Desert Skies

Tucson Amateur Astronomy Association

Volume XLVII, Number 4 April, 2001

BEFORE...

...AFTER!!!

Calendar of Events

BEGINNERS LECTURE: April 6, 6:30 pm at the Steward Observatory Auditorium - Room N210. This month's topic is *More on Fermilab* by Terry Gilmartin.

GENERAL MEETING: April 6, 7:30 pm at the Steward Observatory Auditorium - Room N210. Topic is *Near Earth Resources* by John S. Lewis.

BOARD OF DIRECTORS MEETING: Monday, April 9, 7:00 pm at Steward Observatory Conference room N305.

STAR PARTIES AND EVENTS:

- Apr. 3 - TIMPA Site Prep Sub-committee Mtg.
- Apr. 11 – TIMPA L. R. Planning Sub-committee Mtg.
- Apr. 14 – TAAA Star-b-cue at Kitt Peak
- Apr. 14 – TAAA TIMPA Star Party
- Apr. 18 – Vision Charter High School Star Party
- Apr. 19 – Amphi Middle School Star Party
- Apr. 21 – TAAA Annual Picnic at Vega-Bray Observ.
- Apr. 21 - TAAA Empire Ranch Star Party
- Apr. 24 – Trail Dust Jeep Tours Star Party (Paid)
- Apr. 26 – Agua Caliente E.S. Star Party
- Apr. 27 – Tanque Verde E.S. Star Party
- Apr. 28 - Arivaca Library Public Star Party
- Apr. 30 – Sunrise Drive E.S. Star Party

Newsletter Schedule: Deadline for articles: Monday, April 16. Printing: Monday, April 23. Folding Party: Tuesday, April 24. Mailing: Wednesday, April 25. The newsletter is scheduled to be in the mail at least one week prior to the following month's General Meeting.

Cover: What a great improvement!! Real flush toilets at the TIMPA Site!

TAAA Web Page: http://www.tucsonastronomy.org **TAAA Phone Number: (520) 882-1950**

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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.

Annual Membership in the TAAA:

Regular membership	$ 23
Senior membership (over 60)	$ 21
Student membership	$ 15
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 Magazine Subscription	$ 29.95
Add for Astronomy Magazine Subscription	$ 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

Four 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 George Barber
15940 W. Ridgemoor Ave
Tucson, AZ 85736

or e-mail: barbergj@flash.net

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President's Message

April will be a fun month for the TAAA. There are lots of options for club star parties. On Saturday, 4/14, a group of 60 members and families will have the opportunity to enjoy a Star-b-cue at Kitt Peak or, for those who do not go to Kitt Peak, the TIMPA Site will be open for use. For Saturday, 4/21, the TAAA will hold its Annual Picnic at the Vega-Bray Observatory in Benson. Those members who do not attend the picnic are welcome to use the Empire Ranch. See the announcements for these events in the ***Club News*** and the ***Star Parties & Events*** sections.

The TIMPA Project is going great guns! As you have already seen on the front cover of this newsletter, the long-awaited bathrooms are fully operational. Thanks to a fantastic construction job by the TIMPA Organization and a lot of sweat by a group of cement block hauling TAAA Members, both groups will benefit from this terrific facility. Also, TAAA Member, John Polacheck, is forging ahead with plans to install a nifty, new telescope in the recently donated Home Dome observatory. For the third straight month, the Kitt Peak work party planned for Saturday, 3/10, had to be canceled due to hazardous road conditions up on Kitt Peak. But unlike the previous two months, the volunteers were redirected to the TIMPA Site to dig the footer trench for the big observatory. Within two hours, eight intrepid members carved the prettiest two-foot wide by two-foot deep circular trench in the county. This effort saved the club between $300 - $500. Again in March, both TIMPA Site sub-committees made good progress toward planning for the installation of the main observatory and planning for future development at the site. See the photos and articles in the ***TIMPA Site News*** section.

Although some of the details are still being worked out, we have had some luck in finding members to volunteer to help out with the tasks that were publicized in the last two newsletters. We are working with members for the following responsibilities, Publicity Chairperson, Webmaster, Club Apparel Coordinator, TIMPA Site Prep and Long Range Planning Sub-committee Coordinators, Insurance Researcher, Lecture Hall Prep Assistant and Club Sales Coordinator. There are still three very important tasks needing volunteers. Please consider helping the club. It is important to fill these three remaining positions before the elections in May, so we may have reasonable workloads for our new officers. See the article in the ***Club News*** section.

We are extremely pleased to have TAAA Member Alfredo Garcia, Jr. contribute the ***Object of the Month*** article in our monthly newsletter. His new article will compliment very nicely the ***Constellation Report*** contributed monthly by TAAA Member, Chris Lancaster. The club greatly appreciates these excellent columns as they enhance our newsletter and help to make it one of the finest amateur astronomy publications in the country.

John Kalas

Meeting Information

Beginners Lecture

Title: More on Fermilab
Speaker: Terry Gilmartin

A couple of months ago Terry Gilmartin showed a video about Fermi National Accelerator Laboratory (Fermilab) and there were a lot of unanswered questions. So this is your chance to get more information. Terry will not be getting into the particle physics as much as why we should continue to spend the money on such a laboratory. Is there more than one ring or accelerator? How is a mine in Minnesota involved? Are the Buffalo on the property like canaries in the mines? There will be a slide show and a chance to answer any questions you may have.

Main Lecture

Title: Near Earth Resources
Speaker: John S Lewis

Future large-scale activities in space become vastly more affordable if the native material and energy resources of nearby space are used to minimize reliance on supplies from Earth. John S Lewis of the UA Lunar and Planetary Lab will describe several examples, including manufacture of rocket propellants on the Moon and Mars, life-support materials such as air and water on Mars, and metals and propellants on near-Earth asteroids. For logistical reasons, the preferred source of materials for Solar Power Satellites is asteroids, not Earth or the Moon. The talk will conclude with some remarks on space-based sources of energy for the next century of power consumption on Earth.

Professor John S Lewis has been at the UA Lunar and Planetary Lab since 1981. His research interests include space development and the characterization and economic development of the material and energy resources of near-Earth space. He has written three popular science books (*"Rain of Iron and Ice"*, *"Mining the Sky"*, and *"Worlds Without End"*). His work includes modeling the chemical processes in the early Solar System, and the chemical evolution of planetary atmospheres and surfaces.

Club News

Member News

We welcome the most recent members who have joined the TAAA: William B Ignatoff, MD, and Brad and Arlene TePaske. Glad to have you join! If you haven't already, be sure to pick up a new members pack at a meeting. Hope you'll make it to our star parties or meetings so we can all get to know you.

Upcoming Elections

By Sheila Conrad

It's almost election time. As required by the club's constitution, a nominating committee, consisting of Steve Peterson, Mike Turner, and Sheila Conrad, was elected by a unanimous show of hands at the February meeting. The goal is to present a slate of candidates to the TAAA membership at the April general meeting in preparation for the officer elections at the May general meeting.

John Kalas, TAAA's current president, will not be running for re-election. Andrew Cooper has consented to run for president. We are lacking a candidate for vice-president. Also, note that the offices of member-at-large will comprise three elected persons.

