attendance could be over 200, including parents and siblings. At least seven telescopes will be needed. Setup time is 5:30 pm; observing starts at 6:00 pm. The school is located at 5801 N. Sabino Canyon Rd. (across from Sabino Canyon Recreation Area). From Tanque Verde Rd., take Sabino Canyon Rd. north, past the entrance for Sabino Canyon National Recreation Area. Esperero Canyon Middle School is the second school on west side of the road (the first school is Canyon View Elementary). Enter the parking lot. Gate to the softball field is just north of the building. Nick Applegate is the Star Party Leader for this event (home phone 886-1801).

TAAA Empire Ranch Star Party
December 19 (Saturday)

The Empire Ranch has been our normal observing site for quite a number of years. Empire Ranch is about 4000 feet in elevation, so be prepared for cold temperatures and arrive soon after sunset. Temperatures at this time of the year may get to freezing! Stay as long as you like, but let everyone know when you are ready to leave. Someone may be taking astrophotos. Bring a telescope if you have one, but you don't need one to attend. Any member would be glad to let you look through their telescope. There are no restroom facilities at the site, so be prepared. One nice advantage of belonging to the TAAA is the opportunity to observe among friends. Help in finding an object or the sharing of equipment always goes on at our star parties. If you haven't attended a star party yet, you're missing the best part of belonging to the TAAA. See the directions to Empire Ranch on the outside flap of this newsletter.

Don't Forget the TAAA Holiday Party

Saturday, December 5th

Deadline for Reservations is Wednesday, Dec. 2

Dark Skies for December 1998

DARK SKIES (no twilight, no moonlight) for Tucson in 24-hour MST: 18=6pm, 20=8pm, 22=10pm, 0=12am
RISE, SET, VISIBILITY for sun and bright planets: rise for morning object, set for evening object

Mo/Tu	30/ 1	4:39 - 5:40
Tu/We	1/ 2	- - -
We/Th	2/ 3	Full Moon
Th/Fr	3/ 4	- - -
Fr/Sa	4/ 5	18:46 - 18:50
Sa/Su	5/ 6	18:46 - 19:50
Su/Mo	6/ 7	18:46 - 20:51
Mo/Tu	7/ 8	18:46 - 21:52
Tu/We	8/ 9	18:46 - 22:51
We/Th	9/10	18:47 - 23:47
Th/Fr	10/11	18:47 - 0:42
Fr/Sa	11/12	18:47 - 1:35
Sa/Su	12/13	18:47 - 2:28
Su/Mo	13/14	18:48 - 3:21
Mo/Tu	14/15	18:48 - 4:13
Tu/We	15/16	18:48 - 5:07
We/Th	16/17	18:49 - 5:51
Th/Fr	17/18	18:49 - 5:52
Fr/Sa	18/19	18:50 - 5:52
Sa/Su	19/20	18:50 - 5:53
Su/Mo	20/21	19:16 - 5:53
Mo/Tu	21/22	20:12 - 5:54
Tu/We	22/23	21:11 - 5:54
We/Th	23/24	22:11 - 5:55
Th/Fr	24/25	23:12 - 5:55
Fr/Sa	25/26	0:14 - 5:56
Sa/Su	26/27	1:17 - 5:56
Su/Mo	27/28	2:22 - 5:56
Mo/Tu	28/29	3:28 - 5:57
Tu/We	29/30	4:35 - 5:57
We/Th	30/31	5:42 - 5:57
Th/Fr	31/ 1	- - -

Weekend Sa/Su	Sun Set	Sun Rise	Mercury Rise	Vi	Venus Set	Vi	Mars Rise	Vi	Jupiter Set	Vi	Saturn Set	Vi
5/ 6	17:17	7:09	6:15	9	17:51	6	1:42	1	0:33	-2	3:30	0
12/13	17:18	7:14	5:39	3	18:00	5	1:32	1	0:08	-2	3:01	0
19/20	17:20	7:19	5:36	3	18:12	4	1:21	1	23:44	-2	2:33	0
26/27	17:24	7:22	5:50	3	18:25	2	1:10	1	23:21	-2	2:05	0
2/ 3	17:29	7:24	6:08	4	18:39	1	0:59	1	22:58	-2	1:38	0

Vi=Visibility
-3 brilliant
0 conspicuous
3 moderate
6 naked eye limit
9 binoculars limit

