A great many of us—"us" meaning people who know a bit more astronomy than most—have encountered this question time after time. Of course, as we all know, the standard response is: get a decent pair of binoculars, and start learning the sky. But later on, after the beginner has taken our excellent advice and is now really ready for his or her first telescope—or even after that, when it makes sense to think about an upgrade—the question now requires something more than the standard response.

Among folks of Jewish ethnicity, it is often asked: Why do Jewish people always answer a question with another question? The answer (of course) is: Why shouldn’t we?

It turns out that (Jewish or not) there are occasions when the only proper response to a question is, indeed, another question. In the case of the question under discussion, the appropriate response is: What do you want to do with it?—or, as an alternative—How do you intend to use it? As an aid to determining this, I have developed a “Telescope Selection Criteria” form (included below) that elicits a relative importance rating for each of these nine telescope attributes:

- Aperture
- Focal Length
- Portability
- Easy Setup
- Easy Maintenance
- Ease of Pointing
- Tracking Ability
- Astrophotography
- Cost

—for the benefit of the less knowledgeable, it gives a brief(!) description of the significance of (most of) these attributes—i.e., what each does for (or to) the telescope’s user. This gets things started off in the right direction by identifying most of the things that should be considered when planning a telescope purchase—and getting the would-be purchaser to give them some serious thought. But then what?

I have found that, once you have made the effort to quantify things—i.e., give them some sort of numerical ratings, however approximate—a spread-sheet can be an excellent way of seeing what is implied by those ratings. There is no way that any spread-sheet—or, for that matter, any tool at all—will magically produce answers for you. However, by quickly and clearly revealing the consequences of your assumptions, the spread-sheet can help immensely in figuring out what it is that’s really important to you. (My decisions on where to retire and what automobile to buy were both greatly assisted by spread-sheets much like the one to be described below.)

The first step in creating the spread-sheet—which is, in fact, the next step in telescope selection by any method—is to decide just which telescopes to consider. I decided to go with 21 telescopes of various types, over a fairly wide price range. It’s hard to include too many; the spread-sheet can easily handle hundreds, and it will quickly identify any that can just as well be dropped. For each included telescope, fill in its aperture, focal length, and cost—precision is not terribly important, as long as consistency is maintained.

Now comes the only real effort required in the whole process—but it need be done only once for each included telescope, and can then be utilized time and again for one purchaser after another. For each telescope, assign a rating value for each of the attributes being considered—a scale of zero to nine is suggested,

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**Continued on page 6**
The February 17, 2000 Board of Directors (BoD) meeting of The Albuquerque Astronomical Society (TAAS) was called to order at 7pm by President Eric Bucheit. Other board members present at the meeting were Bruce Levin, Robert Williams, Sammy Lockwood, Carl Frisch, Robert Ortega, Linda Hixon, Barry Spletzer, Dan Richey, and David Brown. Observers included Barry Gordon, Lisa Wood, Chris Wilson, John Sefick, Gordon Pegue, Alejandra, and Tom Pannuti.

Eric presented the meeting’s agenda for approval. Program and Lodestar committee reports, and a Research Proposal for GNTO were added, and the agenda was accepted. Eric also distributed copies of all TAAS bylaws and regulations that he could find, to all BoD members.

Sammy read the minutes from the January BoD meeting. Carl noted that the ST-9E CCD camera TAAS is about to purchase was incorrectly listed as an STS-9 camera. The minutes were accepted with the correction.

Robert W. distributed the February treasurer’s report. Barry S. suggested that for the sake of briefly, the report not be read aloud, since every member had a copy. After discussion, Barry motioned that the treurers report should be presented as printed, not read. Sammy seconded the motion, which passed. If another date becomes necessary for Placitas, or any proposed TAAS event that conflicts with GNTO nights, they will be addressed as needed.

Committees

Program Committee – Bruce reported that guest speakers have been arranged for the coming general meeting, but suggested that TAAS offer our guest speakers more VIP treatment. The Assets committee will research the idea, and offer a proposal at the next BoD meeting. Bruce motioned for a small amount of money be allocated from the general fund to VIP our Feb guest speaker, but was not seconded.

GNTO Committee

Robert Ortega explained:

1 The Committee is finalizing a GNTO handbook, that will incorporate GNTO policies, instructions, and guidelines
2 New GNTO pictures are being selected to incorporate into the TAAS web site
3 The main PCs at GNTO are to be upgraded to Win 98, gravel has been purchased and spread where needed (most all work done by Carl)
4 An air trap (door) for the dome, has been installed
5 A monitor, keyboard and mouse have been installed in the dome, linking the GNC Max with the a PC for aiming the Isengard. Carl notes that the alignment of the Isengard is near perfect, thanks to Kevin McKeown’s polar alignment
6 The Committee is writing Santa Barbara Instruments seeking a discount for the ST-9E camera the committee wants to purchase

Grants Committee

Eric explained that Alan Green, Committee Chair, is working on grant packages from Target, McDonalds, and other smaller firms. If anyone has a lead on a possible grant, or wishes to help, contact Alan at allangreen@worldnet.att.net

Membership Committee

Robert Williams reported that the membership packet is almost ready. Kevin McKeown is the POC.