As of this writing, the slate of candidates is as follows:

President	Andrew Cooper
Vice president	open
Secretary	Jane Tonegate
Treasurer	Terri Lappin
Member-at-large	Robert Callanan
	Steve Peterson
	Bill Lofquist
	John Sosville

If you are interested in running for ANY of the TAAA board of directors offices, please contact any of the nominating committee members: Sheila Conrad, 529-1750; Steve Peterson, 326-5303; or Mike Turner, 743-3437. We encourage your involvement. This is your chance to have your voice heard, and to become an active leader in TAAA's forward direction

Steward Observatory Lecture Hall

Steward Observatory and UA Room Scheduling have been very kind in allowing us to use their facility for our monthly meetings. We've become spoiled by the high-tech equipment and have surely taken full advantage of it. During the last week of May the equipment will be upgraded. This will hopefully be an improvement as the equipment has become less reliable. As a result of this upgrade, we've been asked to relocate our June 1st meeting as there is a chance that the upgrade will not be finished in time (and we really don't want to be the guinea pigs with the new equipment). We are making arrangements to use the Lunar and Planetary Lab lecture hall. (There is also a chance that the May meeting will also have to be moved because the lecture hall is slated for finals that night.) Please watch the newsletters for future announcements.

We would also like to remind members of the rules regarding food and drink in the lecture hall – none is permitted. If you insist on bringing a drink into the lecture hall, please make it only water. We do not want to lose our privileges.

Support Your Club

The following responsibilities are still in need of volunteers. Please consider helping the club out by offering to support the tasks. Descriptions of the tasks are as follows:

1. Holiday Party Coordinator – The responsibilities are as follows: locate restaurant for party which includes checking out new facilities in person, act as contact person between restaurant and TAAA, choose menu/decorations/etc, set ticket price (with board approval), print tickets, sell tickets, arrange for door prizes, coordinate the evening presentations, arrange for AV equipment, make name tags for attendees, give final count to restaurant. Many of these jobs are usually delegated to others.
2. Beginners Lecture Coordinator - Solicit presentations of basic astronomy topics from members or outside resources, schedule presentations, ensure that presenters submit titles and brief explanation of the talk to newsletter editor.
3. Newsletter Folding/Mailing Coordinator - Secure newsletter copy from the editor, paste up the copy, deliver copy to copy person, schedule folding parties, secure mailing labels from treasurer, attend folding parties, coordinate folding and labeling of newsletters, and take newsletters to post office.

Astrophoto SIG Dinner

5 April 2001
China Rose (Speedway/Rosemont) 7pm

Time again to talk astrophotography over Chinese food. Bring any photos you want to share, new or old, good or poor for others to "ooh" over or to learn from your mistakes. Prints always welcome, a slide projector is available, for electronic images, please bring your own laptop or other way to display them. Questions, contact Dean Ketelsen 293-2855.

TAAA Star-b-cue at Kitt Peak

The TAAA will again be permitted to hold a star party and barbecue at the picnic grounds up on Kitt Peak on Saturday, 4/14. For this event, Kitt Peak is allowing an increased maximum of 60 TAAA Members and families to participate. The ramada barbecue pit will be fired up

Club News (cont.)

starting at 4:00 pm and members are invited to cook their dinners between 4:30 and 6:30 pm. Bring a dish to share with other members. The charcoals will be extinguished at 6:30 pm. Telescope observing will commence after sundown and will be concluded by 11:00 pm. All members must be heading down the mountain by 11:30 pm. Be prepared for cold temperatures.

There will be a sign-up sheet at the April meeting. Because of the popularity of this event, attendance will be initially limited to TAAA Members and their immediate family members only. If, after all TAAA Members have had an opportunity to sign up, there are any openings or cancellations, the attendance of guests will be considered. If you are unable to attend the April meeting, phone and e-mail reservation requests will be taken on a first come, first serve basis after 9:00 am Saturday, 4/7. Contact John Kalas at 620-6502 or via e-mail at <jckalas@aol.com>.

It is very important for all attendees to abide by the rules established by Kitt Peak and respect the facility. Adherence to the rules will help to continue activities on Kitt Peak in the future. Another event in October is being proposed.

1. No vehicles are allowed above the picnic grounds after 4:00 pm.
2. Only the ramada barbecue pit is permitted for cooking food at the picnic grounds. No open fires or use of the small remote barbecue grills is permitted.
3. All trash must be placed in the garbage receptacles.
4. Use of cellular phones and radio walkie talkies is prohibited.
5. No alcoholic beverages are permitted.
6. When leaving the picnic grounds after dark, if possible, use your parking lights until you have reached the main road and are headed downhill after exiting the picnic area.

TAAA Annual Picnic

On Saturday, 4/21, the TAAA will hold its annual picnic at the Skywatcher's Inn and Vega-Bray Observatory in Benson, AZ. The club is very grateful to Ed and Pat Vega who so graciously open their beautiful facilities to the TAAA for the hosting of our annual family potluck picnic. Barbecue grills and soft drinks will be provided. Bring your own food, plates, utensils and a dish to share. A card table and chairs or a camping table could be handy. Just in case, bring some insect repellent.

Don't forget to bring your telescope! If you don't bring one, don't worry. There are many telescopes to look through at the observatory. Ed and Pat have turned the inn into a veritable museum of interesting scientific items. There are lots of things for the kids. If you have never visited Vega-Bray Observatory before, here's your chance. It's unbelievable!! Arrive as early as 4:00 pm and take advantage of the surroundings; a fish pond and hiking trails.

To get to the Vega-Bray Observatory, take Interstate 10 East from Tucson. Turn off at Exit 306 (Pomerene Rd.). Head east on the frontage road to Benson Airport Road. Turn right (south) on Benson Airport Road and go 1.9 miles to the Observatory and Inn entry gate. Follow the dirt drive to the base of the observatory/inn hill. Park your vehicle in the parking area at the base of the hill. If necessary, you may drive your car up the hill to unload telescope equipment or heavy coolers and then return to the parking area.

Grand Canyon Star Party

16-23 June

By now, most of those I know are coming have made plans. Rooms are likely getting in short supply and I've given away 18 camping spots (last year we got 16 and some are willing to share). John Dobson's people have confirmed he will be there for most of the event, he is leaving on the 22nd, missing the last 2 nights. He will be giving at least one twilight talk, so if you come for the first part of the star party you will likely catch him at his most entertaining. As I am fond of quoting him "In my good talks we don't have time to get to the slides!" For those of you who still need arm twisting, check out the TAAA website at tucsonastronomy.com, clicking on the Grand Canyon link and read the enclosed info or read reviews of past events. Hope to see you there!

Dean Ketelsen
293-2855

DONATIONS REQUESTED

By: John Polacheck

Plans are moving forward to purchase a new Celestron NexStar 11 GPS telescope to be placed in the small dome at TIMPA. This is a new generation of automated telescopes, which can locate its position and automatically polar align itself! It is very user friendly, easy to use, and fully computerized with over 40,000 objects in its database. It has "go-to" capabilities when it is mounted on a pier or on a tripod.

This telescope will be available to club members for visual viewing, and hopefully, in the near future, for astrophotography. Also, it will be a most welcome addition for the club's popular "beginners" star parties at TIMPA.

We expect that no TAAA funds will be used for the purchase of this truly modern telescope. It will be paid for entirely by private donations. Because we hope to be able to buy the very first NexStar 11 GPS telescope in Tucson, WE NEED PLEDGES OF DONATIONS AS SOON AS POSSIBLE!!!!! Note that no pledges will be collected until the dome and the pier are ready. To date, we already have pledges for between half and two-thirds of the cost of this wonderful telescope. Also, several club members have offered to help with the necessary site preparation for the

Club News (cont.)

dome and construction of the pier. PLEASE SUPPORT TAAA AT THE NEW TIMPA SITE WITH YOUR PLEDGE.

Telephone John Polacheck at 743-1362 (leave a message if he is not available) or send him an E-mail message at jpolacheck@attglobal.net

What a Donation!

by John Kalas

I announced at the March meeting that a woman by the name of Roberta Crawford contacted the TAAA and offered to donate astronomy equipment and books that belonged to her late husband, John W. Crawford. Mr. Crawford was a refractor enthusiast who made refractors by hand. Included in the donation are nearly 500 astronomy-related books and comprehensive collections of Astronomy and Sky & Telescope magazines. The telescope equipment and accessories have been taken by the club and inventoried by John Kalas. They will be stored in the TAAA storage cage in the TIMPA barn.

The club has a more immediate problem of where to store the extensive library. Mrs. Crawford has been understanding of the club's dilemma and has agreed to hold the books for a period of time until we can find a place to store them. If anyone has any dry storage capacity and would be willing to hold all or part of the library until permanent storage or disposition can be arranged, please call John Kalas at 620-6502.

An abbreviated listing of the telescope equipment follows:

1. Three Unitron refractor telescopes, all between 60mm and 63mm in aperature and ranging in focal length from 500mm to 900mm.
2. Two Unitron equatorial mounts and wooden tripods (one small and one huge).
3. Ten homemade refractor telescopes from 38mm to 100mm aperature with unknown focal lengths.
4. Three homemade finderscopes.
5. One pair of 7x50 binoculars.
6. Two 2" dia. eyepieces (one a Brandon 48mm).
7. Twenty-three 1.25" dia. eyepieces including a set of five Brandon eyepieces, one Clave and one Jaegers.
8. Several illuminated 1.25" dia. eyepieces.
9. One very interesting spectroscopic 1.25" dia. eyepiece.
10. Eleven .965" dia. eyepieces.
11. Four 1.25" dia. and one .965" dia. barlow lenses.
12. Lots of diagonals, filters and erecting prisms.
13. Lots of telescope parts and accessories.
14. One Geisler AccuTrak single axis drive corrector.

Items of Interest

Websites: Trips on the Internet Super-Skyway: Life on the Edge

By Rik Hill

Personally, I have never been an avid deep-sky observer. As a kid, in the early 1960s in suburban Detroit, Michigan, with my smaller telescopes, galaxies were particularly disappointing. But I still tried to find these faint smears. In my mind's eye I would see the indistinct blobs as swirling masses of gas, dust and stars, all as significant as the our own Sun just as they appeared in my books. This was and is undoubtedly experienced by many other amateur astronomers. However edge-on galaxies were somewhat more rewarding. At least these looked somewhat like the photographs. They had shape, form and were often bright enough to show up in the telescope through the light pollution.

Spring is a good time for these edge-on galaxies and a good place to plan your observing project is on the web starting with the website of Tom Polakis, of Tempe, AZ. He has constructed a spectacular web page entitled: EDGE-ON GALAXIES OF THE SPRING SKY at:

http://www.psiaz.com/polakis/edgeons/edgeon.html

Here he has a table of the best ones for amateur telescopes, images from the Palomar Observatory Sky Survey (POSS) and a list of his own excellent drawings of many of these done with his 13" telescope. These are far better than what I was able to eek out with a dew covered 6" f/8 (RV-6) reflector on the squishy, pungent front yard lawn in a Michigan spring!

Don't stop with this one web page though. Be sure while you are there to browse his whole, excellent website by starting at: <http://www.psiaz.com/polakis/>. It's sure to be inspirational.

If this piques your interest, then there are several other web trips you should take. There is a very interesting site that allows you to make observing list by type of object. Again it is an Arizona site at: <http://www.virtualcolony.com/sac/>. As the URL suggests it's put together by the Saguaro Astronomy Club (undoubtedly with a lot of Steve Coe's input). You go to the link for the objects you want where you will find a search engine. Enter some basic parameters about the objects you want to observe and it will then produce the list sorted by a number of different parameters of the object. You can take this list to the telescope to guide you through a night's observing.

Should you want more there are always the galaxies in the Virgo Cluster, and you can find a lot of information about them on the web. Students for the Exploration and development of Space have a very informative and comprehensive site at: <http://seds.org/messier/more/virgo.html>.

Armed with this you could spend a number of our warming nights prowling through the arms of Virgo. A number

Items of Interest (cont.)

have done so with cameras and their results are on the web too. One fine example is by Naoyuki Kurita in Japan. These pages are divided up by season as well as subject. It's a well done website at: <http://www.ne.jp/asahi/stellar/scenes/english/deepsky1.htm>. He has superb images of a large number of the galaxies of spring including many of the edge-ons.

So, as the Milky Way of winter disappears in the twilight, look out past our galaxy and enjoy the edge-ons!

As always, if you know of a particularly good website you would like mentioned here, drop me a line at <rhill@lpl.arizona.edu>, or visit my website at: <http://www.lpl.arizona.edu/~rhill> and email from there.

ALPO WEBSITE NEWS

By: Richard E. Hill

In an effort to bring more ready resources to the attention of amateur planetary astronomers we have added a new link to the main ALPO web page. This is the JPL Solar System Simulator. With this you can see any major body in the solar system as it looks at any time from any other major body! This should be especially helpful to those trying to understand what the various dark markings on Mars are at any given time.

But for the serious Mars observer there is an even better Mars image generator on the Mars page at:

http://www.lpl.arizona.edu/~rhill/alpo/mars.html

Under Mars Artificial Image Generator. This one will generate pretty good images for any date/time with or without an Areocentric coordinate grid. It is run off the Cornell website that provides the amateur community (and professional community for that matter) with Mars Watch.

The Mars Section has been very busy with publishing the Martian Chronicle which, unlike its namesake, is dedicated to serious articles on Mars' features and observable weather phenomena. You can see these free at:

http://www.lpl.arizona.edu/~rhill/alpo/marstuff/marschron.html

Numbers 13, 14 and 15 were all issued just this week.

The Solar Section has just posted some of the latest information on not only current activity on the Sun (which we do daily) but a recent submission by Patrick McIntosh of HelioSynoptics and McIntosh Squared Graphics, that summarizes the H-alpha activity for Carrington Rotation 1973 (2001-02-14 to 2001-03-13) and gives an analysis of coronal activity and changes in Solar cycle 23.

Both the Venus & Saturn Section pages have now been expanded with useful and informative links pages that will give the browser a pretty good education on the latest and historical activities in planetary science on those bodies.

We have weekly updates on meteor activity on the Meteor Section's - Meteor Activity Outlook at:

http://www.lpl.arizona.edu/~rhill/alpo/meteorstuff/outlook.html

The Computing Section is now providing ephemerides for the Sun, Moon, Mercury, Venus, Mars, and Jupiter & Saturn. This is in addition to ephemerides listed on many of those object's individual pages.

Please also notice our Youth Programs page. This Section serves to educate and inform younger amateur solar system astronomers so they may competent life-long observers and, hopefully, participating members in one or more of the programs offered by the A.L.P.O.

Project ASTRO Site Coordinator

By: Suzanne Jacoby

Please join me in welcoming Connie Walker as Site Coordinator for Project ASTRO-Tucson! As an astronomer at the University of Arizona, and a Project ASTRO astronomer partner since 1996, Connie has considerable experience in both astronomy education and research. I am thrilled she has joined our group, and am looking forward to having everyone meet her at the March 24 Follow-up Workshop.

Connie is splitting her time between NOAO and the UA for a few months, but is up to speed on her ASTRO duties and eager to hear from all of you. Please contact her with questions, concerns, and words of welcome!

Property For Sale

TAAA Member and former Project ASTRO Coordinator, Ginny Beal, has some property she would like to sell. Description as follows:

A super property for stargazing! 39.2 acre building site, ten miles east of Tubac, beneath Mt. Hopkins. Located in Tubac Foothills Ranch, property is fenced, has a well and utilities. $120,000. Call Ginny at 323-7591 in Tucson.

ASP Annual Meeting

"Universe 2001 Expo," a part of the 113th Annual Meeting of the Astronomical Society of the Pacific (ASP), takes place Saturday and Sunday, July 14-15, 9:00 a.m.-5:30 p.m., at the Radisson Riverfront Hotel, 11 E. Kellogg Blvd., St. Paul, MN 55101, 651-292-1900. Among activities already planned are a star party hosted by the Minnesota Astronomical Society on Friday, July 13, a weekend expo for the general public featuring talks by leading profes-

Items of Interest (cont.)

sional and amateur astronomers, and an exhibit hall filled with astronomy-related merchandise and displays. For complete details, including fees, visit our website regularly for updates.

http://www.aspsky.org/meetings.html.

Tucson Children's Museum Activity

The TAAA will be supporting the Tucson Children's Museum with a series of star parties this summer in support of their new Mars Quest exhibit. As part of the festivities the TCM is presenting a gala dinner event, Mars Under the Stars: a Celestial Celebration, at the University Park Marriot Hotel on Saturday evening, June 2nd. The dinner will have an astronomy theme and will include speakers; Peter Smith, Principal Investigator for the Mars Pathfinder IMP Camera Project, Dr. William Boynton, Principal Investigator of the Mars Odyssey GRS instrument, David Levy, co-discoverer of the Shoemaker-Levy 9 comet, and Dr. William Hartmann noted astronomer, author and painter. The event will be hosted by Tucson Mayor, Bob Walkup. There will be a silent auction hosted by Arizona Daily News Cartoonist, Dave Fitzsimmons. For more information and to make reservations call 792-9985 ext. 112.

Dark Skies for April 2001

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, s=et for evening object

Sa/Su	31/ 1	1:32 - 4:49	Tu/We	10/11	20:15 - 21:48	Sa/Su	21/22	20:25 - 4:20
			We/Th	11/12	20:16 - 22:48			
Su/Mo	1/ 2	2:29 - 4:48	Th/Fr	12/13	20:17 - 23:46	Su/Mo	22/23	20:26 - 4:18
Mo/Tu	2/ 3	3:21 - 4:46	Fr/Sa	13/14	20:18 - 0:39	Mo/Tu	23/24	20:27 - 4:17
Tu/We	3/ 4	4:08 - 4:45	Sa/Su	14/15	20:19 - 1:28	Tu/We	24/25	20:28 - 4:16
We/Th	4/ 5	- - -				We/Th	25/26	21:21 - 4:14
Th/Fr	5/ 6	- - -	Su/Mo	15/16	20:20 - 2:12	Th/Fr	26/27	22:25 - 4:13
Fr/Sa	6/ 7	- - -	Mo/Tu	16/17	20:21 - 2:52	Fr/Sa	27/28	23:27 - 4:12
Sa/Su	7/ 8	FULL MOON	Tu/We	17/18	20:21 - 3:27	Sa/Su	28/29	0:26 - 4:11
			We/Th	18/19	20:22 - 4:00			
Su/Mo	8/ 9	- - -	Th/Fr	19/20	20:23 - 4:22	Su/Mo	29/30	1:19 - 4:09
Mo/Tu	9/10	20:14 - 20:45	Fr/Sa	20/21	20:24 - 4:21	Mo/Tu	30/ 1	2:07 - 4:08

Weekend	Sun	Sun	Mercury	Venus	Mars	Jupiter	Saturn	
Sa/Su	Set	Rise	Rise Vi	Rise Vi	Rise Vi	Set Vi	Set Vi	Vi=Visibility
31/ 1	18:41	6:10	5:28 7	5:30 5	0:02 0	23:06 -2	22:17 1	-3 brilliant
7/ 8	18:46	6:01	5:31 9	4:57 1	23:45 0	22:45 -2	21:53 1	0 conspicuous
14/15	18:51	5:53	5:37 -	4:30 -1	23:28 0	22:24 -2	21:29 1	3 moderate
21/22	18:56	5:45	Set -	4:08 -2	23:08 -1	22:03 -1	21:06 2	6 naked eye limit
28/29	19:01	5:38	19:32 9	3:50 -2	22:47 -1	21:42 -1	20:42 3	9 binoculars limit

By Erich Karkoschka

Star Parties & Events

TAAA Star Party at TIMPA
April 14 (Saturday)

What makes this event special is that our novice members can get help with observing issues or equipment problems. There will be experienced members present who would be more than happy to help. If you don't own a telescope, don't worry. There will be lots of scopes set up and everyone is invited to look through them. This is a great way to check out the different telescope designs before you make that all-important decision to buy. There is no scheduled talk for this activity. Just come out with lots of questions and we'll do our best to get you the answers you need. Arrive at about 6:00 pm for a group question and answer session. It should be dark enough to observe by 7:00 pm. If you have friends who might be interested in amateur astronomy, bring them along. Be prepared for cold weather and dress warmly. Directions to the TIMPA site are located on the outside flap of this newsletter.

TAAA Star-b-cue at Kitt Peak
April 14 (Saturday)See article in the ***Club News*** section.

Vision High School Star Party **Southwest**
April 18, (Wednesday) No. of Scopes 5
Bill Lofquist

Vision High School is a Charter School located in the Pima Community College Campus at 5901 South Calle Santa Cruz. This road is parallel to I-19 and the campus is between Valencia and Irvington. The Santa Cruz River is on the right as you go south from Valencia, and the PCC building is on the left. On the south side of the building there is a large parking area, and we will be viewing in the field south of the building. If there is too much light there, we can move to the west side of the road, between the road and the river. There are a number of amber lights in the parking lot, but we can probably find a dark enough site to view from. Setup time is 6:45, and viewing will begin at 7:15. The star party should last for two hours or less. Bill Lofquist will be leader for this one. A sign up sheet will be available at the April meeting.

Amphi Middle School Star Party [North-Central]
April 19 (Thursday) No. of Scopes: 4-5

The school is located at 315 E. Prince Rd. (between Stone Ave. and 1st Ave.) Take Stone Ave. north from Prince Rd. to Pastime St. and turn right. Turn right into a parking lot at the rear of the school and park near the gate to the track. The set-up area will be behind the school on a running track. Set-up begins at 7:00 pm. Observing starts at 7:30 pm. and ends at 9:00 pm. A Star Party leader is needed for this event. A sign up sheet will be available at the April meeting.

TAAA Annual Picnic at Vega-Bray Observatory
April 21 (Saturday)

See article in the ***Club News*** section.

TAAA Star Party at Empire Ranch
April 21 (Saturday)

The Empire Ranch has been our normal dark-sky observing site for quite a number of years. Empire Ranch is about 4000 feet in elevation, so be prepared for cold temperatures and try to arrive before sunset. 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. Attendees should park their vehicles either perpendicular to the airstrip facing toward the center of the strip or parallel to the airstrip along either side facing west. That way, when you are ready to leave, you will not have to backup and turn on your bright white backup lights. 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.

Trail Dust Jeep Tours Star Party (Paid)
April 24 (Tuesday)

Our friends John and Zelda at Trail Dust Jeep Tours has invited the TAAA to support another of their corporate outings. Three telescopes are required. TDJT will transport our equipment to the mountain sight at 6:00 pm. Set-up will be at 6:30 pm and observing will go until 9:30 pm. Volunteers will be treated to a super barbecue dinner. John Kalas is the Star Party Leader for this event. There will be a sign-up sheet at the April meeting.

Agua Caliente Elementary Star Party [Northeast]
April 26 (Thursday) No. of Scopes: 7-10

Join the approximately 200 expected students and parents of the school for PIZZA and stargazing. Pizza will be served to all telescope volunteers starting at 6:00 pm. Take Tanque Verde Rd. east to Catalina Hwy. Turn left on Catalina Hwy and proceed approx 1.5 miles and turn right on Prince Rd. Pass Houghton Rd, Wendell Rd and Melpomene Rd. Prince Rd. will end and take a left on Homestead Rd. The school's athletic field will be on the left. Enter the gate on Homestead and drive to the north side of the field. Set-up begins at 7:00 pm. Observing starts at 7:30 pm, and ends approximately at 9:00 pm. Jeff Buzek will be the star party leader for this event. A sign up sheet will be available at the April meeting.

Star Parties & Events (cont.)

Tanque Verde Elementary Star Party [Northeast]
April 27 (Friday) No. of Scopes: 5-6

The school is located at 2600 N. Fenimore Avenue. From the Catalina Highway and Tanque Verde Road, go east on Tanque Verde past Houghton, Soldiers Trail and the 49er's Country Club to Fenimore Avenue. Turn left (north) and go ¼ mile. The school is on the right. Turn into the school parking lot area and proceed east to the far east section of the parking lot. The set up area is in the east section courtyard that faces the Santa Catalina Mountains and there is an access road that goes around the last building. Set up is at 7:00pm with observing from 7:30pm to 9:30pm. A star party leader is needed for this event. A sign up sheet will be available at the April meeting.

Arivaca Library Star Party [Far South]
April 28 (Saturday) No. of Scopes: 2

The library is located at 17050 W. Arivaca Road in Arivaca. Go south on I-19 past Green Valley to Arivaca Exit 48. Go west on Arivaca Road (takes off between the Mini Market and Cow Palace restaurant) for 23 miles. The library is on the right (north) side of the road just before you enter Arivaca, just past the Buenos Aires Refuge parking lot. There is a road sign that indicates the Arivaca Library. The trip takes approximately 1½ hours from Tucson. Set up is in the library parking lot at 7:00pm with observing from 7:30pm to 9:30pm or so. A star party leader is needed for this event. A sign up sheet will be available at the April meeting.

Sunrise Drive Elementary Star Party [North]
April 30 (Monday) No. of Scopes: 5

The school is located at 5301 E. Sunrise Drive. Go north on Swan Road and turn right (east) on Sunrise Drive. Proceed to the next traffic light and turn left (north) onto Suncrest. This street accesses the school. The set up area is located on a concrete patio north of the parking lot but just south of the school building. Set up is at 7:00pm with observing from 7:30pm to 8:45pm. Debbie Brooks, the school contact person, has indicated that a donation will be provided to the TAAA for supporting this event. A star party leader is needed for this event. A sign up sheet will be available at the April meeting.

TIMPA Site News

Sub-Committee Meetings:

- The next Site Prep Sub-committee meeting is scheduled for Tuesday evening, 4/3, at 7:00 pm in Steward Observatory Conference Room N305.
- The next Long Range Planning Sub-committee meeting is scheduled for Wednesday evening, 4/11, at 7:00 pm in Steward Observatory Conference Room N305.

TIMPA Long-Range Planning Meeting

The next meeting of the TIMPA Long Range Planning Subcommittee will be held on Wednesday, April 11th at 7:00pm in the Steward Observatory 3rd floor conference room (N305). We will be considering the feasibility of building roll-off buildings to house additional telescopes. All TAAA members are encouraged to attend, especially those who use the TIMPA site. This is YOUR chance to give input into what happens at TIMPA. (If you wish to be included in TIMPA Long-Range Planning Committee email announcements and reminders, send a request to Terri Lappin via email (tklappin@earthlink.net).

TIMPA Update
by John Kalas

For those of you who attended the 3/24 TIMPA Star Party, you have already seen the fantastic new bathrooms at the TIMPA Site. The TIMPA Organization is to be complimented on their aggressive and thorough construction project to build the bathrooms. They are great! In particular, a fellow by the name of Gary Ellingson of TIMPA did a terrific job in coordinating the purchase of materials, in supervising the skilled trades that were involved in some of the construction, and in performing much of the construction himself. The TAAA supported the project with a long day of hauling cement blocks for the bathrooms and, of course, we paid for half of the $8,000. cost.

The other major accomplishment this past month was the digging of the footer trench for the main observatory on

TIMPA Site News (cont.)

Saturday, 3/10. Eight dedicated TAAA Members dug for two hours and produced a lovely circular hole in the ground. Many thanks go to; Claude and Teresa Plymate, Steve Furlong, Bill Lofquist, George Barber, Ed Finney, Robert Crawford and John Kalas.

TIMPA Site Prep Sub-Committee Meeting
by John Kalas

The TIMPA Site Prep Sub-committee met on 3/13 and spent the evening laying out the remaining tasks required to complete the installation of the main 16' diameter observatory. With the completion of the footer trench, careful coordination of subsequent activities is crucial to the project. The project breakdown is as follows:

1. Install rebar & electrical conduit.
2. Pour footer and install cement block rebar ties.
3. Confirm diameter of support structure.
4. Determine connection technique for support structure to cement block.
5. Lay two courses of cement block.
6. Excavate pier.
7. Frame and rebar pier.
8. Pour pier.
9. Get Support structure from Kitt Peak.
10. Install support structure.
11. Design interior deck flooring.
12. Construct deck flooring.
13. Disassemble dome up on Kitt Peak.
14. Get dome from Kitt Peak.
15. Reassemble dome onto support structure.
16. Complete dome repairs.
17. Install electrical circuits.
18. Install new siding and door on support structure.
19. Install club's 16" diameter telescope.

Claude Plymate brought nifty photos that he took of the TIMPA Site while flying over it. These photos will be on display at the April 6th meeting.

TAAA Board of Directors Meeting - February 12, 2001

Location: Steward Observatory Conference Room N305 University of Arizona
Board Members Present: John Kalas, Andrew Cooper, Terri Lappin, Jane Tongate, Robert Callanan
Board Members Absent: Steve Peterson, Bill Lofquist
Member Present: Rich Watson
Call to Order: 7:07 pm

1. Events - The activity calendar for March was presented by John Kalas.
2. Treasurer's Report - Terri Lappin presented the Treasurer's report.
3. TIMPA Update - John Kalas reported that he is concerned about the climbing cost of the TIMPA bathrooms and that anything over $8,000 will be paid as advanced monthly maintenance fees.
4. TAAA sponsored solar observing activity - no action taken.
5. Officer Workload Reduction/Committees for 2001 - this is not panning out and will continue to be worked on.
6. TAAA E-mail Exploder - Andrew has spent some time on this but something is not working quite right.
7. Signs for TIMPA Site - arrangements have been made to have this sign produced.
8. Kitt-Peak Star-b-cue dates - April 14 has been entered on the calendar. John Kalas is working on a second date in October.
9. TAAA Website - Andrew Cooper reported that the photo gallery link has been improved. Links have been added for our donors.
10. Special Request - Robert Callanan has requested that John Polacheck be invited to our next meeting. The Board reminded Robert that all members are welcome at Board meetings. An agenda item for Dr. Polacheck will be added to next board meeting.
11. Mrs. Hoag - Widow of Art Hoad, TAAA member from Lowell Observatory. Mr. Hoag has been donating towards the land fund. Terri will contact Mrs. Hoag to see if she will continue this donation. A thank you card will be sent also.
12. Lifetime membership - Terri presented this idea to the Board. Board members will look at other organizations to see if this is something TAAA would like to pursue.
13. IDA - Rich Watson will submit article for newsletter and would like to post IDA announcements at monthly meetings. Terri can include any announcements in the Power Point presentation at the beginning of monthly meetings with other announcements.

The meeting was adjourned at 8:15 pm.

Respectfully submitted,
Jane Tongate
Secretary, TAAA

Editor's note: Due to space limitations, the March 12, 2001 Board of Directors Meeting Minutes will appear in the May 2001 newsletter.

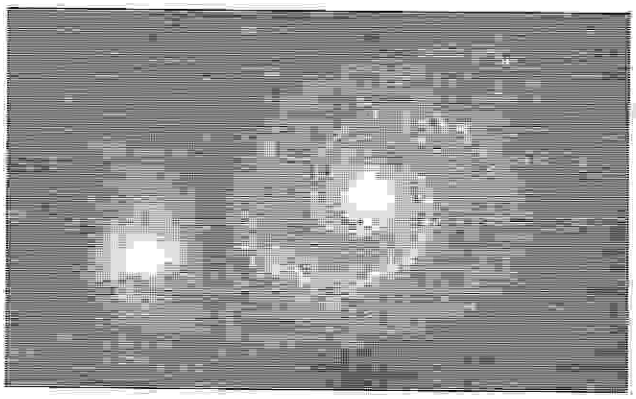
Object of the Month by Alfredo Garcia, Jr

Hello again!! :-) Wow, March was a fast month. I hope you were able to get out see last month's Object Of The Month (OTM), M104. It is indeed a fascinating object!!

For this month, I am going to continue with another galaxy and swing in azimuth from the southeast sky to the northeast sky on 15 Apr at 9:00 PM Local Time. At this date and time and at an altitude of about 50 degrees above the northeastern horizon, you will find the larger of the two long-tailed bears [Ursa Major (UMa)] with its tail well placed for observation. Bordering the end of UMa's tail is the minor constellation known as Canes Venatici (CVn), The Hunting Dogs. These are the Hunting Dogs (no relation to Orion's dogs, Canis Major and Canis Minor) held on a leash by Boötes, The Herdsman, as he hunts for the two long-tailed bears.

Our April OTM lies in this minor constellation and is perhaps one of the most viewed, astrophotographed, and CCDed objects in the sky. It is none other than the beautiful face-on spiral galaxy known as the **Whirlpool Galaxy** or **M51 (NGC5194) and its companion** NGC 5195. As a matter of fact, it is the cover picture on April's Sky & Telescope issue as well. This galaxy is certainly worthy of all the notoriety it receives!!

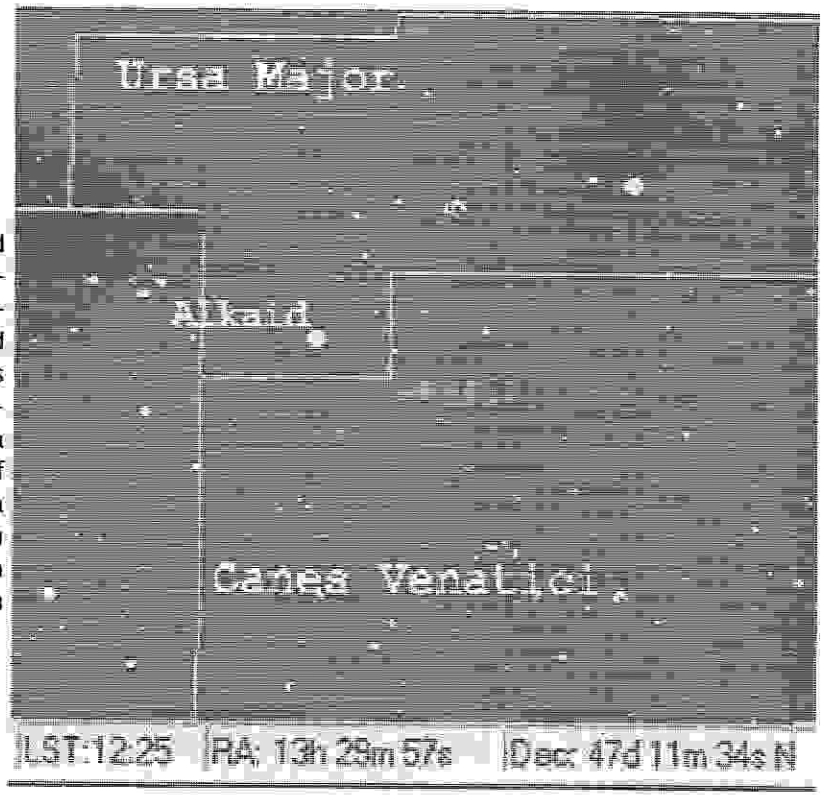
And speaking of M51 pictures, shown below is my own rendition of this majestic, swirling galaxy. I was amazed at what detail I was able to acquire with my equipment set-up, thus proving that CCD cameras are opening avenues only dreamed of before by amateur astronomers. Let's here one for CCD technology!! Hip, hip, hooray!! :-)



M51, The Whirlpool Galaxy
(Image by Author)
(10" f/6.3 Meade LX200 At f/4 (used a f/6.3 focal reducer) 15 Min Exposure Using SLX MX5C CCD camera)
(Map From StarTraveler Software)

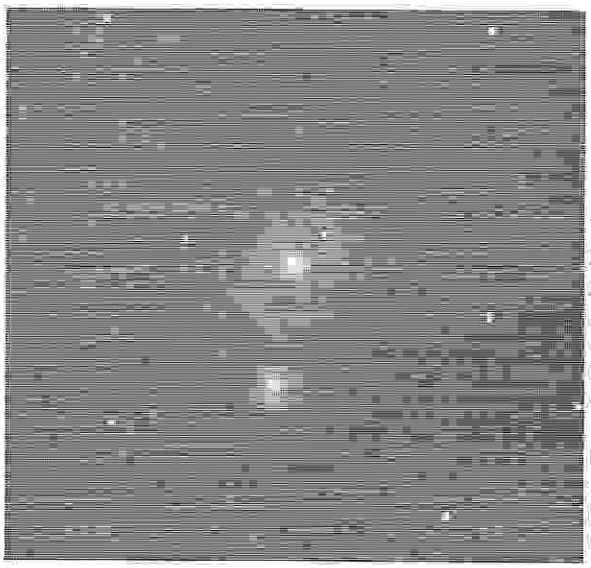
Vital Statistics
Position: RA 13 hours 29 minutes 57 seconds
DEC +47 degrees 11 minutes 34 seconds
Size: 11 Arc minutes
Magnitude: 8.4

OK, back to M51! This galaxy is fairly easy to find and is located close (within 3.5°) to the end of the larger bear's tail near the star Eta Ursae Majoris (or Alkaid) as you can see from the location map. A good dark sky location like that at our Empire Ranch Site is best to find M51 as it is quite sensitive to light pollution. This is another excellent object to view during a star party where you can see it through a variety of different size instruments. My 10" LX200 does a good job on it, but the view is simply awesome in an 18" or larger scope. Scopes as small as 4 inches can hint at the spiral structure leaving no doubt that you have found M51.



Object of the Month (cont.)

As an experiment, I CCD-imaged M51 through my 80mm f/5 Orion Short Tube Refractor from a good dark sky location and was quite pleased at my result even though it was imaged with this slightly larger than 3" short focus refractor. Here is the resulting image. Not bad!! Once again proving the capability of a CCD camera even with a small scope. ☺



M51, The Whirlpool Galaxy
(Image by Author)
(80mm f/5 Orion Short Tube Refractor 10 Min Exposure Using My SLX MX5C CCD camera)

The Whirlpool Galaxy was one of Messier's original discoveries. He discovered it on October 13, 1773, when observing a comet. His friend, Pierre Mechain, discovered its companion, NGC 5195, in 1781. Another interesting historical note on M51 is that this galaxy was the first one where Lord Rosse, who made a very careful and accurate painting, discovered the spiral structure, in 1845. Therefore, M51 is sometimes referenced as Rosse's Galaxy.

M51 is the dominating member of a small group of galaxies. As it is about 37 million light-years distant and so conspicuous, it is actually a big and luminous galaxy. The diameter is approximately 100,000 light years and the total mass is estimated to be the equivalent of 160 billion suns. In contrast, our own Milky Way Galaxy is also about 100,000 light-years in diameter, but our total mass is probably between 750 billion and one trillion solar masses. This makes us a "giant" mass-wise when compared to M51. Imagine what our own Milky Way Galaxy must look like to the inhabitants of a planet orbiting a star in M51!! What is their name for our galaxy???

According to astronomer's present understanding, the pronounced spiral structure is a result of M51's current encounter with its neighbor, NGC 5195. Due to this interaction, the gas in the galaxy was disturbed and compressed in some regions, resulting in the formation of new young stars. As is common in galactic encounters, spiral structure is preferably induced in the more massive galaxy. At first glance it appears as if the two galaxies are interacting (colliding), but NGC 5195 is partially obscured by the spiral arm extending from the Whirlpool's core.

And one final note about M51 is that on 2 April 1994 a colossal stellar explosion known as a supernova was discovered. The supernova was designated as SN 1994I (that's "i" not "1") and was located some 14" east and 12" south of M51's nucleus. The supernova was discovered independently by several people and got as bright as magnitude 12.8. Our own Club's Chief Observer, Wayne Johnson, was a co-discoverer of this supernova event. Cool!!!

Well, I hope you get a chance during the normally clear skies of April to go out and observe this face-on splendor of a galaxy that Charles Messier designated as M51. Maybe you too will get caught in the "Whirlpool"!!

Clear Skies,
Alfredo ☺

Desert Skies Classified

FOR SALE:	Eyepieces (1 1/4"): Celestron 25mm SMA wide angle $25; Orion Explorer II 25mm (2) $20, Orion Explorer II 10mm (2) $20. Call Chris at 750-9463 or e-mail <ctlancaster@earthlink.net> (5/01)
FOR SALE:	Standard Questar, S/N 2-1229 with coated lens and sun filters, 16mm Brandon eyepiece, Diopter adapter, Camera coupling, Porro prism, Leather carrying case, all brochures and instruction books. $3,000. Call Howard Baxter in Green Valley at 625-7127 or contact via e-mail at <kb1jt@juno.com> (4/01)
FOR SALE:	Astro-Physics 155mm EDF f/7 refractor telescope w/ 4 inch focuser. Excellent condition. Comes with tube rings, 7X50 finderscope and Losmandy plate. Serious inquiry only. Asking $8,500. Call Ted @ 806-3808 or e-mail to CTGWC@aol.com (7/01)
SERVICE:	Custom machine shop work – design and manufacture of telescopes and mountings. Fabrication of small parts or repair of existing hardware. For consultation and price quotes, call Duane Niehaus at 290-1722.

Your ad will run for 4 months unless specified. Month and year of last appearance is last item of ad. For additions or changes to this list, call John Kalas at 620-6502 or e-mail at jckalas@aol.com.

Constellation Report by Chris Lancaster

Ursa Major, the Great Bear

Just about everyone is familiar with this constellation from the asterism of bright stars that outline the famous dipper shape. Show someone the night sky for the first time and usually he will ask, "Where's the Big Dipper?" Van Gogh has painted it, Shakespeare and Tennyson have mentioned it in their literature, and, it should be safe to say, every civilization has taken note of it throughout history and prehistory. But the Big Dipper is only part of the complete constellation called Ursa Major. The most popular form which these stars have assumed in the eyes of observers is a bear. The Greeks called it Arktos, the origin of our word "arctic"--an appropriate derivation for a constellation that circles over the extreme northern latitudes. Greek legends explain that Callisto, who was a maiden that caught Zeus's eye, was turned into a bear by Zeus's jealous wife, Hera. Zeus gave the bear an honorary spot in the sky, but Hera had the last word by moving it near the pole so the bear would never enjoy rest, but endlessly circle the celestial pole.

Ursa Major is rich in objects to view. You can start with your naked eye by looking at the 2.3 magnitude star in the handle of the Big Dipper where the handle bends (this is Zeta [ζ] Ursae Majoris, also called Mizar). Those with sharp eyes can spot an optical companion to Mizar of magnitude 4 about 12 arc minutes away called Alcor. Through a telescope Mizar becomes a double itself with a 4th magnitude companion 14" away. Not only was this the first double star to be discovered (in 1650), but it was also the first double to be photographed (1857). There is little or no color contrast between these stars. They all appear a pure white. Squeezing this trio of stars in your eyepiece makes for a truly striking sight. Another naked eye sight is found in three pairs of stars which, to the Arabs, represented the footprints of a leaping gazelle. As part of the bear, the stars form the toes of two of his hind feet and one front foot. Nu (ν) and Xi (χ) form the first leap, Mu (μ) and Lambda (λ) the second leap, and Iota (ι) and Kappa (κ) the third.

Ursa Major lies far from the galactic equator, which means that it is packed with galaxies. A pair of outstanding ones, M81 and M82, are in the northern part of the constellation centered near RA 9h 56m Dec +69° 28'. Upon first sight this duo becomes a favorite of many observer. They are separated by only 37 arc minutes so both can be seen in a low power field. They have quite distinct personalities. M82 glows at magnitude 9.2 with a size of 11.3'x 4.3'. Small telescopes will show a thin oval with perhaps a hint of dusty mottling toward the center. Large instruments will capture the inner calamities of this tortured galaxy. Whatever is happening in M82, it is a source of loud radio noise as well as the cause of a tremendous explosion of material rushing out from its nucleus resulting in streamers and filaments similar to the those which contribute to the appearance of M1, the supernova remnant in Taurus. M82, on the other hand, is a handsome spiral of magnitude 7.9. It is much larger than M82, covering 26'x 14'. Most will see a uniform oval since only very large scopes will be capable of bringing out its spiral arms. An easy way to find this pair is to start at Gamma (γ) Ursae Majoris (the lower left star of the Dipper's bowl), move diagonally across the bowl to Alpha (α), and then double that distance in a straight line to arrive at your target.

