

The OBSERVER

The Newsletter of the Twin City Amateur Astronomers, Inc.

June 2002 Volume 27, Number 6



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The Well-Traveller Doctor — Susan Rogers, Dallas Bagby

Hot on the heels of last month's coverage of Sally Ride's ISU visit, this month, we are delighted to offer this article, from our special Canadian correspondents, on the doings of another NASA scientist/ astronaut.

This is a report of a presentation by Dr. David Williams to Manitoba grades 6 and 7 students at the Planetarium of the Manitoba Museum of Man and Nature on April 11, 2002. A Canadian physician, Dr. Williams was selected by the Canadian Space Agency to train as an astronaut. In 1995, NASA selected him to train for future space missions, and, in 1998, he flew aboard the Space Shuttle Columbia on Mission STS-90, which studied the effects of long duration spaceflight on the human body and the neural system. In October 2001, he joined two NASA astro-



nauts as part of the NASA Extreme environment Mission objectives (NEEMO) project in the Aquarius habitat, the world's only undersea laboratory in the Florida Keys. Dr. Williams is currently director of NASA's Space and Life Sciences Directorate which has over 1,000 working members and is concerned with

continued on next page

Requarth Observatory Field Trip — Take It
See p. 3 for new date and details...

TCAA Calendar

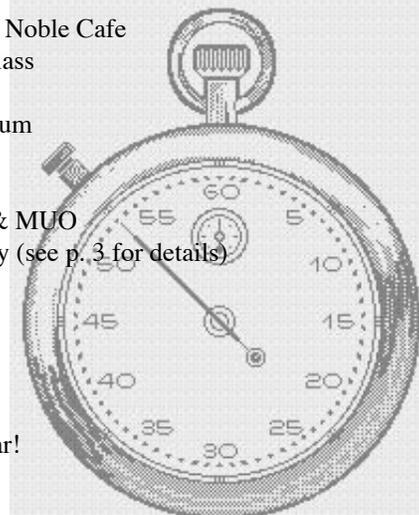
Monday, 3 June, 2002, 7:30-9:00 PM, Barnes & Noble Cafe
TCAA Reading Group/Beginning Astronomy Class

Monday, 10 June, 2002, 7:00 PM, ISU Planetarium
TCAA Meeting. Topic: TBA

Friday, 14 June, 2002, 6:30-9:30 PM, Panera's & MUO
Field Trip to the Millikin University Observatory (see p. 3 for details)

Saturday, 15 June, 2002, 9:00-11:00 PM, SGO
Public Observing Session

Sunday, 16 June, 2002
Father's Day: Buy Dad the Peekskill Meteor Car!



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@mac.com, or jmemken@ilstu.edu

Dues

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

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all programs and experiments related to life science.

Dr. Williams opened the combined slide and video presentation on his experiences in space and underwater by describing the preparations and training which qualified him for his diverse missions. He showed candid photos of life aboard the shuttle and answered the most frequently asked questions about how to eat and sleep in space. The effects of space on rats, fish, crickets and teddy bears was also discussed. Film taken from cameras attached to the Satellite Rocket Booster (SRB) during an actual mission was shown. It revealed how the SRB fell to earth and went underwater off-shore from the Kennedy Space Station. The SRB and the camera were then retrieved for reuse on future missions. Dr. Williams pointed out that the spacecraft had been around the earth once before his guests for the launch could return to the hotel. Cartoon slides were shown of an extremely puffy face and of an astronaut standing on Earth on toothpick legs. Dr. Williams explanation of the facts behind the cartoons led to a discussion about the physical effects of spaceflight on the



body. All the fluids from the legs go to the head as a result of the extreme forces experienced in space.

The uniqueness of Dr. Williams is that he also served aboard the underwater science laboratory Aquarius in October 2001. NASA and Dr. Williams became interested in the relevance of the undersea environment to space when it was realized that

the effects of lengthy stays underwater are quite similar to space flight. He described how, as he and his colleagues went from the capsule, they needed ropes to ensure they could return to their base. He spoke to Canadian students in a live broadcast from Aquarius, and, as well, participated in the first communication between astronauts underwater and the International Space Station. He also noted that it took 17 hours of decompression before they could surface and stand on land.

In closing, Dr. Williams revealed that in the year 2019, they hope to have a mission on the moon to commemorate the 50th anniversary of the lunar landing and that he himself hoped to participate in the building of the International Space Station.



14 June, 2002

Requarth Observatory Field Trip – Take II

– Michael P. Rogers

MILLIKIN University recently opened the Leighty-Tabor Science Building, a splendid new facility for Physics, Chemistry, and Biology. One of the building's coolest features is the Requarth Observatory, housing a 20" computer controlled monster: just watching the dome open is worth a trip! We were clouded out on our first attempt last month, so, we're baaack. Once again Millikin University Physics professor Dr. Jim Brown, has offered to lead us on an *exclusive tour* on June 14th.

The plan is to meet at Panera's, in Decatur, for supper, then travel as a convoy Millikin. If you need a ride, drop an e-mail on the list, or contact a board member.

Schedule:

Panera's: 6:30 PM
 Depart for MUO: 7:30 PM
 Arrive, MUO: 7:45 PM
 MUO Tour: 7:45 PM - 9:30 PM*

** or whenever Jim decides to kick us out*

Directions:

Panera's is located at 255 East Ash Avenue, in Decatur, about 0.5 miles south of the I-72 Route-51 junction, on the left. There is a Wal-Mart's directly to the north, so it should be easy to find. If not, and you need to be talked in, call 309-825-6454, for assistance.



Club Notes

– Sandy McNamara, President

First of all, appreciation was given at the last general meeting but I wish to get into print a big (if belated) **thank you** to all who assisted with Astronomy Day at Eastland Mall on April 20. For those of you unable to attend, it was guesstimated that around 500 people stopped by to talk, see the displays, peek through a telescope, try their hand at mirror grinding, or pick up some of the free goodies we had available.

ANNUAL PICNIC - The annual TCAA summer picnic is tentatively scheduled for Saturday, July 13, from 5 - 8 PM. The picnic is a potluck affair so bring a dish to share, your own tableware, and, if you wish a personal dish to grill; charcoal grills and drinks will be provided by the TCAA. This is also the date for our July POS as well as being only several days past new moon.

Weather permitting, bring along your telescope or binoculars and plan to stay for an enjoyable evening observing. Since we

are having a gathering for the picnic, there will be **NO** monthly meeting in July

SGO UPDATE - Our 12-in LX200GPS

was installed at SGO but, after the skies cleared enough to do some serious observing with it, we unfortunately found a problem which will require a return of the telescope to Meade for repair. "Snoopy", as we have been unofficially calling it will be leaving about June first and will hopefully be back by mid-June. In the meanwhile, the venerable C14 has been reinstalled on the pier for use by keyholders. The next MOOS (Member Only Observing Session) is scheduled for Saturday, June 8. Remember, however, that the SGNC site is available for observing to members any evening they might wish to check it out.

POS UPDATE - Our next POS (Public Observing Session) will be at Sugar Grove Nature Center, Saturday, June 15, from 9



to 11:30 PM. We have been getting good public attendance at SGNC this year despite not having time to publicize the events to any great extent. No experience is necessary to assist at the POS. Aside from showing the public deepsky objects, help is also needed to pass out information and assist visitors unfamiliar with the site.

GENERAL MEETINGS are held the second Monday of each month at the ISU planetarium, 7 PM; the next meeting is

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scheduled for June 10. May attendees discovered the mysteries of the celestial coordinate system. They were also given a presentation on how to set up the equatorial mount found on many beginner telescopes and how to polar align it so the telescope motions matched the movements of the sky. If there is something YOU would like to see, hear, or learn about, please contact Sandy McNamara. Note that, pending approval of the board of directors, there will be NO meeting at the planetarium in July since we will gather for the annual TCAA picnic instead.

TCAARG - It was decided at the last meeting to utilize the TCAA Reading Group forum as a beginning astronomy class for interested TCAA members. The TCAARG meets the first Monday of each month at the Barnes and Noble Bookstore coffee shop beginning at 7:30. At the June 3 meeting, participants will be discussing books to be used for the lessons/discussions. If you are interested in participating, either as a learner OR a mentor, please come and join in any or all of our sessions for the next several months.

Skyline!

The Official Voice of the ISU
Planetarium/TCAA

438-5007

The Peekskill Meteorite Car

—Jake Delgaudio

Psst, hey, bud. Wanna buy a 1980 Chevy Malibu? Cheap? It's only been in one accident, and it most definitely was not the owner's fault!

THIS VERY brief email message is to inform you that we are offering, for sale, AT A GREATLY REDUCED PRICE...The PEEKSKILL METEORITE CAR (details below), on this, the 10th anniversary year of the fall!

This sale includes:

- 1) The Peekskill Meteorite car: a 1980 Chevrolet Malibu, reddish in color. The car is complete except for the gas tank, which was not included in the original purchase, almost 10 years ago.
- 2) A Slice of the Peekskill meteorite weighing 37 Grams and measuring 59mm by 36mm and 6mm thin. This PRIME slice also has RED-PAINT markings on the crust from the impact itself through the back-end of the car!
- 3) One Original License Plate
- 4) One actual-cast replica of the Original Peekskill meteorite
- 5) One local newspaper with the Peekskill report of the fall
- 6) The original bill of sale of the car signed by Michelle Knapp, the original owner
- 7) Peekskill Policeman's Jacket with original Police Dept. Patch

This is most of the entire original exhibit for this scientific treasure! The initial asking price was \$250,000.00....for JUST the car. We have decided to include ALL the above mentioned collectibles and to lower the price of this spectacular package to only \$175,000.00 which is FIRM.

If you have interest in discussing this further, and would like additional informa-

tion, please contact me at your earliest convenience...

You may view images and information about the car on our webpages at:

<http://www.nature-source.com/content/meteor.htm>

The impact of the twelve and a half kilo H6 chondritic meteorite into the back



Alas, poor Malibu (with the fiend that did the damage atop it, smirking)

of Ms. Michelle Knapp's parked car on the evening of October 9, 1992, in Peekskill, New York, is the best known meteoritic event of modern times. Everyone has heard of the "car that was hit by a meteorite." The meteoritic fall and the car are very well documented. The car, a 1980 Chevrolet Malibu, reddish in color, is owned by Iris and Alan Langheinrich, Owners of the famed R.A.Langheinrich Meteorite Collection and Lang's Fossils and Meteorites.

I have been contracted, by them, to oversee this offer of sale.

Thank you and Very Best Regards;

Jake Delgaudio

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An Observer Software Review

Celestia: an Open Source Showcase

—Michael P. Rogers

SINCE WE are once again in the midst of the Season of Eternal Thunderstorms (aka “Spring”) Central Illinois astronomers are undoubtedly turning to their computers for their daily astronomy fix. But before you fire up Starry Night, or The Sky, or Red Planet, hold that mouse! There is a new (well, OK, new to *me*, anyway) contender for the title of “Best Desktop Planetarium Package”, Celestia.

Open Source:

Celestia is *Open Source*. Literally, this means that the *source* code — the underlying program that comprises any application — is *open* to inspection. Just to clarify the terminology, a *program* is a series of programming statements, called *source code*, written in a language such as C, C++, or Java. An *application* is created when those programming statements are translated, or *compiled* into executable code, terse, arcane statements that can only be understood by a particular processor, such as a G4, or a Pentium. The people who develop applications are called *developers*.

You use applications all the time: Starry Night, The Sky and Netscape Navigator, are all fine examples of the genre. You almost never read the underlying source code that makes an application run, unless you are a programmer/developer. Why? Well, most source code, from commercial organizations, is zealously guarded by the modern equivalent of Cerberus: the license agreement. Said agreement (shrouded in secrecy simply because nobody can be bothered to read it) specifically bans clever people from attempting to deduce what the source code is, based on the application.

However, if you are a programmer, there are advantages to making your source code open. • Other programmers can read it (typically Open Source projects are

stored on public servers), and help quash bugs.

- Qualified programmers are encouraged to contribute to the project, not for money, but out of a desire to make a good product better (and, admittedly, for the ego boost that comes with being associated with such a product).
- Motivated developers may take the source code and compile it for new platforms. That explains why, for example, Celestia is currently available for Linux, Mac OS X, and Windows, and in the future will undoubtedly be available for even more operating systems.

There is one last huge advantage to Open Source software. It is almost always distributed free of charge. It is not shareware, but honest-to-goodness free software that you may download and distribute as you see fit. Does this mean the software is inferior in anyway? On the contrary, in many cases open source software is at least as good as what you can buy commercially. We offer, as exhibit A, Celestia!

Introducing Celestia:

Celestia is an ongoing effort, led by developer Chris Laurel, with help from Clint Weisbrod, Deon Ramsey, Colin Walters, James Holmes, and Bob Ippolito (the latter responsible for the Mac OS X port, and to whom I would like to extend a personal thank you). Being open source, about the only place you can get it is on the internet: specifically, at <http://www.shatters.net/celestia/>. Assuming that you have 14.6 MB of hard drive space, 64 MB of RAM, and a modern operating system, installation is straightforward (drag-and-drop on Mac



Celestia

OS X; configure, make and make install on Linux; and setup.exe on Windows). Celestia does use OpenGL, so if you don't have the OpenGL drivers installed, you will need to download those, too.

The program runs virtually identically on all platforms: this review is based on the Mac OS X version, running on Mac OS X 10.1.4, with 0.640 GB of RAM.

Launching Celestia causes a single, star-studded scene to appear. After a brief animation, Jupiter's Io appears front and center. The entire scene is *gorgeous*, and the picture below cannot begin to do it justice (although check out the color version on the TCAA web site). Part of the beauty is due to the care with which planetary and moon map textures have been stitched together, using the most up-to-date, high-resolution images from NASA's Jet Propulsion Laboratory. The stars are also rendered using textures, giving them a slightly fuzzy appearance that is pleasing to the eye. Ah, the joys of OpenGL...

Celestia has a deceptively minimalist interface. There are no palettes to clutter up the screen, just a single window with labels in the corners specifying location, time, etc. The mouse can be used to move about through space, orbit a particular object, zoom in and out, or bring up a contextual menu (although not, apparently, on the Mac OS X version, which is still in development). Betraying its Linux roots, keyboard shortcuts are provided to control the majority of operations — navigation, time, and display options. You could completely avoid the menu bar, if you felt so inclined.

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Relying on the keyboard is instinctive for Linux users, but not for those of us raised on GUI. While you certainly can resort to menus, it is faster to simply press a key on the keyboard — and in keeping with the spirit of Linux, impress your friends with your arcane knowledge. Keyboard shortcuts range from the obvious (C to center a selected object, F to follow a selected object), to the grudgingly comprehensible (HOME to zoom in, END to zoom out) to the seemingly arbitrary (L to speed up time by 10x, K to slow it down by 10x, J to reverse time, space to stop time).

Keyboard Shortcuts:

A glance at just a few of Celestia's numerous keyboard shortcuts reveals that it is indeed a full-featured program:

Navigation:

H : Select the sun (Home)
 C : Center on selected object
 G : Goto selected object
 F : Follow selected object
 Y : Orbit the selected object
 T : Track selected object
 HOME : Move closer to object
 END : Move farther from object
 ESC : Cancel motion or script
 Left/Right Arrows : Roll Camera
 Up / Down Arrows : Change Camera Pitch

Time:

Space : stop time
 L : Time 10x faster
 K : Time 10x slower
 J : Reverse time

Labels:

N : Toggle planet and moon labels
 B : Toggle star labels
 = : Toggle constellation labels
 V : Toggle info text

Options:

U : Toggle galaxy rendering
 O : