

# The OBSERVER



The Newsletter of the Twin City Amateur Astronomers, Inc.

September 2001 Volume 26, Number 9

## Announcing a New ATM Class!

— Michael P. Rogers

**B**E HONEST, how many of you read the above and thought, how convenient yet thoroughly inap-

propriate for an astronomy club — a class on how to operate Automatic Teller Machines?

You are *not* alone in this — for the percentage of the population that would read ATM and recognize it as an acronym for Amateur Telescope Maker is miniscule.

However, we hope to increase that percentage, at least somewhat, by introducing a new class for those of you who want to learn how to make your own telescope.

The class will be taught by Joseph DeHoff, who many of our newer members may have first encountered during

Astronomy Day — he was the tall distinguished gentlemen in the lab coat, punctiliously grinding mirrors amidst the admiring crowds. Joe builds telescopes large and small for fun and profit; we will begin with small telescopes, purely for fun (although if you are able to sell yours later, more power to you!).



*No, it's not a waffle, but a pitch lap (don't worry, it's covered in class!)*

Class times, dates, and meeting locations have not yet been finalized, because we

*continued on p. 8*

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**Back By Popular Demand...**  
**Monthly Meetings @ the ISU Planetarium!!**  
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## TCAA Calendar

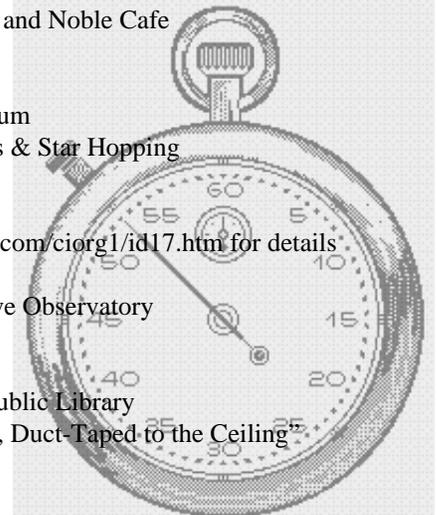
Monday, 1 October, 7:30 - 9:00 PM, Barnes and Noble Cafe  
TCAA Reading Group. Selection: Parallax

Monday, 8 October, 7:00 PM, ISU Planetarium  
TCAA Monthly Meeting. Topic: Star Maps & Star Hopping

j8-13 October, Scopeville, Kansas  
Great Plains Star Party (see [members.tripod.com/ciorg1/id17.htm](http://members.tripod.com/ciorg1/id17.htm) for details)

Saturday, 13 October, Sundown, Sugar Grove Observatory  
Members Only Observing Session (MOOS)

Tuesday, 30 October, 7 PM, Bloomington Public Library  
Public Lecture: "M. Messier Lives Upstairs, Duct-Taped to the Ceiling"



## The Observer

The Newsletter of the TCAA, Inc.

The Observer is a monthly publication of the Twin City Amateur Astronomers, Inc., a non-profit organization of amateur astronomers interested in studying astronomy and sharing their hobby with the public.

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Articles, ads, etc., are due by the 1st weekend of each month. Items may be e-mailed to: mprogers@mail.millikin.edu, or jmemken@ilstu.edu

#### Dues

\$25.00 per household, per year  
\$15.00 for members over 60  
\$12.00 for newsletter only  
\$ 1.25 for a single newsletter copy

## Club News & Notes

— Sandy McNamara

**G**ENERAL Monthly Meeting - Our first meeting back at the ISU planetarium definitely felt like coming back home to those who attended. Dan Miller's presentation for beginners on different telescope types was well received and Tom Wilmitch's night sky tour using the planetarium dome was a wonderful way to end the evening. I'm still working on a guest speaker for next month so can't give any details but if he can't come in October, we'll see him in the near future. The beginner's topic for the evening will be on how to interpret star maps and relate them to the cryptic RA/DEC positions given for many objects. If our guest speaker is delayed for a month, this topic will be expanded into a hands-on lesson in star hopping, using the maps to find selected objects for binocular or telescopic viewing. As someone who knows how to star hop (usually <g>), I think even more experienced observers will have fun with the activity.

We are looking for members to give a short beginner's talk at each meeting. If you would like to do so, PLEASE contact me. Don't think you need to be any sort of "expert" to give a talk! Many times someone who is just learning can give help on a topic from an angle that is more helpful than that of more experienced astronomers. We can help you find the resources you need to research any given topic and the talk is an excellent way to practice public speaking in front of a small and informal group of friends.

Meetings are scheduled for the second Monday of each month. Our next meeting will be Monday, October 8, at the ISU Planetarium beginning at 7 PM.