By Erich Karkoschka

Observing Reports

Marana Middle School Star Party Report (Oct. 23)
by Terri Lappin

The skies were threatening all day long, and it didn't look very promising. It would be understandable if those on the sign-up sheet didn't show up. Fifteen Marana Middle School science students had been looking forward to the sleep-over at the school, so they weren't going to let a few clouds spoil their evening...they would be there anyway! Alfredo Garcia, who was in the middle of moving, said he needed a break from the work and was prepared to give his presentation. As I pulled up to the school, telescope in tow (just in case), I saw Jim O'Connor in the parking lot. He decided to come out, despite the clouds, to give an unscheduled talk to the kids. He gave a super presentation about general astronomy, including some history about the invention of the telescope. Alfredo gave an excellent talk about deep sky objects, showing them many objects we had hoped to show the kids with our telescopes. Ivy Sweeney, the teacher-in-charge, had asked Flandrau Science Center to bring their portable planetarium to the school for a star show. It was fun crawling into the blow up planetarium and seeing the stars against a beautifully black sky...very surprising since the gymnasium was so brightly lit! I also spent a few minutes making a comet for the kids...one of the best I've ever made. It was now close to 10pm. Lo and behold, the sky was clearing! Quickly, our telescopes, which were in the gymnasium for Jim's talk, were moved outside. We spent about 2 hours observing with the very enthusiastic kids. Leaving the school after midnight, I thought about how much fun I had and how much each of us had put into making the evening great for the kids. And, yes, as I left the school at that late hour the kids still had as much energy as they had when I arrived hours earlier! Thanks to Jim O'Connor and Alfredo Garcia for helping out with this event! Hope you had as much fun as I did.

Leonid Observations 1998
By Laurel Dunlap

My observations took place during the predawn hours of 5:00-6:30am on 11/17/98, at my home in Oro Valley. I had decided to forego the 3-4am time frame because I had a 9am final exam to take later that morning.

The number of meteors visible during the early morning was impressive. They were of varying numbers, and sizes. During one of my many trips outside, I counted 15 meteors in ~2 minutes, without even trying. Some left vapor trails that lasted several seconds. One trail was visible to the Northeast for a full 7 minutes! It hung in the sky like a wisp of smoke, and changed shape slowly as it began to fade.

Meteors could be seen as low as 20° above the horizon to the South. These appeared to be smaller, and moved more quickly through the sky. Several fireballs were seen even as the Sun began washing out some of the stars to the East. I retreated inside my house a few times, to review some notes for my final. While sitting at my table reading, I saw one very bright fireball through the window. It had come from the Southeast and appeared to be moving toward the Northwest. In the glow of the predawn sky, this one was easily brighter than Jupiter, and blazed through the sky in my window field of view, for a full 5 seconds; long enough to change my focus from turning pages, to gazing out my window. That was it for me, back outside I went.

Observing Reports (cont.)

Leonid Observations 1998 (cont.)

Considering the fact that I put essentially no effort into observing, the show was spectacular. I had expected less, because I knew that I would not be viewing until after the expected peak. The Leonid Meteor shower of 1998, was not a disappointment! Incidentally, I passed the exam with a fairly high score. I only wonder what it might have been, had I truly studied.

The Leonids Roared
by Steve Alden

Wow....what a shower. First off, I am just your average backyard observer and not a hard core data taker. So with pure enjoyment of the night sky in mind, I got up at one in the morning, bundled up, dragged a sleeping bag into the backyard, made a cup of coffee and settled in for the night. I didn't expect much from the Leonids. They had never been much of a shower in the past, and despite all the hype I just hoped for a few good meteors. Not so this night. The shower was superb. Starting at 0130 MST, I began to count in one hour blocks. My backyard is on the far eastside of Tucson, with a nice unobstructed look at the sky from the east to the northwest. I choose to confine my observations to the northeast; my darkest bit of sky. Light pollution from Tucson wipes out everything to the west of me. Limiting magnitude last night was about 4.5, perhaps a tad bit better. I quit right on the dot at 05:30 giving me four one hour observing blocks. My cat PC was my observing partner, not much for counting but good for warmth as she snuggled into the sleeping bag and went to sleep.

0130-0230: 43 Leonids plus 3 background
0230-0330: 48 Leonids plus 4 background
0330-0430: 53 Leonids plus 5 background
0430-0530: 86 Leonids plus 5 background

The counts were certainly higher than I expected from past experience, but the best part was the unusually high number of really bright meteors. It seemed that at least half of these were magnitude 1 or better. Most left a persistent trail following their passage. I had about a dozen that were brighter than mag -3. And a pair, side by side, in the sky at 0550 (not included in the counts) that were simply dazzling. The bright one in the pair was easily -8 and vivid green; the companion meteor was probably about -3. They lit up the entire sky and woke my next door neighbor. He came outside and asked what had just blown up, as the flare lit up the inside of his bedroom. Five minutes after this fireball, the trail was still visible to the naked eye. As the sky lightened into dawn, bright meteor were still falling at better than one a minute. Makes you really wish you could teleport yourself three thousand miles to the west to keep watching the shower. I just hope our observing brethren in Asia get the big storm that is being predicted. The other impression on this shower was how clumped the meteors seemed to be. They came in bunches of three to five within less than a minute followed by several minutes of nothing. I don't know if this was actual or observer artifact. My trend toward greater numbers of meteors as the night wore on is probably due to the radiant rising higher in the sky. All in all, it made for a hell of show.

The Leonids at TIMPA
by John Kalas

Only nine people showed up at TIMPA on Monday evening, 11/16, and two of them left early due to the cold. It was unfortunate for the light turnout because the show was fantastic. Although we had no official count recording, there were times on Tuesday morning that we saw 200 to 300 meteors per hour, maybe more. Absolutely incredible! Many of the meteors seemed to come in "clumps". Early on Monday evening (10:00 - 11:00 pm) there were bright, long trailing meteors, many low to the north, travelling horizontal. One meteor traversed approximately 60 degrees of the sky before extinguishing. As the constellation Leo rose in the northeast Tuesday morning, the angle of the meteors inclined accordingly and the counts increased. Just before daybreak, with Leo almost overhead, the shower was everywhere. At that point, most of the meteors were bright but short, falling straight down like "fire-rain". Many were bright enough to illuminate the nighttime like flashbulbs. As the sky brightened on Tuesday morning, a beautiful thin crescent Moon rose over the Tucson Mountains, just one day short of new moon. I tried to take photos. We'll see if any come out. On the way home, just before sunrise, a meteor came straight down in front of us and "puffed" a vertical smoke trail just above the mountains. What a night! I can't wait til next year.

TAAA Board of Directors Meeting - November 12, 1998

Location: Steward Observatory Conference Room N305, University of Arizona Call to Order: 7:05 pm
Board Members Present: John Kalas, Andrew Cooper, Ingrid Saber, Terri Lappin, Bill Lofquist, John Polacheck and Dave Reynolds.
Board Members Absent: None Members Present: Elizabeth Kalas, Gary Rosenbaum and Larry Wilson

1. Events
   - Dec. 4 - TAAA Monthly Meeting
     Beginners Lecture: Andrew Cooper
     Main Lecture: Craig Foltz, MMT Conversion
   - Dec. 5 - TAAA Holiday Party
   - Dec. 10 - Board of Directors Meeting
   - Dec. 12 - Beginners Star Party at TIMPA
   - Dec. 15 - Wilson Elem. School Star Party
   - Dec. 17 - Esperero Canyon Middle School Star Party
   - Dec. 19 - TAAA Star Party at Empire Ranch
2. TIMPA Site Committee - John Polacheck expressed his appreciation for the support provided by Gary Rosenbaum and Terri Lappin.
3. Treasurer's Report - Terri Lappin distributed the October 1998 financial statements. They are available for review at the monthly meeting.
4. Student Level Membership - John Kalas reported that interest in a reduced level of membership for the TAAA had been expressed to him on several occasions. The suggestion was made that a $15 per year student membership level be established. Discussion followed regarding age and benefits limitations. A motion was made by John Polacheck and seconded by Bill Lofquist that any full-time student shall receive full benefits for an annual fee of $15. The motion passed with Bill Lofquist, John Polacheck, Dave Reynolds and Ingrid Saber voting for the

TAAA Board of Directors Meeting – November 12, 1998 (cont.)

motion and John Kalas, Terri Lappin and Andrew Cooper voting against the motion. Most of the opposition was based on there being no restriction due to age. Ingrid Saber raised concern over the legal ramifications of admitting minors who had not obtained parental consent. Terri Lappin will review this issue with a lawyer. Proof of full-time student status will be required for this membership.