Public Relations

Sammy reported that UNM Fridays, a future school party, and the upcoming general meeting are being publicized.

List of Committees

Barry Spletzer distributed a compilation of TAAS Committees and duties, and asked the BoD to review them.

Awards Committee

Gordon reported that the committee has nearly completed its work for this year’s awards, to be presented at the March General meeting, and asked the BoD for an unspecified amount to purchase the awards. Robert Ortega motioned that the Awards Committee be authorized to spend unspecified
amount from the general fund. The motion was seconded, and passed 8-1. Last year’s awards totaled $349.

Lode Star Committee

Carl explained that he has represented TAAS as a non-voting member of the Load Star board for some time now, and asked the TAAS board to define our relationship with Lode Star, and if we wanted to continue this post on the Lode Star board. There was discussion on the ups and downs of TAAS’s past history with Lode Star, but the consensus for the Board was to build our relationship. The Lode Star Committee will review possible avenues and report to the board.

Calendar

Due to scheduling conflicts, the following changes were motioned:

1. Astronomy Day moved from 4/8 to 4/29,
2. Elephant Butte moved from 4/29 to 4/8,
3. GNTO night on 4/29 canceled.

The motion was seconded, and passed.

Events

School Star Parties

Lisa explained that Alamosa had a good party, but bad weather. Forms for next year’s parties are being distributed, no one who had a school party this year will have one next year.

Eric noted that the preset time limit for the board meeting of 8:45 had expired, and asked for a motion to continue. Sammy motioned for a 15 minute continuum, the motion was seconded, and passed.

Science Fair (3/16-18)

Bruce explained that he is the POC for anyone interested in judging the Science Fair. Judging will be on Friday, 3/17.

Astronomy Day 2K (4/29)

Sammy explained that preparations are rolling for Astronomy Day 2K:

1. The contract has been signed with Coronado for 4/29,
2. Letters to 28 possible exhibitors have been mailed,
3. The newsletter and Board E-mail list have been used to solicit TAAS volunteers,
4. Several exhibitors and TAAS volunteers have expressed early interest, although Sammy still needs some key team leaders to help with the effort.

Sammy then explained efforts he has pursued to provide free Astronomy Day T-shirts to all volunteers, and asked for Board approval to proceed using the TAAS logo and name on the shirts, and possible Astronomy Day patches. There was back and forth discussion about placing the TAAS name with Coronado. A motion was made for Sammy to proceed. The motion was seconded, but failed to pass.

Space Suit

Lisa explained efforts she has pursued to borrow space suits from NASA for use at several TAAS events, including Astronomy Day. Insurance and shipping for the space suits is $130. Sammy motioned that $130 be authorized from the education fund to cover the suits. Robert O. seconded the motion, which passed.

Eric noted that the 15 minute continuum had expired, and asked for a motion to continue. He did not receive a motion. The following agenda items will be carried over to the next meeting:

1. TAAS positions and Responsibilities.
2. Committees of the Board / vs./ Committees of the Membership.
3. Research Proposal for GNTO

The meeting adjourned at 9:15

-A Proposal-

Research Facility at GNTO

by Carl Frisch,
February 15, 2000

This proposal is for the construction, and operation of a world class amateur astronomical observatory. The mission would be multi-purpose, including, but not limited to the following goals:

1. The observatory would serve members of The Albuquerque Astronomical Society for individual and joint research projects.
2. It would be a place where select high school and community college student can carry out scientific research for credit and science fair projects.
3. It could serve as a confirming agency for professional observatories around the world.
4. The newly formed Troop 110 could use the facility to educate and earn merit badges.
5. The imaging capability would provide a database for school star party presentations.

The Facility would be built at the General Nathan Twining Observatory site just south of the Belen airport in Socorro county. It would consist of a robotic telescope, dome, and control building. The total estimated cost of such a facility would be around $130K, depending on current pricing and possible TAAS discounts. This is a preliminary proposal and all input, good or bad, is welcome; please direct your input to Carl Frisch @ 239-6002.

Once finalized this proposal will be submitted to the TAAS BOD for approval. After that it will be in the hands of the grant committee.
## April 2000

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### A Butte of a Star Party!

*by Chris Bolen, Interpretive Ranger II*

**Saturday April 8th** is going to be a very special evening. It is the night of the 2nd annual Elephant Butte Lake State Park Star Party! This event was a success last year and we hope this year’s will be even better. TAAS members will offer campers, visitors and local residents a unique treat and an opportunity to expand their understanding of the stars above.

For those members that have not visited Elephant Butte Lake, this weekend should prove to be an enjoyable experience. The Lake is located in the Chihuahuan Desert at an elevation of 4200’ msl. In April, our evenings are in the mild 50s and the days are in the upper 70s making for pleasant conditions.

Elephant Butte Lake is a 31,000-acre oasis in the desert. The Lake offers recreational opportunities such as swimming, boating, water skiing, hiking, biking, miles of sandy beaches, and breath-taking scenery. Additionally, the cities of Elephant Butte and Truth or Consequences are only minutes away, each with stores, motels, and restaurants.

The clean campground offers modern facilities including hot showers, electrical hook-ups, level pads and water faucets. Several electrical sites are currently being reserved in the campground where the Star Party will take place. Other primitive sites will be available on the beaches if required. The sites will be provided to the TAAS members and their families for 2 nights at no charge.

The night skies here at the park are unobstructed and generally clear from horizon to horizon. Any wind from the day usually is dissipated by nightfall. Light pollution from the surrounding communities is minimal. There are many areas beyond the developed areas of the park for unpolluted viewing if you are interested in venturing off on your own.
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### Messier Marathon

*by Carl Frisch*

This year as well as previous years the TAAS Messier Marathon will be held at GNTO on **April 1, 2000**. The evening begins without a moon or Venus in the sky, so the first tough objects of the evening, M74 and M77, should be doable weather permitting. A handy checklist will be available or simply copy the checklist in the March Sky & Telescope. Dress warm in layers, bring snacks, water, etc. Come about an hour before sunset so you have plenty of set up time and won’t disturb others with your lights. The warm up trailer will be available with the fixin’s for coffee and hot cocoa.

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### NOTES:

- **TAAS** = The Albuquerque Astronomical Society
- **GNTO** = General Nathan Twinning Observatory. Call Gordon Pegue @ 332-2591 to confirm.
- **UNM** = University of New Mexico Observatory. Call the TAAS hotline @ 296-0549, or the UNM hotline @ 277-1446 to confirm.
- **ATM** = Amateur Telescope Making. Call Michael Pendley for information @ 296-0549.
- **PandA** = UNM Physics and Astronomy. Corner of Lomas and Yale.

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Elephant Butte Lake State Park is located about 150 mile south of Albuquerque right off I-25. Take exit 83 (Rt. 195) to go directly to the park and the city of Elephant Butte, or Take exit 79 to go to the city of Truth or Consequences. When you arrive at the visitors center, just inform the staff that you are with TAAS and you are in. The Park Superintendent has requested that each member tape a copy of his membership card to the windshield of his vehicle for easy identification during the weekend.

On behalf of the Park and its staff, let me extend a huge thank you. We look forward to seeing everyone at the event.

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-o0o-
Which Scope?
Continued from page 1

but any scale with all positive numbers will work. An additional attribute, reputation/quality, is included to let you (the advice giver, not the advice seeker) give extra “bonus points” to telescopes of particular over-all excellence, or penalize known “losers”, if you should wish to do so. The values assigned will be up to you, but you are obviously free to consult with anyone you wish in establishing them.

That’s it—you are now in business. At this point, all you need do is fill in the relative importance ratings (and the upper limit on price, if one is given)—provided by the advice seeker on his or her Telescope Selection Criteria form—on a single row of cells just below the spread-sheet’s column headings. Then, when aforementioned advice seeker asks how come a particular telescope is rated so high (or low, as the case may be)—you can point out the responsible ratings and ask if they are truly reflective of what’s really important—and then easily demonstrate a few ways in which changing those ratings affects the results.

Two examples are shown on pages 8 and 9. One of them is my guesses as to what a first-time telescope buyer might assign as relative importance ratings. The other is from an actual genuine first-timer who sought my advice. (Note that telescopes costing more than the price limit are still rated—however, they are rated without considering price—i.e., as though cost had zero importance—and this is indicated by their ratings being in parentheses.)

The spread-sheet itself is available to anyone who wishes to:

* Use it
* Critique it
* Play with it
* Any or all of the above

It was written for Lotus 1-2-3 Release 2.3 (no, that is not a typographical error, it is indeed Release Two-Point-Three)—but presumably can be read and translated by a somewhat more recent spread-sheet program.

Telescope Selection Criteria

Rate the importance to you of each of the following telescope attributes — on a scale of zero to whatever, where zero means of no importance whatsoever. This can be an extremely useful aid in determining the type of telescope that best suits your needs.

Large Aperture

The aperture of your telescope determines its ability to collect light. A large aperture is needed to reveal the dimmer Stars, Clusters, Nebulas, and Galaxies; a more modest one will suffice for the brighter, and thus better-known, showpieces.

Great Focal Length

Greater focal length increases the magnification, or power, that can be used — but the importance of power is very widely over-rated. High powers are used for splitting Double Stars and for observing the Moon and Planets — they are rarely used for “Deep Sky” observing, i.e. Star Clusters, Nebulas, and Galaxies.

Portability

Impressive apertures and focal lengths mean telescopes of correspondingly impressive sizes and weights, and (despite America’s obsession that “Bigger is Better”) no telescope — however impressive its specifications — will do you much good if you find it too burdensome to haul to your viewing site or, even worse, too bulky to fit in your car.