While we are in the neighborhood, you may want to move 46 arc minutes east to galaxy NGC3077, a decently bright galaxy (mag. 10.8) 5.3'x 4.4' in size. Being a dwarf elliptical, this galaxy shows a fat oval structure that is quite bright in the center, and then fades out to its boundaries.

Another pair of objects can be seen along the bottom surface of the Dipper's bowl. One and a half degrees ESE of Beta (β) Ursae Majoris is M108. This galaxy is very similar to M82 from the fact that it is oriented edge-on, measures 8.3'x 2.5, and has a dispersal of dusty lanes across its entire disk. M108 shines brightly at 10.1 and is located at RA 11h 11.5m Dec +55° 40'. Move only 48 arc minutes virtually in the same direction and you will see M97. A dark sky and at least a medium sized telescope will reveal why this planetary nebula is given the popular name of the Owl Nebula. You will see two dark circles forming the eyes of the bird within the round face of the nebula with the 12th magnitude central star exactly in the middle. Unfortunately, the Owl glows at only magnitude 11.5 from a disk 3 arc minutes in diameter, so it can be elusive depending on seeing conditions.

Move toward Gamma (γ) Ursae Majoris to find another easy galaxy--number 109 in Messier's catalog (RA 11h 57.6m Dec +53° 23'). It is 38 arc minutes from the magnitude 2.4 star marking the lower left corner of the Dipper. This is a bright magnitude 9.8 barred spiral galaxy covering 7.6'x 4.9', so it is an easy target in any telescope. But 8 to 10 inches is necessary to attempt seeing details of the bar and spiral arms.

Forming a slightly flattened equilateral triangle with Zeta (ζ) and Eta (η) Ursae Majoris is the huge galaxy M101. It spans nearly half a degree across its face. Even though this galaxy shines strongly at magnitude 7.7, it has such a low surface brightness that little detail can be observed. I've spotted it in a telescope as small as 60mm, but I had to look twice to make sure it was there. Larger scopes, of course, make it an easier target, but most views will still only show a soft glow with a slightly brighter middle. M101 sits at RA 14h 3.2m Dec +54° 21'.

Several other bright galaxies populate Ursa Major, as well as many dozen additional faint ones. Here's a partial list of some of the remaining brighter ones:

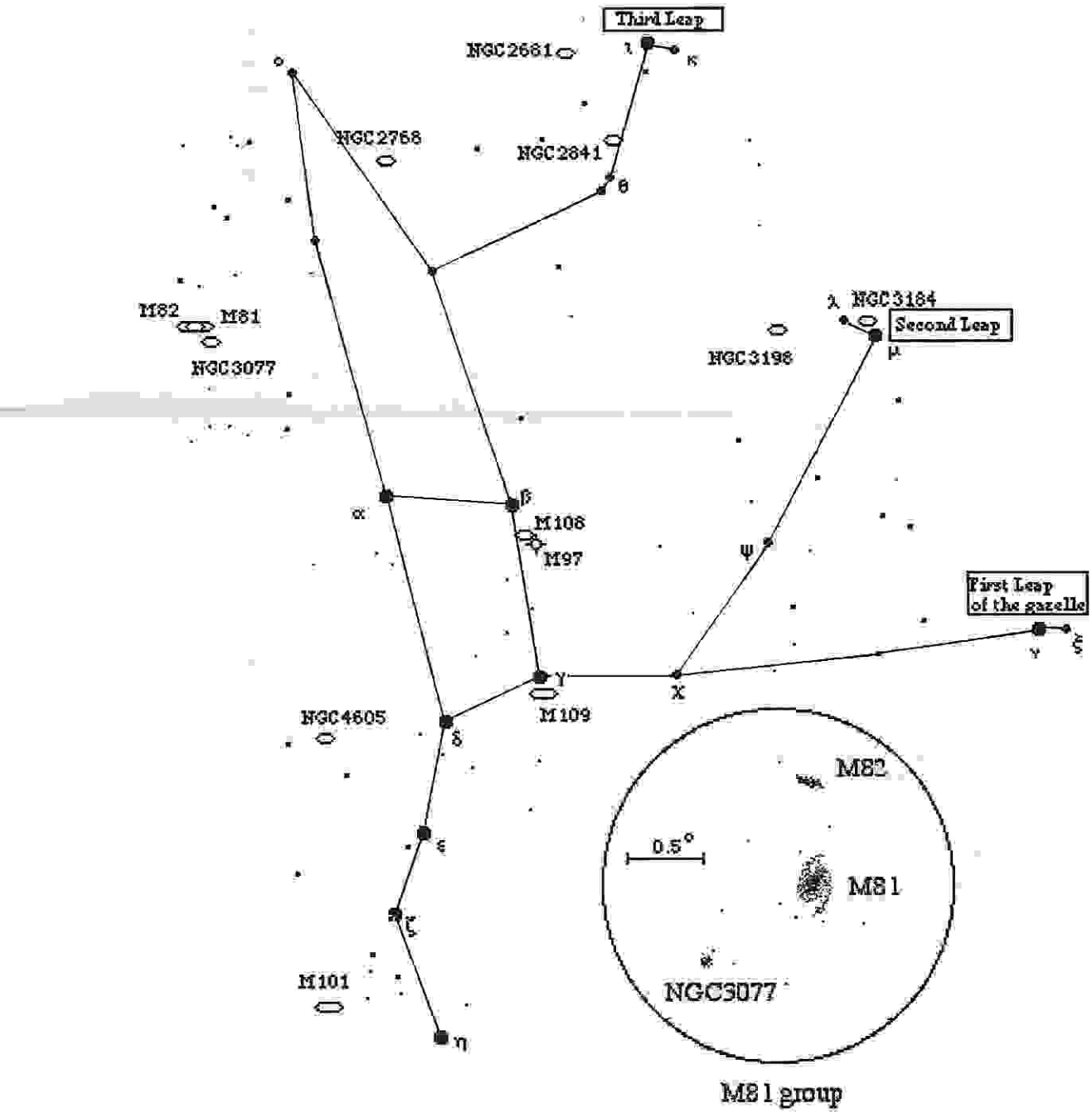
NGC #	RA/Dec	Mag.	Size
2681	8h 53.5m/+51° 19'	10.9	3.6'x 3.4'
2841	9h 22m/+50° 59'	10.1	8.1'x 3.5'
2768	9h 11.5m/+60° 2'	10.8	8.1'x 4.33'
3198	10h 19.8m/+45° 33'	10.8	8.6'x 3.3'
3184	10h 18.3m/+41° 25.5'	10.4	7.4'x 7.0
4605	12h 40m/+61° 36.5'	10.9	5.7'x 2.1

Let's end with an interesting double star, Xi (ξ) Ursae. The two stars average 26 AU of actual separation, but they are close enough to Earth that even small telescopes can split them.

Constellation Report by Chris Lancaster (cont.)

Currently, they are separated by 1.8" which will increase to its maximum of 3.1" by the year 2035. The total period is only 60 years, which helped M. Savary in 1828 to be the first to compute the orbit of a binary star. Due to its relatively fast orbit, it is possible to see a distinct change in PA in a short time. It is now in a prime spot so that during the next thirteen years you will be able to see their PA turn by about 90 degrees.

So many more binary stars, variable stars, and galaxies that cannot be covered in a short article await you in Ursa Major. The only limitations are time and aperture.



M81 group