**SGO Update** - The kindly nature center officials have poured a nice, wide sidewalk from the parking area to our observatory building. There is also a wide concrete patio in front of the building and another sidewalk alongside that would

make a nice place to set up a telescope (and within easy reach of the electrical outlets on the side of the building if you should need them). Observatory manager Dan Miller also recently installed the permanent holders for our new slide screen on the side of the building so we can use the opportunity to give slide show or computerized projection programs.

As those who attended last month's meeting found out, we are well on our way to possibly acquiring a new computerized 12-in telescope with LOTS of bells and whistles for the observatory! More details will follow as they are known.

**POS & Presentations** - The last Public Observing Session of the season was rained out but a sincere thank you is extended to all who assisted in the programs over the summer. During just the last 2 months, TCAA members have hosted presentations for the boy scouts (over 100 attended!), the Golden Prairie Library District at Arrowsmith (attended by over 3 dozen) and Covell, and the Ecology Action Group. In addition, Dan M and Mike R presented, for the second year, an extensive educational conference at Millikin for teachers on using telescopes in the classroom. To all who have assisted (especially those who have assisted on almost \*every\* activity), a very grateful THANK YOU.

**TCAARG** - The current selection being discussed is Parallax, a Race to Measure the Cosmos, by Alan Hirshfeld. Written by a scientist, the book reads more like a best selling detective story and would be enjoyed by anyone. Our next selection is probably going to be a translation of great classic of astronomy, "Starry Messenger" by Galileo. The TCAA Reading Group meets at 7:30 PM on the first Monday of each month in the coffee shop at Barnes and Noble.

## Astroimages

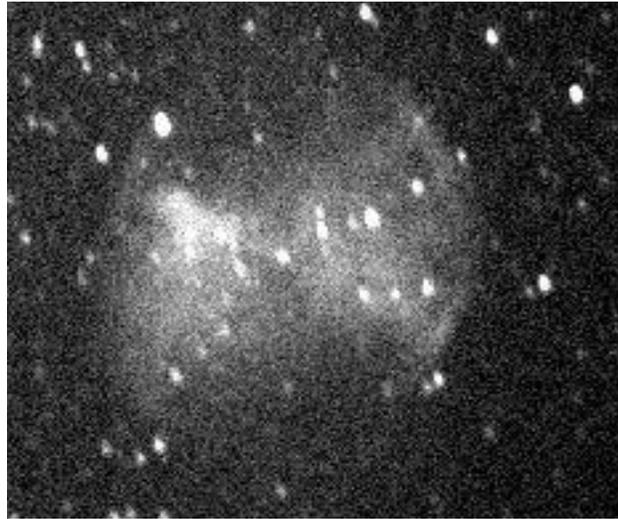
— Dan Miller, Michael P. Rogers

**T**HE IMAGES that you see at right were made by the authors using an STV (a digital CCD camera made by SBIG, reviewed in last month's Observer). They are not perfect; and while the exposures might have lasted minutes, the setup and the failures took up hours. Looking at these images, the skeptics among you might think we had perhaps inadvertently interchanged the successes and failures, but, no, these are our best efforts. However, they are also our first efforts, and we have learned **much** from making them.

What have we learned? First and foremost, how much **fun** it is to do astroimages. Sure, the toys have gotten a lot more expensive than those we used to play with, but we are still playing with toys. It is pleasurable to ponder the incongruity of being outside, exposed to the elements, yet surrounded by enough computing power to have made Kepler, or, come to think of it, even Einstein, weep with astonishment and envy.

We have learned much about focusing, in particular, how incredibly difficult it is to perform the most basic skill of the astroimager, namely focus. Focusing on a fuzzy object was clearly a non-starter, so we needed to use a star for focusing, and if one wasn't handy in the field — likely since the field was so tiny — we had to shift to a known star, focus, and return. In spite of the LX-200's vaunted precision, on the return we didn't always find what we were looking for. Consequently we had to carefully remove the STV, insert an eyepiece (at which point we would almost always see the object in question, just a smidgen away from center), and reposition the telescope. Whew!

If you are interested in using this equipment (borrowed with permission from Millikin) drop us a line, or read the mail list -- one of us usually posts a note when we plan to go CCDing, and we'd welcome the company!



*M27, the Dumbbell Nebula, 60 second exposure*



*M13, 10 second exposure during a full moon!*



*M51, the Whirlpool Nebula, exposure time unknown*

## Fall Classics

— Sandy McNamara

AS AUTUMN arrives, so does some of the most pleasant viewing weather in central Illinois. To start the season, we're going to explore some well-known objects that beginners are encouraged to find on their own. Experienced observers still enjoy returning to these classics repeatedly and those of you with larger telescopes are encouraged to study them in detail to see what you may have missed on prior occasions.