Easy Setup

And getting there is only half the “fun”. Once at your observing site, your telescope must be assembled for use — and then taken down again for the return home.

Easy Maintenance

Telescopes don’t require a lot of maintenance, but they do call for a bit, eg, collimation of the optics on some but not all of them.

Ease of Pointing

Without question, the most difficult and frustrating aspect of telescope use for the inexperienced is getting the blamed thing pointed at what you’d like to look at. A number of aids are available, ranging all the way up to fully automated pointing done by built-in computers.

Tracking Ability

Once the sought object has been found, the telescope must be continuously moved to compensate for the Earth’s rotation and thus keep the object within the field of view. On the simplest — and least expensive — telescopes, this is strictly a manual task; the more sophisticated models automate it.

Astrophotography

This means the photography of objects in the heavens. It adds significantly to the complexity of the instrument required, as compared to simply observing things visually at the eyepiece.

Cost

In addition to a relative importance rating, you may also, if you wish, specify an absolute upper limit here.

TAAS Needs PR People
by Sammy Lockwood

TAAS has become widely known through the media as one of New Mexico’s leading resources in Astronomy. Over the last year, TAAS has built a relationship with assignment editors and story writers, that has helped put us in the public eye time and time again. TAAS is looking for people to continue this media relationship, and help maintain our position of notoriety.

If you are looking for a way to become more active in our astronomical society, and would like to work directly with local editors, writers and photographers, contact Sammy Lockwood for details.

-o0o-
Astronomy Day 2K Update
by Sammy Lockwood
Astronomy Day 2K Event Chairman

Preparations for TAAS’s Astronomy Day 2K at Coronado Center, April 29, are rolling along like a steamroller, but it’s not too late to become an active part of the effort. Teams are still forming, and there’s enough work and fun for everyone.

This year’s effort concentrates on pulling in the “quiet” TAAS members. Those who recently joined and want to get started, or those who have been members for a while, but unsure of how to get involved. To pull these members in, I am exploiting a seldom used Board E-mail list, and the results have been VERY encouraging.

In addition, 29 Astronomy and Science related exhibitors from around the state were invited to Astronomy Day 2K, and confirmations from these exhibitors are pouring in weekly.

You can track the progress of our Astronomy Day 2K preparations on the Internet, through the TAAS web site www.taas.org or visit http://members.aol.com/abqsammy/astroday.html.

TAAS Inventory Time
by Sammy Lockwood

It’s time once again to document the tangible assets of The Albuquerque Astronomical Society, via the TAAS 2000 Inventory.

As our astronomical society had grown over the years, it’s becoming more and more difficult to keep track of everything that we have accumulated, and the necessity of a yearly inventory has grown paramount. In 1998, the TAAS Board of Directors passed an amendment to our bylaws that mandated a yearly tally.

Last year’s inventory, our first, valued TAAS’s tangible assets at over $100,000. There will be several items to add this year, and maybe even items that were overlooked before.

The TAAS inventory can be viewed through our web site at www.taas.org. Just scroll down the buttons on the left and click on the Inventory link. Your point of contact for questions, comments, additions, or corrections to the inventory is Sammy Lockwood.

-00o-

CCD imaging at GNTO
by Carl Frisch

At the time of this writing the first CCD classes have not occurred yet. Being optimistic I went ahead and scheduled two more. The dates are March 24 and 25, Friday and Saturday. The subject matter will depend on who shows up. I will try to have some printed handouts with CCD basics. Again, the Astro-Physics telescope will be utilized with the SBIG ST-6 CCD camera.

The 16 inch Isengard telescope will also be available for visual work with emphasis on using the digital setting circles. If the weather is exceptional, I will have my 24-inch f/4 Dobsonian set up as well.

Come on out even if you are just curious about GNTO—all are welcome. Come early and picnic at our picnic area or take a short hike. The setting is beautiful and offers panoramic views. Questions? Call me at 239-6002 and leave a message.

-00o-

Are we doing what you want?
by Robert Williams

Since becoming involved with TAAS, I have taken on a number of tasks. I have enjoyed all that I do—and have done—and would not trade any of this for anything. I can still remember the first school star party I attended and can still hear the excitement of the kids as they looked through the telescope I had. I can also remember my first star party at Chaco Canyon and the excitement of showing an elderly lady the Ring Nebula in Lyra—it was the first time she had looked through a telescope in her entire life. I can still remember my first board meeting as an observer. I was asked to become secretary at that meeting. What a mistake that was (just kidding). I have no complaints to speak of and would do it all again. TAAS has grown since I joined and we have many more members than ever before, we are doing more events than ever before and we need your help to plan and organize them.

If there were anything any one would like to see done I would strongly recommend that you become involved and express your concerns. There are several ways to express what you would like to see done. If you have an idea you want to share you can call any of the board members (names and numbers in back of newsletter), or you can come to the board meetings and ask to speak your mind. Don’t worry about thinking you do not know enough about astronomy to have a good idea, I could barely find the big dipper when I began and look at me now.

We (the board of directors) need you help. You do not need to become a board member to help; we need help on committees.