5. TAAA Holiday Party – It was suggested that a calling campaign be initiated to contact all TAAA members to promote attendance to the party. Volunteering to assist him were Ingrid Saber and John & Liz Kalas. John Polacheck is pursuing speakers for the event.
6. TAAA Permanent Telephone Number – Andrew Cooper concluded from his research that small, independent companies offer the best mix of price and services. For about $15 per month, basic services would be available supplying ample announcement message capacity and call-in message storage and include a white pages listing. A club member would be responsible to monitor the service regularly. Andrew was authorized to make his final selection of a company for Board approval at the December meeting.
7. Freebie Newsletter Listing Review – Terri Lappin distributed a current list of all non-members and organizations receiving the TAAA newsletter. Sixty "freebie" newsletters are mailed out each month. The Board discussed the benefits of the free newsletters. It was recommended that newsletters be sent to amateur astronomy organizations only if they reciprocate. A decision was made to send out postcards to the organizations receiving free newsletters to determine the value of the newsletter to the organizations. Terri Lappin will perform the survey.
8. Door Prizes to Non-Members – John Kalas advised that dissatisfaction was expressed to him regarding the ability of non-members to participate in the door prize raffles held at many monthly meetings. John Polacheck and Ingrid Saber pointed out that the TAAA Mission Statement indicates that education of the public is one of our goals. It was in that spirit, and with the intention of increasing membership, that John Polacheck made a motion that was seconded by Andrew Cooper to have the club continue its policy of including the non-members present at the monthly meetings in the raffles. The motion passed six to one. John Kalas was the only dissenting vote.
9. Beginners Star Parties – Inspired by the example of the Saguaro Astronomy Club of Phoenix, John Kalas suggested that the TAAA hold special star parties for novices to help them with basic observational issues, i.e. telescope equipment, finding your way around the night sky, astrophotography, etc. John Polacheck recommended using the TIMPA site for such an event. The date of Saturday, 12/12, was selected with a starting time of 5:00 pm. John Kalas and Andrew Cooper offered to give a talk on selecting a telescope. John Polacheck would check with the TIMPA organization for permission to use the site.
10. Website Concerns – John Kalas explained that concern has been voiced about web page links. Terri Lappin recommended additional educational links be added to the page. Discussion took place about the difficulty of monitoring all of the links, particularly member webpage links. John Kalas recommended that a disclaimer be added to the area of the webpage where the links are located and this was accepted. Larry Wilson will investigate the possibility of the TAAA obtaining its own domain name, i.e. "TAAA.com".
11. Youth Programs – Bill Lofquist presented board members with copies of a survey questionnaire that he designed as a follow-up for a proposal to document TAAA club and member's activities relating to astronomy education for young people. Bill requested feedback on the survey form from the board members. When complete, Bill would like to survey the entire TAAA membership. Ultimately the data would be used to develop effective youth astronomy education activities and could also be used to support grant acquisitions.

Meeting Adjourned: 10:15 pm

Respectfully submitted, Ingrid Saber, TAAA Secretary

Desert Skies Classified

FOR SALE: Low profile piggyback camera mount for an 8" Schmidt-Cassegrain type telescope, $20. Molded rubber dew shield for a Celestron C-90 telescope, $20. Call Ray Wallace at 294-1197. (3/99)

FOR SALE: Celestron First Scope 70mm refractor telescope, 900mm FL, alt./az. mount with slow motion controls, wooden tripod with accessory tray, 5x24 finderscope, 1.25" focusser, 1.25" diagonal, three 1.25" eyeprieces (25mm, 12.5mm & 10mm), storage box & manual, $300. Call Jeff Brydges at 888-0591. (3/99)

FOR SALE: Celestron CG-11 telescope, Losmandy mount, Digital Setting Circles, Polar Alignment Scope, 2" Diagonal, f6.3 Reducer, extra counterweight, sure sharp focus, scope cover and dew shield and two eye pieces - $3,500. 2" Rear Cell UHC filter by Lumicon fits all SCT. See the whole loop of Veil Nebula, $199 new, yours for $125. Tuthill 80mm Ultimate Finder $395 new, brand new in box, exact image as Uranometria with erect image diagonal and lens - $295. 9x63 Celestron PRO Binoculars $95. Call Jody Humber in Phoenix at 602-412-2329 or e-mail at jjhumber@juno.com (3/99)

FOR SALE: Swift Audubon Mark II 8.5x44 wide field binoculars with carrying case, like new, $175. Brandon 48mm 2" dia. eyepiece, $150. University Optics Binocular Eyepiece Holder with removable 2X barlow lens, $200. 2" dia. Light Pollution Rejection No. 5 filter, $60. Call Duane Neihaus at 529-7767. (3/99)

WANTED: Sturdy, equatorial mounting suitable for a 5" refractor, i.e. old Cave or Edmund Scientific mount. Call Max Bray in Phoenix at (602) 943-0360. For questions call Dean Ketelsen at 293-2855.

FOR SALE: Besseler Dichroic Enlarger with Gray Lab timer and power supply. Includes two lenses and 35mm slide holder. All for $300. Also other darkroom items. Call Duane Neihaus at 529-7767 for details. (12/98)

FOR SALE: C5+, tripod, acc'y tray, Telrad, Dec motor, hand controller, JMI Moto-Focus, Celestron Advanced AstroMaster computer, 26 mm Plossl. Like new, used twice. $1600. On display at Starizona - 5201 N. Oracle Rd 292-5010 or call Dave Reynolds 579-2231 evenings. (11/98)

FOR SALE: 6" f/8 Newtonian reflector tube assembly with finder, $250. WWII vintage Elbow telescope (M75C) with crosshair reticle and dial-in filters (neutral, red and amber). Easily adapted to a camera tripod. Excellent condition, $100. Call Duane Niehaus at 529-7767. (12/98)

WILL TRADE: A complete 10" F5.9 Newtonian mounted on an 4" pipe part mount (equatorial), 3" eyepiece mount, HD fiberglass tube, comes apart in three sections, with the top one spinable, Novak curved vane spider. Real beefy telescope, will deliver anywhere in the Tucson area. Trade for a good 16, 17 or 18 inch mirror or complete DOB. Call James Miller (520) 751-4961 (1/99)

FOR SALE: 6" Celestron Star Hopper dobsonian telescope, new condition, includes 3 eyepieces (7.5mm, 12mm & 22mm), 2X barlow, all for $350.00. Call Eric Schilling at 323-8435 (H). (2/99)

FOR SALE: 5", f/4 rich field Newtonian reflector with very solid and vibration free fork mounting and tripod. Byers worm gear drive on polar axis, tangent arm slow motion on dec. axis. Superb diffraction limited optics. Scope won merit award at Riverside and award for optical quality and mechanical excellence at Stellafane. Asking $1200, but will consider all reasonable offers. For private demonstration or for more info call Duane Niehaus at (520) 529-7767. (2/99)

FOR SALE: 11x80 Swift Observer Binoculars, Model No. 845, field of view: 236 ft. at 1000 yds., new, complete with tripod. Price negotiable. Call Ann Hilemn at 577-9125 (H) or e-mail at: ahilemn@azstarnet.com (2/99)

Observing Article

THE OWL CLUSTER

As December starts we see high overhead the constellation of Cassiopeia the Ethiopian queen, shaped like an 'M', and terminated at the east end by the glorious "Double Cluster". This is a fine time of the year to turn your telescope and casually scan the cluster rich Cassiopeiaen starfields of our Galaxy. This region marks out one of the major spiral arms of our Galaxy. This is the 'Perseus Arm'. Galactic star clusters along this arm are very distant, spread out some 6,000 to 10,000 light years away. Astronomers during the mid 20th century discovered that OB associations of young, hot massive stars were strung out like pearls on a strand along this arm of the Galaxy. Associated with these OB regions are young star clusters made up mostly of giant and supergiant stars.

One such association is Cassiopeia OB8, which is centered from our line of sight around Delta (δ) Cassiopeiae. Delta Cassiopeiae is only 90 light years from us, whereas the Cassiopeia OB8 association is 100 times more remote. Cassiopeia OB8 contains two fine galactic star clusters for small telescope observers. One is M103 and the other is NGC457. NGC457 is visible to the unaided eye, glowing as a dim 6th magnitude nebulous patch of light. It is located 2° southwest of δ Cassiopeiae. NGC457 contains some very luminous supergiant stars.

The most luminous one is Phi (φ) Cassiopeiae, located at the southeastern edge of the cluster. Phi Cassiopeiae can be seen shining as a 5th magnitude star without telescopic aid. It is exceedingly luminous, glowing with the light of over 200,000 suns, or four times more luminous than Rigel in Orion. This star is a yellow supergiant with a spectrum of F0Ia, and it is very massive and hundreds of times larger than our Sun in diameter. You might envision this star as a lighthouse beacon shining through the murky fog of the numerous Milky Way stars of the Perseus Arm. Some day in the future it will become the brightest star in the Galaxy when it detonates as a supernova. What a sight that will be for future generations!

Another supergiant cluster member is HD7902, a 7th magnitude blue supergiant with a spectrum of B6Ib. It has a luminosity of about 40,000 suns. This star is the 2nd brightest one in the telescopic field, and can it be seen 6' southwest of φ Cassiopeiae. Lying near the center of the cluster, and visible as a 8½ magnitude ruddy colored star in large reflectors is the red supergiant HD236697. This star is comparable in size and luminosity to Betelgeuse in Orion. It has a spectrum of M2Iab, and it has a luminosity of 10,000 suns.

NGC457 itself contains about 100 or so stars ranging in magnitude from 8 to 13, that are visible in amateur telescopes. All these are giant stars. There probably are thousands of solar-type dwarf stars, that remain invisible to amateur instruments, making the cluster quite populous over all. This star cluster is fairly young with an estimated age of about 25 million years. As far as it's diameter goes, it is average sized. The ¼° apparent diameter coresponds to over 30 light years.

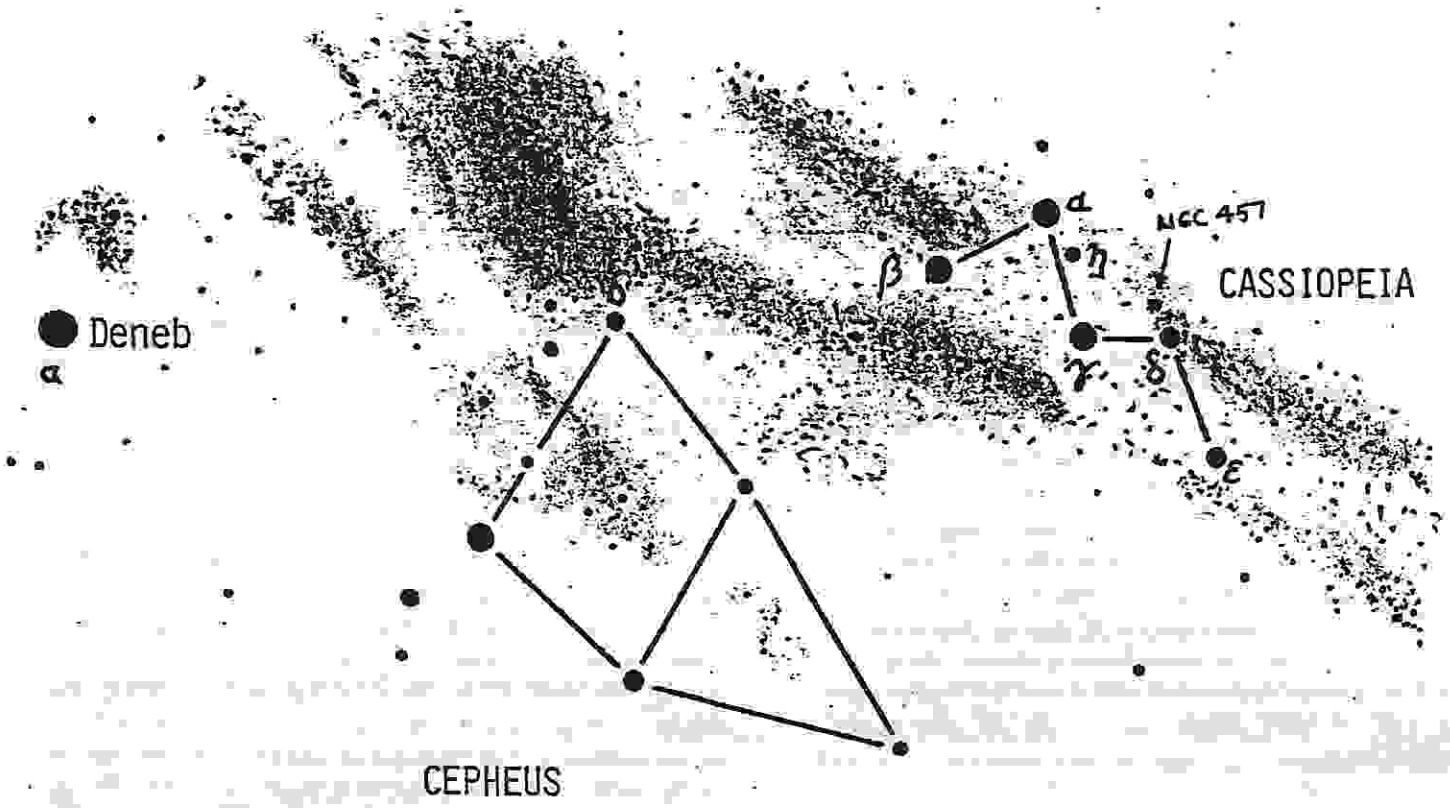
NGC457 has been awarded some interesting names over the years. Most amateur observers know it as the "Owl" cluster, because both φ Cassiopeiae and HD7902 represent the raptor's eyes. Alan Mac Robert sees it as a resemblance to the cinema alien E.T. I see the cluster as a miniture representation of the constellation Gemini. Where yellowish φ Cassiopeiae replaces Pollux, and bluewhite HD7902 would be Castor, with a row of stars forming the arms running midway through the cluster, plus a couple of stars marking the twins feet. Who knows maybe your imagination will see some other configuration.

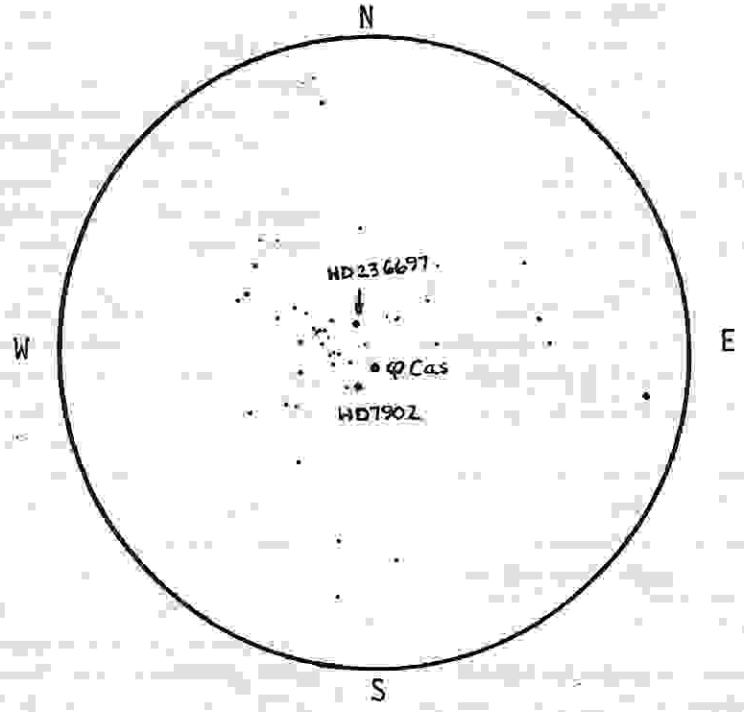
In my 2.4" refractor I count about 35 stars being visible. I like to use medium magnifications (50x-100x), because the cluster is quite compact. The higher power also darkens the sky background allowing the fainter cluster members to be seen. If you use a large reflector see if you can detect the yellowish hue of φ Cassiopeiae, and the orange-red color of HD236697 amongest the other white cluster members.

So set up your telescope some cold wintery, moonless night and enjoy this beautiful cluster of distant suns glittering like diamond dust against the inky blackness of deep space.

by Jeff Brydges

Observing Article (cont.)





NGC457 in a 2.4" telescope
at 75x.