Note -- if you are having trouble finding any of these, attend our next meeting, October 8th, at the ISU planetarium! The beginner topic for the evening will be a hands-on practice with star maps including how to read them, how to find objects when only the cryptic RA/DEC coordinates are given, and how to use various types atlases to "star hop" to your target with a telescope or binoculars!

To start the tour on an easy note, point your telescope to the star in the middle of the still prominent summer triangle. Beta Cygni, or Alberio, is the premier double star of the northern hemisphere, famous for its dazzling color contrast. It can be separated into its gold and blue components using low power with even the smallest telescopes. The brighter golden sun is actually a double star itself, although with a separation of only 0.4 arc-sec, they are too close to be resolved by most telescopes (I've only seen them resolved once in a high quality large Astrophysics refractor)

M27, the Dumbbell Nebula, is visible in binoculars as a dim, small, sl fuzzy round spot. 3 degrees N or gamma Sagitta it forms the 4th corner of a rectangle with epsilon-gamma-beta Cyg. Small telescopes will only show a slightly elongated glow while a 6 to 8-in telescope will reveal its bright hourglass shape. Those of you with larger telescopes should be able to find at least a half dozen faint superimposed stars seemingly embedded within the nebula as well as the 13th mag-

nitude central star (be sure to remove any nebula filters before searching for these little pinpricks of light). An OIII or UHC filter on a smaller telescope brings out the "apple core" appearance of the central area and, in larger telescopes, the fainter arcs of nebulosity encircling the entire object. The nebula takes high power well and on a good night you can magnify it to fill the entire field of view.

OK, globular cluster NGC 6760 is not a "classic" but it IS the only fall target for our beginner's Universe Sampler program which is not also one of the other showcase items listed here. Although not terribly impressive, at least it is brighter than a few of the GC on the famous Messier list. Look for a dim, round, little fuzz ball 4 degrees SW of delta Aquila. An 8-in tele-

ble", this one is easier to separate the individual stars than the famed double-double (epsilon) in Lyra. Locate the large triangular neckerchief shape of Capricornus low in the southern skies and turn your attention to alpha-Cap at the western point. The smallest binoculars will show that Alpha is a pair of yellow stars; someone with excellent eyesight may be able to see this with the naked eye. Most star catalogs refer to these as alpha-1 and alpha-2 with alpha-1 being the slightly dimmer one to the west. This pair is only an optical double but each of them is a true binary star in their own right. Point any size telescope to the two at around 60x and you will find that each has a faint companion. What color would you call the secondary star of each pair?