TAAS has several committees that do much of the organization of events and keep things running smoothly, we need more people to help with specific items. We are working now at identifying all the committees and what their tasks are, I will see that we have sign-up sheets at the general meetings for you to look over and sign up if you choose to.

Please help us to make TAAS what you want it to be it is difficult for a small group to make all the decisions for a large organization. If you would like more information on the different committees or would like to volunteer to help with something please let me know and I will see that you get the answers you are looking for.

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### Table 1
(continued from page 6)
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The Sidereal Times
March 2000

Table 2
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**Refractors**
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(5) 4 26 3 3 9 6 5 6 5 2106 Orion VX102-ED
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(5) 4 26 3 3 9 9 5 6 5 2927 Orion VX102-ED SkySensor [*]
(5) 4 36 3 3 9 9 5 6 6 3635 Orion VX102-FL SkySensor [*]
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**Celestron 8" SCTs**
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(7) 8 80 5 0 6 9 9 9 3 2700 Ultima 2000 [*]
**What Are The Ecliptic And Equatorial Planes**

Those two planes can be a source of confusion for novice and experienced observers alike. The ecliptic plane is the plane defined by the Earth's orbit around the Sun. The equatorial plane is defined by the plane that passes through the Earth's equator. This plane is perpendicular to the Earth's axis about which the planet rotates. The angle between these two planes is 23.5°. If this angle seems familiar, it should be because the Earth's axis is tilted at the same angle from a perpendicular or vertical line drawn with respect to our orbital plane.

There are two points in time and space where the line that passes from the center of the Sun through the center of the Earth is common with the line created by the intersection of the ecliptic and equatorial planes. These two instances occur at the exact moment of the Vernal (Spring) equinox and the Autumnal (Fall) equinox. The precise moments of the Winter and Summer solstices occur when the line from the Sun and Earth crosses the common equatorial/ecliptic line at an angle of 90°. The vertex point of that angle is at the center of the Earth. Figure 1 shows the seasons of the Earth throughout the year. Figure 2 shows the alignment of the Earth with respect to the ecliptic and equatorial planes and the positions of the sun at one of the equinoxes and solstices.

Star charts show celestial objects using Right Ascension (RA) and Declination (Dec). These charts are based on Sidereal (Star) time position and the angle position of the object with respect to the equatorial plane. Angles up to +90° are North of the celestial equator and angles down to -90° are south of the equator. The equatorial coordinate system is the same system used by polar aligned equatorial mounted and driven telescopes.

In summary, the ecliptic is the plane on which the Earth revolves around the Sun, and the celestial equator is the plane which passes through the Earth's equator and is used as a reference for astronomical observations.

March Meeting to Discuss Galileo Mission
by Bruce Levin

How have our scientists been able to learn about Jupiter and some of its moons? This is not a question that will be addressed in our “Ask the Experts” column, but one that will be answered by our guest speaker for this month. There have recently been two close flybys of Io and a close flyby of Europa. Len Duda will recap the Galileo mission and present information on Jupiter and the four Galilean moons. He will emphasize the most recent results of Io and Europa. Scientists hypothesize that Europa has a large ocean beneath its ice-encrusted surface. They now think that conditions may be sufficient to support some type of life on Europa. Len will conclude with prospects for further studies at Jupiter using both the Galileo spacecraft and the Cassini spacecraft now en route.

Dr. Duda received his Ph.D. in physical chemistry from the University of Illinois and has worked at Sandia National Laboratories for twenty years. Len works in the Primary Electrical Standards Department specializing in microwave metrology. He has and continues to do science activities at our schools, is on the Board of Directors for ¡Explora!, and regularly gives Sunday afternoon science demonstrations at ¡Explora! usually twice a month. Len is one of 140 selected volunteers nationwide in the Solar System Ambassadors program. This outreach program was begun by NASA JPL in the summer of 1999 to provide presentations aimed at the general public about current or upcoming NASA missions to investigate planet, asteroids, and other bodies in our solar system. New Mexico has one ambassador each in Albuquerque, Roswell, and Alamogordo.

Mark your calendars now to hop on board for “Our Next Journey to Jupiter” and general meeting on March 18th, 7:00pm at Regener Hall. A social period will follow the presentation.

You Have Mail, Part II
by Peter Eschman

This is a follow up to an excellent article by Robert Williams in the August 1999 Sidereal Times. There are two types of e-mail notification systems that TAAS uses today. The first type is what I will call the Board of Directors Official E-mail List (or BoDOEL). This distribution list is built from the TAAS membership database, and contains e-mail addresses for all TAAS members that have given their address as part of membership applications. This list is used sparingly for official e-mail messages from the Board of Directors, with e-mail distribution by blind carbon copy (BCC), so that e-mail addresses are concealed for privacy reasons. Typically these e-mail messages appear to originate with the TAAS WebMaster, and indeed, Mike Pendley does send out the message the Board has given him. This list requires a fair amount of effort to maintain, as it requires periodic additions and subtractions when membership renewals and new subscriptions are processed. This distribution method is one-way, from the TAAS Board of Directors to the membership. If you would like to be on this list, then simply make sure that your e-mail address is part of the TAAS membership information. Contact our Treasurer, Robert Williams, robawil@cs.com to add your e-mail to this membership database. If you wish to have your e-mail address removed from the database, please contact Robert at (505) 839-2840.

The second e-mail notification system that TAAS uses is the TAAS-L listserv. This exciting new service is available to all TAAS members. The TAAS-L listserv is a group of TAAS members who have joined to form a discussion group related to TAAS and amateur astronomy in general. Your e-mail address will only be added to this group when you chose to join TAAS-L, and it is up to you to take the steps to join. TAAS-L is limited to TAAS members only, and operates as a private discussion group; that is, new subscriptions have to be approved by the owner of TAAS-L. TAAS-L has been configured as a private discussion group to reduce the likelihood of being flooded by spam (messages not related to TAAS or amateur astronomy).

TAAS-L serves as an automated e-mail message relay where e-mail addressed to the list is sent to all list members. Individuals wishing to reply to a message may do so in a public way by addressing their response to the list, or may reply in private by addressing a response directly to the originator. So far, TAAS-L has about 30 participants and we join in inviting other TAAS members to join in our discussions on topics ranging from objects observed, to equipment, to neat web sites we have seen.

If you would like to join us, then subscribe to the TAAS-L by sending the following message:

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Here is what my subscription request looked like:

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1. There is no “e” on the end of listserv, so your message to listserv@, NOT listserve@
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Continued on page 14
Tom’s Excellent Adventure—Prologue

by Tom Pannuti

Lisa Wood convinced Tom Pannuti to keep TAAS up to date on his latest research trip via e-mail. Lisa posted this update to the TAAS e-mail list—ed.

As promised, here is the background information regarding Tom’s supernova research—he’ll be posting periodically for those of you who, like myself, want to know what it’s really like to have an observing run at a professional facility. LW

Hello! My name is Tom Pannuti, and I am a Ph.D. candidate in astronomy at the University of New Mexico’s Department of Physics and Astronomy. Recently, I informed a friend of mine, (someone I know through The Albuquerque Astronomical Society) that I would be traveling to Australia to conduct an observing run for my dissertation research, and she invited me to write an e-mail diary about my trip. I thought that I would begin with a little background about my research before I leave, and follow this up with entries once I’ve arrived and settled in at Sydney. 10 PM, 2/19, Albuquerque, NM:

Tonight I’m trying to make sure everything is ready for the trip, and also stay loose and relaxed too. I fly from Albuquerque to Los Angeles International on Monday morning, and then fly to Sydney non-stop on Monday afternoon, with an expected arrival time at 10pm local time, on Tuesday evening. The more I think about this, and the approximately fourteen hours that I will be in the air, the more my head spins, so I think that I will leave this subject alone for now ... :) I have never been to Australia before, so there’s a healthy mixture of nervousness and excitement about the big trip.

About my work, and my observing plans: I work chiefly in radio astronomy, and my dissertation work is devoted to the study of supernova remnants in nearby galaxies. A supernova remnant is the term given to the expanding shell of material (both stellar ejecta and swept-up interstellar matter) produced by a supernova explosion. Supernova remnants are known to be responsible for many crucial properties in their native galaxies, such as significantly enriching the heavier-element content of their surrounding interstellar medium, and depositing vast amounts of kinetic energy into this medium. Astronomers believe that the vast majorities of the heavier-element atoms in the universe originate in the cores of massive stars, and when these stars perish in supernova explosions, these atoms are released en masse into the star’s immediate surroundings. Shock waves that are also produced by the supernovae may also trigger nearby interstellar clouds to collapse upon themselves gravitationally, thus initiating the creation of new generations of stars.

While both low-mass white dwarfs and high-mass supergiant stars are theorized to be progenitor stars for supernova explosions, my research has concentrated on the remnants produced by the deaths of stars of the latter type. Specifically, I’m investigating how the characteristics of the progenitor’s surroundings (such as density) shape the evolution of the remnant itself: while this subject has been the source of much study and modeling by theoreticians, a comprehensive model that satisfies all of the observed properties of remnants has yet to emerge. These models have been limited by the low number of supernova remnants that have been extensively studied at all wavelengths by astronomers.

A supernova remnant is expected to be a prominent source at X-ray, optical and radio wavelengths for different reasons. Vigorous expansion by the remnant’s shock wave into the surrounding interstellar gas can abruptly raise the temperature of the gas to millions of degrees, producing significant amounts of high-energy X-ray radiation. The shock wave can also ionize atoms in this gas by stripping ions from atoms, and when these electrons recombine with the atoms, trademark so-called “recombination” radiation is produced at optical wavelengths (astronomers studying remnants have recently concentrated on observing recombination radiation from sulfur atoms). Finally, electrons moving at relativistic speeds (nearly the speed of light) in the magnetic fields of remnants produce a signature type of radiation called “synchrotron radiation” at radio wavelengths.

Through radio observations, astronomers have detected 220 supernova remnants in the Milky Way Galaxy. These efforts have been conducted in the radio mainly because radio waves are not significantly absorbed or scattered by dust and gas in the plane of the Milky Way, and the potential exists to thoroughly examine the whole galaxy for supernova remnants using radio observations. However, attempts to observe these remnants in a complementary manner with X-ray or optical observations have been badly hampered by the fact that dust and gas in our galaxy dramatically absorbs and scatters X-ray and optical light making it very difficult to study remnants at these wavelengths. Because of this, less than a third of these 220 remnants have been successfully observed; these 220 remnants have been successfully been observed at either or both of these wavelengths (examples of remnants that have been studied at more than one wavelength include the Crab Nebula, the Vela Remnant, and Cassiopeia A, among other sources). To get around the difficulties associated with observing remnants in our own galaxy, my advisor Nebojsa Duric and I have instead looked for remnants in nearby galaxies. By carefully choosing nearby, face-on spiral galaxies (such as M33 and M83) that are located well away from the plane of our own Milky Way Galaxy, we can perform observations at all three wavelengths with less concern about the effects of absorption and scattering.

To help explain this, I’ve come up with an analogy which I hope isn’t too tortured :) : imagine that you’re standing in a crowd, and you have the task...
of finding all of the people in the crowd who, say, are wearing a red shirt. Well, if the crowd is very large and dense, you might be able to find everyone with a red shirt who is within several persons of you, but it would seem pretty hopeless to find someone with a red shirt who was several hundred feet away from you. If, however, your perspective is in a helicopter hovering above the crowd rather than within the crowd, the task would be more straightforward, and it would be more likely for you to find all of the people in the crowd with the red shirt. This analogy helps illustrate our observing technique: because our observing perspective in the Milky Way Galaxy is defined by the position of Sun, which is embedded within the disk of the Galaxy, we can only effectively sample a certain radius of the Galaxy before absorption and scattering effects become insurmountable. By looking at other galaxies — namely galaxies that are face-on or nearly face-on to us — we can act to minimize the effects of absorption and scattering, and make observations that reveal the true nature of remnants that lie in these galaxies.

One of the galaxies in our sample, NGC 300, was observed by us in the radio at the wavelengths of 6cm and 20cm using the Very Large Array (VLA) Radio Telescope here in New Mexico. Our intent was to find new remnants and to investigate the radio properties of remnants identified previously by other experimenters using optical observations. The new remnants would be identified as radio sources that were associated with regions of optical emission in NGC 300, and the radio properties of remnants follow the paradigm that they emit more radiation at the 20cm wavelength than the 6cm wavelength, consistent with the profile of synchrotron radiation. Unfortunately, NGC 300 is located at a rather low Declination (-37 degrees) which made it difficult to observe from the latitude of New Mexico, and Nebojsa and myself were concerned with the resulting image. Around this time (roughly the spring of 1999), we received an e-mail from Miroslav Filipovic and Paul Jones, astronomers at the University of Western Sydney. In the e-mail, Filipovic and Jones noted that they had considered proposing for observing time to search for remnants in NGC 300, using the Australia Telescope Compact Array (ATCA), but they had noticed through a literature search that we had examined this galaxy already with the VLA, and asked if there would be merit to conduct a similar study of the galaxy using the ATCA. After some discussion, we agreed to jointly propose for an observing run with the ATCA to observe NGC 300 at the wavelengths of 13cm and 20cm. The proposal was submitted, and observing time was allotted for February 28th, 2000. I made travel arrangements to go to Sydney, with a leaving date on February 21st and ... now that’s just one day away!

The ATCA can be described as the southern hemisphere’s analog to the VLA: ATCA is composed of 6 22-meter dishes arranged in an east-west array, in contrast to the 27 25-meter dishes of the VLA that are configured in baselines (i.e. separations between telescopes) that run both north-south and east-west. We have two major ambitions with the new ATCA data: the first is related to the fact that some of our candidates were robust detections at 20cm but not at 6cm, and we want to see if any of the remnants first “surface” at the intermediate wavelength of 13cm. The second ambition is to combine the data from the ATCA at 20cm with the VLA data at the same wavelength, as a way to study both diffuse and point-like radio emission from this galaxy. This combination, in effect, would be something like transporting the ATCA to the VLA site and placing the six dishes within the VLA configuration, thereby increasing the collecting area! Hopefully, such a combination will prove fruitful and yield meaningful results for our study.

Well, it’s getting late here, and I feel like I’m at the point where I’m just blabbing (Lisa, are you still awake? :) ), so I’ll wrap this letter up here. I will try to write again once I’m settled in at Sydney. More information, including some useful web sites, to follow. Cheers, Tom :)

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The new planetarium at the New Mexico Museum of Natural History “will be truly world class and at least for a while will be truly unique in the planetarium field.”

That description came from the planetarium’s director, Ryan Wyatt before the General Meeting of The Albuquerque Astronomical Society on February 19 in Regener Hall.

Wyatt recently came to Albuquerque from the Arizona Science Center in Phoenix, where also helped set up a planetarium. Working with Lodestar, he will also have the opportunity to contribute to the design of a planetarium when Lodestar’s Enchanted Skies Park comes to fruition.

The 142-seat planetarium near completion at the museum is non-traditional in that its dome sits at an angle of 25 degrees from the horizontal, one of the most steeply tilted domes now in existence. Balancing the comfort of the tilted dome against natural orientation of a traditional dome remains a source of controversy in the planetarium community, Wyatt noted.

The planetarium will be able to project a single, high-resolution image over the entire dome—higher resolution, in fact, than are currently possible at the Hayden Planetarium in New York and the Adler Planetarium in Chicago.

It will also be capable of projecting “caricatures of the night sky,” such as the planar nature of the solar system, as well as advanced graphics, such as one showing the progression of a supernova from the core of the star.

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**February General Meeting Recap**

by David Nelson Blair

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**UNM Report**

**Library News**

**Docent News**

See next month

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**Star Myths and More**

**Gemini “The Hunter”**

*by Robert Williams*

This month I am going to talk about Gemini “The Twins”. I do not have any Messier objects for this month observing but I do have an evening’s worth of TAAS 200s to look at. Some of the TAAS 200 this month are difficult to find, but they are doable. I used the Isengard telescope for this article and you can too. The telescope at the observatory is working better than it has ever worked before, and it is much easier to use even for the beginner observer.


In the Greek myth the twins are Castor and Pollux, the Dioscuri (“sons of god”). They were born from an egg laid by Leda, queen of Sparta, after she had coupled with Zeus disguised as a swan. Mortal Castor was the son of Leda’s husband; immortal Pollux was the son of Zeus.

The twins traveled to the land ruled by Idas and Lynceus. Idas killed Castor with a spear, whereupon Pollux, although injured, killed Lynceus. Zeus intervened and struck Idas dead. Pollux refused to accept his immortality unless Castor could share it. Zeus allowed the two to alternate their days forever between the realm of the gods and the underworld, Hades.

Poseidon made the twins the protectors of sailors; they were both members of the crew (the Argonauts) that Jason enlisted to help him retrieve the Golden Fleece. Accordingly, the stars Castor and Pollux stand high above the mast of Argo Navis.

Gemini is just above Orion’s raised hand with the club. So this time of year if you look for Orion in the night sky and look above Betelgeuse towards the northern sky you will see Castor and Pollux the heads of the twins. It is not a hard constellation to find because it looks like to stick figures walking across the Milky Way.

All but one of the objects this month is an open cluster. The first one is TAAS #47 or NGC 2129 it lies just off of Castor’s right (westerly most) foot. NGC 2129 is an open cluster of about 12 bright stars forming a sort of face in the eyepiece. There is a double star that forms the two eyes. This is a very nice object and is fairly easy to find. Next we move north just slightly to TAAS #48 or NGC 2158 another open cluster just above Castor’s right foot. This is a very faint rich cluster of hundreds of stars; it is very pretty with M35 in the top of the field of view. For the next object, TAAS #56 or NGC 2266, we moved to Castor’s waist; this is a difficult one to find because it is very faint. It has a line of 3 stars that cut across it but there are no really bright stars to speak of. Good luck with this one. It took me a while but once I found it—it was worth the work.

I then moved on to Pollux, and TAAS #60 or NGC 2355 off of Pollux’s left knee, another open cluster of very faint stars with a bright star at about the three-o-clock position. Again this is a faint object but well worth the work. Next we have the only object in this group that is not an open cluster TAAS #64 or NGC 2392. NGC 2392 is also called “The Eskimo Nebula” and is a planetary nebula, this is a very bright object but was difficult to find without a UHC filter. It is very pretty and with high power I was able to see the central star. Once I found it I removed the UHC filter and could see a diffuse disk that got dimmer towards the edge. Next I moved to TAAS #67 or NGC 2420 below Pollux’s left hand. NGC 2420 is an open cluster; it is very compact but very pretty. It was not too difficult to find and was not difficult see once I found it. I liked this one a lot and will probably be looking for it again and again.

I again went to GNTO to work on these objects, it is a great place to view and the skies are very nice. I also used the Isengard telescope for all the viewing; it is a great telescope. While we were looking at things we spent some time looking at Saturn and Jupiter, all I can say is “WOW”. Saturn looked great and we were able to put extremely high power on the eyepieces and see banding on the planet, division in the rings and five of the many moons. Jupiter was great as well we were able to see the shadow of Io very clearly on the planet, as well as the disk of Ganymede as it transited the planet. We were able to see the banding very well as well as some features in the cloud bands, unfortunately we had just missed the red spot when we began viewing for the evening. This was one of the best nights I have had at GNTO in some time; I would encourage everyone to get out there as often as possible.

Till next month, happy viewing and dark skies.

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**You Got Mail**

*Continued from page 11*

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