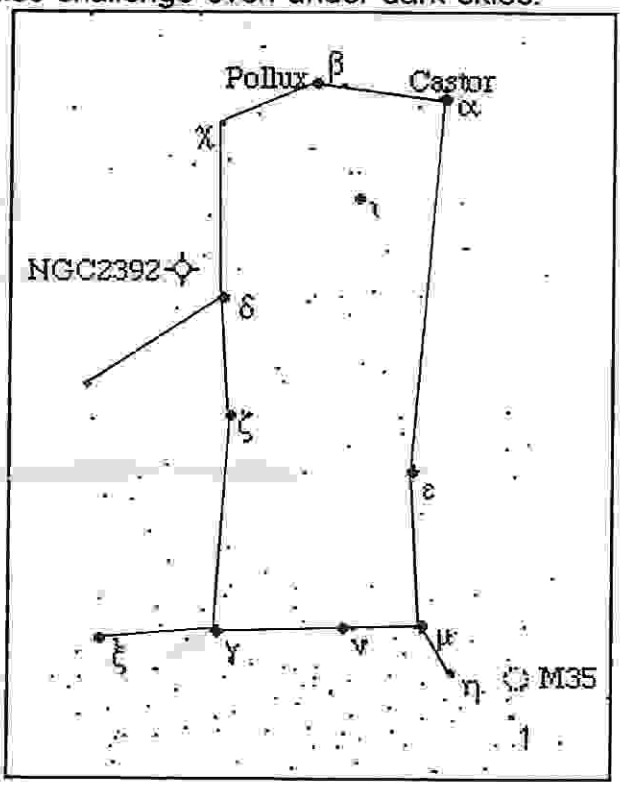
Constellation Report

Gemini

To the Chinese, they were yin and yang, the dual forces of nature. In ancient Rome, the pair was sometimes seen as Romulus and Remus, the founders of that city. Classical mythology gives us the traditional names of the two bright stars that represent the twins Castor and Pollux, who were hatched from an egg created by the seduction of Leda by Zeus while he was in the form of a swan. After Castor and Pollux were raised by Chiron, a centaur, they joined Jason and the crew of the *Argo* on his journey to find the Golden Fleece. The twins helped to calm a terrible storm that they encountered while at sea, and, as a result, became known as protectors of sailing vessels.

Gemini stands above Orion's left shoulder with the twin's feet within the winter Milky Way. If you ever confuse the two stars of Castor and Pollux [Alpha (α) and Beta (β) Geminorum, respectively], just remember that Castor is nearer to Capella (in Auriga), and Pollux is nearer to Procyon (in Canis Minor), or that Pollux has a Pinkish tint since it is a K type star while Castor is of a bluish white type A. At first glance, Castor may appear as a single star, but it is actually a system of six stars, divided into three pairs which can be split with just about any telescope. The closest pair are 2" apart, and so require magnification of perhaps 180X or more, and appear like two brilliantly white beacons of magnitudes 2 and 3. The third pair appears as a 9th magnitude star 73" from the main quartet. None of these can be resolved individually.

Due to Gemini's proximity to the Milky Way, the constellation is rich in star clusters and nebulae but lacks any significant galaxies. The most impressive star cluster is the 5th magnitude open cluster M35. Located at RA 6h 08.8' Dec +24° 20', or approximately 2.5° to the northwest of Eta (η) Geminorum, this cluster, about 2,800 light years distant, contains about 120 stars in an area spanning half of a degree. Just on the edge of M35 is a small open cluster, NGC2158, that is easy to overlook if you become lost in the splendor of M35, but you will see a separate fuzzy patch of less than 10' in size that just overlaps M35 on its southwestern limb. Two other similarly sized open clusters are nearby. IC2157 is about 2' west of NGC2158, and NGC2129 is about 3' west of 1 Geminorum. These small clusters are a nice challenge even under dark skies.



An interesting planetary nebula resides in Gemini one degree south and 9' east of Delta (δ) Geminorum. Designated NGC2392, the popular name of this object is the Eskimo Nebula because of the way it resembles a face wrapped in a fur lined hood in photographs. Through a telescope, however, don't expect to see much more than a faint 8th magnitude fuzziness about 45" wide at RA 7h 29.2' Dec +20° 55'.

If you find yourself observing Gemini this month, remember that the Geminid meteor shower peaks on the 13th, with the radiant very near Castor. These 22 mile-per-second meteors may produce 15-20 bright meteors and up to 40 additional fainter ones per hour.

by Chris Lancaster