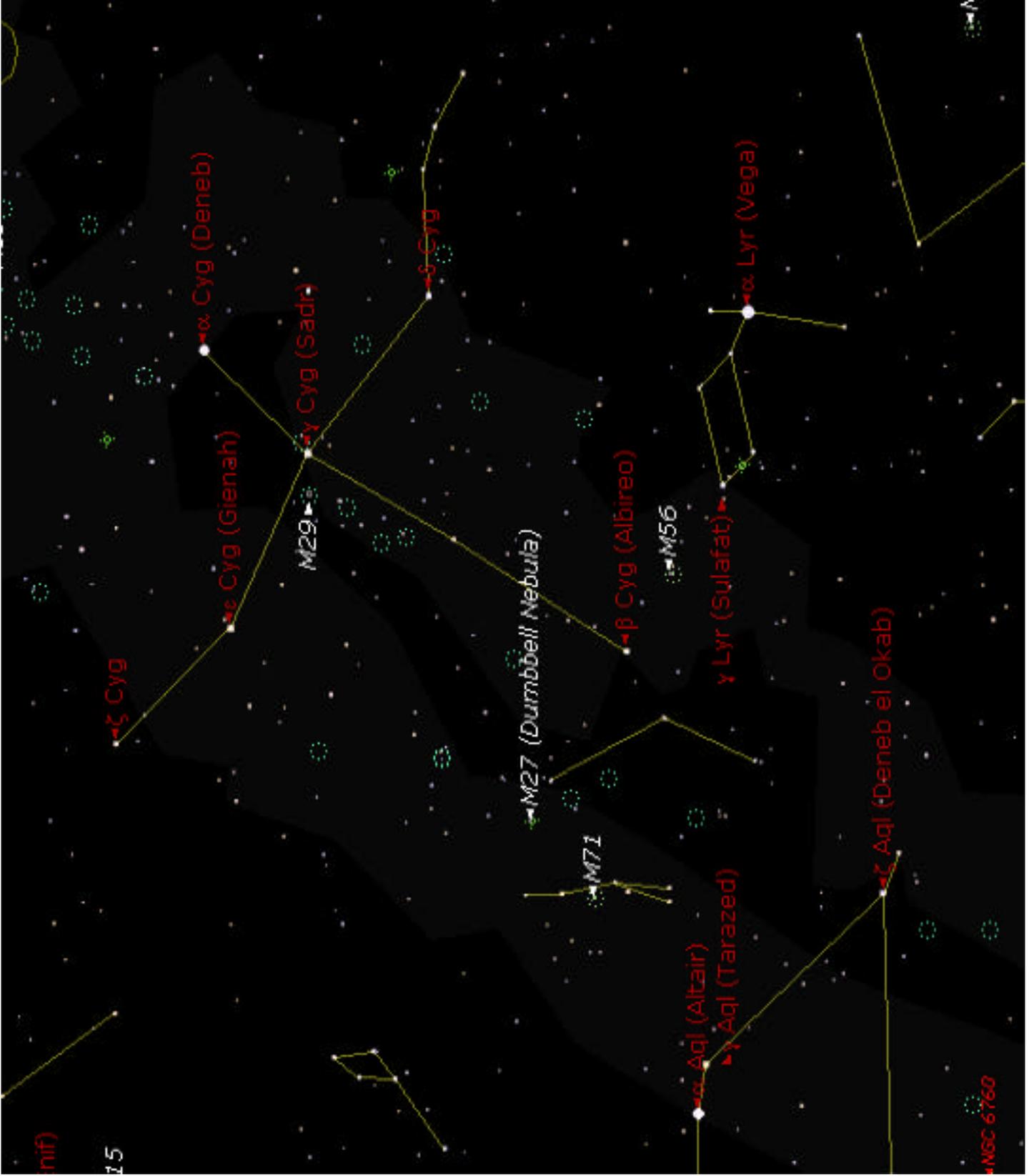
*Here's looking at you, kid! The Helix Nebula (Copyright, Royal Observatory, Edinburgh/Anglo-Australian Observatory)*

scope is usually required to resolve a few stars around the edges at 150x while larger telescopes may show a few faint stars sprinkled across the middle.

Onward to our easiest double/multiple star of the night. Another "double-dou-

The Helix nebula is the largest, brightest, and closest of the planetary nebulae. It is also one of the most challenging to observe with a small telescope. The location of the Helix is fairly easy to find, but

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the nebula itself may be difficult to see if you are not at a dark sky site. Move about 4 degrees S of delta Cap, then sweep about 10d east of delta Cap OR drop about 20d south from the distinctive “water jar” of Aquarius (which somewhat resembles a child’s jack). The nebula is located between the 5th magnitude stars upsilon and 57 Aquarii, about a third of the way from upsilon toward 57 Aqr.

The Helix nebula itself is fairly bright, but it is quite large and the light is spread out over a substantial area producing what is referred to as “low surface brightness”. Unlike most planetaries, which are usually much smaller, you’ll want to use your lowest power eyepiece to find the elusive smoke ring. Using an 6-in telescope at its lowest power eyepiece and no filter enhancement under mod dark suburban skies, I can see a large (about half the size of the full moon), faintly glowing, round area best described as merely “lighter than the background sky”. A narrow band filter such as the UHC/Ultrablock or OIII enhances the visibility of this object quite a bit. 8-10 inch telescopes at 150x should show the dark “hole” inside the nebula and subtle brightness variations along its edges as well as several faint stars sprinkled in the area. One of these stars, a 13th magnitude bluish star near the center, is the central star whose slow death is producing the nebula as it blows off layers of its outer atmosphere.



We’ll end our evening with the true showcase of the autumn skies. The great Andromeda Galaxy is easily visible in binoculars and often to the naked eye when the skies are dark enough. To locate it, draw an imaginary line from beta And through mu And and keep going about the same distance further on; or look just over 1d W and slightly N of 4.5 magnitude nu And.

This galaxy is almost too large to enjoy in the typical 3/4 or 1 degree field of view of a typical low power eyepiece; the true extent of the halo is obvious only in finderscopes or binoculars. Two companion galaxies are also easily visible in binoculars and small telescopes; these orbit M31 just as our own Milky Way galaxy is accompanied by the Magellanic Clouds. Appearing stellar in binoculars, M32 can be seen in small telescopes as a small

bright round spot just under 1/2 degree S of the center of M31. A “fuzzy star” in binoculars, NGC 205 appears in telescopes as a bright little oval about 3/4 degree NW of the center of M31.

Telescopic observers can spend more than an entire evening sleuthing out the myriad of details visible in and around M31. 6-10 inch telescopes will find streaks of dark, star obscuring dust, a bright round nucleus, and a star cloud on the SW end so bright it even has its own NGC number (NGC 206). Larger telescope users can challenge themselves by seeing how many of its splendid globular clusters they can make out (perhaps over a dozen, depending on aperture) or looking for its spiral arm structure. Or you can simply sit back, relax, and soak up the Andromeda Galaxy’s beauty just for the pure pleasure of stargazing :-)

Object	AKA	Con	type	RA	DEC	Mag(s)	Size/Sep	Notes
NGC 6760		Aql	GC	19h 11m	01d 02m	9.0	6.6'	a
Beta (6)	Alberio	Cyg	DS	19h 31m	27d 58m	3.1/5.1	34.4"	a, c
NGC 6853	Dumbbell, M27	Vul	PN	19h 60m	22d 43m	7.3	480" x 240"	a,b
Alpha (5/6)	Algiedi	Cap	DS	20h 18m	-12d 33m	3.6/4.2	378"	a, c
Alpha-1 (5)	Prima Giedi	Cap	DS	20h 18m	-12d 31m	4.2/9.2	45.4"	
Alpha-2 (6)	Secunda Giedi	Cap	DS	20h 18m	-12d 33m	3.6/11.0	6.6"	
NGC 7293	Helix	Aqr	PN	22h 30m	-20d 48m	6.5	960" x 720"	a
NGC 205	M110	And	Gal	00h 40m	41d 41m	8.1	17.1' X 9.8'	b, c
NGC 224	Andromeda Gal, M31	And	Gal	00h 43m	41d 16m	3.4	178' x 63'	a,b
NGC 221	M32	And	Gal	00h 43m	40d 52m	8.1	7.6' x 5.8'	b

Notes: For those of you working on various observing projects: “a” = included in the Universe Sampler Award, “b” = included with the Messier Award, “c” = included with the Double Star Club award, “d” = included with the Herschel 400 Award

## A Meal that is Out of this World

— Jean Memken

Of all the articles that have appeared in *The Observer* over the years, I don't believe we have ever included a restaurant review. But amateur astronomers are known to eat on occasion, and our family stumbled on a great place for astronomy buffs, as well as others, to enjoy a wonderful meal in a "cosmic" environment.

Mars 2112 is the latest of theme restaurants to hit the mall scene. We found this gem on a recent trip to Woodfield Mall in Schaumburg, Illinois. Woodfield has the reputation of being one of the biggest malls in the country, and so it seems logical that it would be the location of this new adventure in dining.

We "discovered" Mars 2112 after spending most of the morning and part of the afternoon waiting in a long, winding line to be one of the first patrons of the new Apple Store, and then subsequently checking out every inch of the store once we got in. By the time we left the Apple Store, our feet were tired, our arms were laden with various electronic gadgets and software, and our stomachs were quite empty. Luckily, it was about 2:30 in the afternoon, so most of the eateries in the mall were clearing out the regular time lunch bunch. It is our understanding that if you go to Mars 2112 at noon or between 4:30 and 6:30 p.m., be prepared to wait a long time for a chance to experience a real Martian meal.

When we first arrived at Mars 2112, we were ushered into a room that looked kind of like a launch pad. There was a large circle on the floor where we were told to stand, and there were many unusual lights and television screens surrounding us. Also, there was a window through which we could see an unusual looking space pod which we surmised was the vehicle

that would whisk us to Mars for lunch.

Finally, a door opened and a rather tall young man in a uniform that looked like something out of a Star Trek episode (somewhere between James Kirk and Jean Luc Picard) stepped out and informed us our space ship was ready for launching. He escorted us into the space pod we had seen through the window and then shut us inside, saying that Mars was our destination. The "pod" turned out to be one of those flight simulator machines that are quite popular at theme parks, carnivals, and county fairs. Thanks to the video that



was projected at the front of the pod, and the movement of the simulator, we had a two-minute "virtual" flight to Mars. If this part of the journey seems kind of corny, you can skip it and head straight to the restaurant, but our kids got a great charge out of it.

When the pod stopped moving, the doors opened and another uniformed man escorted us to the actual restaurant. It is an amazing place. You round a corner, and there you stand on a landing that overlooks what appears to be a Martian landscape. The walls are orange and rugged, looking much like the Badlands of South Dakota. The carpet has an orange and yellow swirl pattern to remind



one of Martian dust, and the lighting is minimal, all the better to enjoy the lasers that shoot around the room and form amazing scenes of various space ships, astronauts, aliens and Martian mountains and craters. In the center of the room was a volcano spewing fire from its peak. The music is loud and eerie, all the more to add to the effect that you are somewhere other than planet Earth.

There was a small television screen at the top of the landing, informing us that our table was ready, so we checked in at a small booth and a uniformed host escorted us down a circular staircase from the landing to the lower level of the restaurant. There is an upper level on the other side of the volcano where we could see smoke rising, so we figured that must be the smoking section, although from our vantage point, we couldn't see any diners in there because the volcano and accompanying mountain range separating the two levels obscures the view.

Enclosed behind glass on the other side of the dining area where we were seated was a futuristic looking bar where we saw many people enjoying themselves (an unusual sight on a Saturday afternoon in a shopping mall, but hey, I guess they start partying earlier up there than we do down here).

In spite of the fact that we didn't have to wait to get into the restaurant, the place was packed, mostly by families with young children as well as large tables accommodating numerous children attending birthday parties. Our "captain"

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want to see who is interested, and when they would be available. We envision making several telescopes, beginning with one whose success is nearly guaranteed — a 6 inch solar telescope. For those of you who had visions of Keck III dancing about in your head, let me explain (paraphrasing Joe's rationale as best I can). Your first telescope making adventure ought to be a successful one — there's no point in agonizing months over a 16 inch mirror only to discover that it is best suited as a bird-feeder.

A 6 inch mirror is a good size — not too small as to be difficult to manage, not too large as to take days to grind. The tolerances for a solar telescope are greater than for an astronomical one, too.

As an aside, this telescope is ingeniously designed to prevent eye damage. The telescope uses a piece of welder's glass angled at 45 degrees. Some of the light penetrates the glass, strikes the mirror, and bounces back; some of the glass that bounces back will reflect into the eyepiece. Should the glass should fall out, then the telescope will cease functioning; looking through the eyepiece will merely show the other side of the tube.

## Registration

If you want to sign up, and we really, really hope that you do, please contact either Joseph DeHoff (josephd@connectingpoint.com) or Michael Rogers (mprogers@mail.millikin.edu).

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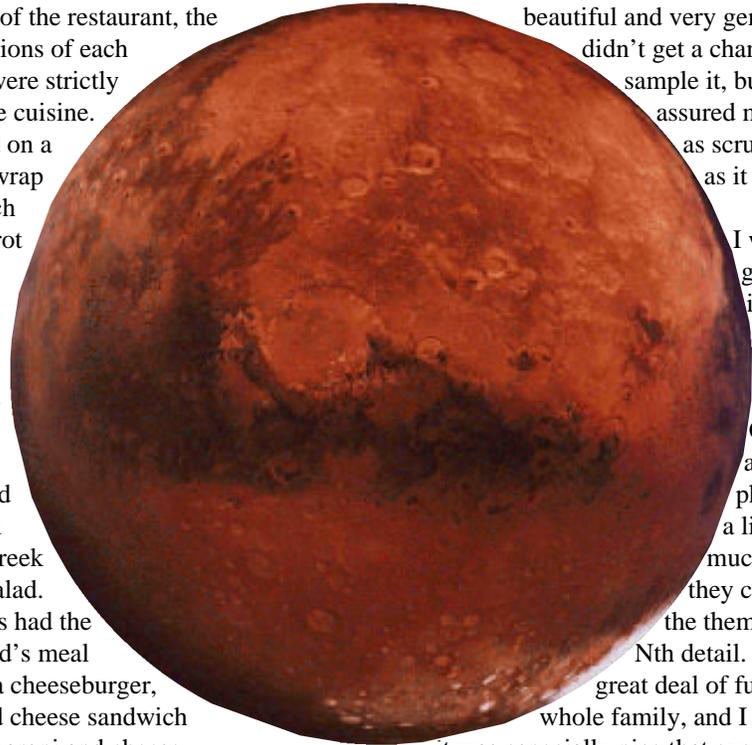
(waiter) greeted us and took our drink orders right away. We got down to the business of looking at the menus, and true to form, each item had a name that went right along with the theme like "Promethean Pork Roast Comfit", "Astral Tuna", and "Cosmic Chaos Cheesecake." Although the menus looked as campy as the rest of the restaurant, the descriptions of each entrée were strictly nouvelle cuisine. I settled on a turkey wrap sandwich and carrot soup (yes, it was orange just like everything else) and Michael had a Greek Pasta Salad. The kids had the usual kid's meal fare of a cheeseburger, a grilled cheese sandwich and macaroni and cheese.

While we waited for our food to arrive, we were greeted by several "aliens" who wander about the tables. We were also treated to a laser show which explained that as various space probes landed on Mars, our alien friends watched them from behind nearby rocks. They decided they would come to earth and open a restaurant! It was an amusing show for the kids and Michael and I couldn't help but laugh at the thought of little Martians watching the Mariner and Viking space probes from behind rocks on the Martian surface. Why anything they might have seen on those probes inspired them to fly to earth and open a restaurant, we don't really know, but maybe they hoped people wouldn't think too deeply about that.

The food was served quite promptly and it was, in a word, delicious. My soup was hot, slightly sweet, with a hint of sweet basil. The wrap had lots of good shaved turkey and fresh vegetables wrapped in a tomato tortilla. It came with an Olympus Mons portion of French fries that were also very tasty. Michael's salad was beautiful and very generous. I didn't get a chance to sample it, but he assured me it was as scrumptious as it looked.

I was greatly impressed with Mars 2112. OK, the atmosphere was a little much, but they carried out the theme to the Nth detail. It was a great deal of fun for our whole family, and I thought it was especially nice that even though the atmosphere might cater to the younger generation, the cooking staff didn't forget the fact that it takes adults to get the kids into the restaurant, and they do not generally subsist on fast food.

So far, there are only two Mars 2112 restaurants. The other one is in New York City and if you would to see the interior of that one and look at the menu, visit their web site at [www.Mars2112.com](http://www.Mars2112.com). But better yet, take a jaunt up to Chicago and see the real thing for yourself. It's the next best thing to a space shuttle ride (OK maybe to the Star Wars ride at Disney World), and the food really is out of this world.



# Highest Resolution Comet Picture Ever

— NASA/JPL

In this highest resolution view of the icy, rocky nucleus of comet Borrelly, (about 45 meters or 150 feet per pixel) a variety of terrains and surface textures, mountains and fault structures, and darkened material are visible over the nucleus's surface. This was the final image of the nucleus of comet Borrelly, taken just 160 seconds before Deep Space 1's closest approach to it. This image shows the 8-km (5-mile) long nucleus about 3,417 kilometers (over 2,000 miles) away.

Smooth, rolling plains containing brighter regions are present in the middle of the nucleus and seem to be the source of dust jets seen in the coma. The rugged land found at both ends of the nucleus has many high ridges along the jagged line between day and night on the comet. This rough terrain contains very dark patches that appear to be elevated compared to surrounding areas. In some places the dark material accentuates grooves and apparent faults. Stereo analysis shows the smaller end of the nucleus (lower right) is

tipped toward the viewer (out of frame). Sunlight is coming from the bottom of the frame.

Deep Space 1 completed its primary mission testing ion propulsion and 11 other advanced, high-risk technologies in September 1999. NASA extended the mission, taking advantage of the ion propulsion and other systems to undertake this chancy but exciting, and ultimately successful, encounter with the comet. More information can be found on the Deep Space 1 home page at <http://nmp.jpl.nasa.gov/ds1/>.

Deep Space 1 was launched in October 1998 as part of NASA's New Millennium Program, which is managed by JPL for NASA's Office of Space Science, Washington, D.C. The California Institute of Technology manages JPL for NASA.

Deep Space 1 flew by comet Borrelly and took these measurements with its plasma instruments between 90,000 kilometers

(56,000 miles) and 2,000 kilometers (1,200 miles) away. These data show that the flow of ions around the comet's rocky, icy nucleus (the center of the deep V-shaped feature) is not centered on the comet's nucleus as scientists expected before the Borrelly flyby. Ions in the turbulent flow are heated to about 1 million Kelvin (2 million degrees Fahrenheit) causing the bands of ions to appear broad and jagged compared to the solar wind.

## Deep Space 1: The Facts

Objective: Test 12 advanced technologies in deep space to lower the cost and risk to future science-driven missions

Project Manager: Dr. Marc Rayman.

Total Cost: \$149.7M (FY95-99)

Development Costs: \$94.8M

Operations Costs: \$7.7M

Launch Service: \$43.5M

Science: \$3.7M

New Start Date: October 1, 1995

Launch Date: October 24, 1998

Launch Vehicle: Delta 7326-9.5 Med-Lite

Launch Site: Cape Canaveral, Florida

### Mission Results:

1. 12 technologies tested successfully
2. Flyby asteroid Braille & Borrelly
3. Began extended mission 9/99

End Of Primary Mission Date: 9/99

End Of Extended Mission Date: 10/01

Launch Mass: 486.32kg

High Gain Antenna Diameter: 0.274 m

Max Data Rate: 20 kbps

Max Power: 2500W



## Treasurer's Report — August 2001

— Duane A. Yockey, Treasurer

OPERATING FUND BALANCE – July 31, 2001 - **\$1,454.29**

### Income

Joseph McCarron (dues) -	\$ 25.00
Don Dupuy (dues) -	\$ 25.00
David Skinker (dues) -	\$ 25.00
Michael Rogers (dues renewal) -	\$ 25.00
Dan Miller (dues renewal) -	\$ 42.00

### Expenses

Postage (Herschel 400) -	\$ 2.18
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OPERATING FUND BALANCE – August 31, 2001 - **\$1,594.11**

OBSERVATORY FUND BALANCE – July 31, 2001 - **\$ 131.65**

### Income

Dan Miller (key deposit) -	\$ 10.00
Michael Rogers (key deposit) -	\$ 10.00

### Expenses

Observatory Reimbursement. (Dan Miller) -	\$ 52.00
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OBSERVATORY FUND BALANCE – August 31, 2001 - **\$ 99.65**

TOTAL TCAA FUNDS – August 31, 2001 - **\$1,693.76**

# The Observer Crossword

—Observer Staff

**ACROSS**

- 1 9th Greek letter
- 5 Ball game
- 12 Not closed
- 13 Japanese sash
- 14 Extent of space
- 15 Portable shelter
- 16 Observation
- 17 Strike breaker
- 18 Moderately slow
- 20 Mouthpiece of a bridle
- 21 Narrow beam of light
- 22 Spot on the skin
- 24 aka Alpha Cygni
- 27 Exclamation of surprise
- 28 To free
- 29 Greek god of love
- 30 On Jupiter, this is about 10 hours long
- 31 Martial art
- 32 Fish appendage
- 33 Anglo-Australian Observatory, for short
- 34 Shield
- 35 Vigor
- 37 Comrade
- 38 Contend
- 39 Ingenuous
- 43 Paradise
- 45 23rd Greek letter
- 46 Notion
- 47 Sisters
- 48 Jamaican popular music
- 49 Lyric poems
- 50 Practice of having totems
- 51 Lets head fall wearily

1	2	3	4		5	6	7		8	9	10	11
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47					48				49			
50									51			

**DOWN**

- 1 9th Greek letter
- 2 A type of star cluster
- 3 Propend
- 4 Brightest star in Scorpius
- 5 Pillage
- 6 A religious eyepiece?
- 7 Sister
- 8 Fundamental
- 9 Brightest star in the constellation Bootes
- 10 Meadow
- 11 Retriever
- 19 Arrest
- 20 Exclamation of contempt
- 22 Month
- 23 Public swimming pool
- 24 Ptolemy's epicycles ran on these
- 25 Ireland
- 26 Anticlimax
- 27 Anglo-Australian Observatory, for short
- 30 On Jupiter, this is about 10 hours long
- 31 Indefinitely vast number
- 33 Period of human life
- 34 Large container
- 36 Wash lightly
- 37 King of Troy
- 39 Inquires

- 40 Root of the taro
- 41 Propagative part of a plant
- 42 Disrespectful back talk
- 44 Pair
- 45 23rd Greek letter

S	D	O	N	M	I	M	E	L	O	I
S	D	O	V	K	S	S	N	I	N	
H	E	N	P	I	S	P	N	I	A	
S	A	I	E	S	A	R	E	R		
T	L	L	R	V	A	I	A			
R	O	I	A	O	V	V	N	I		
O	D	J	A	V	D	S	O	S		
D	E	R	B	H	V	A	V	R	I	D
V	A	C	L	M	A	V	A			
R	I	I	B	E	L	N	V	N		
B	V	C	S	S	B	O	L	N		
V	A	R	V	I	B	O	N			
L	I	V	A	L	B	A	S	E	B	A

## The Welcome Mat

How many new members this month? So many that the cherubs have had to move, and have requested a calculator!! A warm September welcome to 9, count 'em, 9 new TCAAers...



Tori & Tiffany Connelly  
Bloomington, IL 61701

Don Dupuy  
Bloomington, IL

Kal Kumar  
Bloomington, IL



David Skinker  
Normal, IL

Tim Winter & Karen Earing-Winter  
Bloomington, IL

Allan & Martha Yarmer  
Verona, IL

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## The OBSERVER

The Newsletter of the Twin City Amateur Astronomers, Inc.

Michael Rogers & Jean Memken, Editors  
2206 Case Drive  
Bloomington, IL 61701

Dues Due?

## The Dues Blues

If you see a check in the box above, it means **your dues are due**. To retain membership -- and with a new observatory, why quit now??? -- please send \$25 to our esteemed treasurer:

Duane Yockey  
508 Normal Avenue  
Normal, IL, 61761

As always, thank you for your support!!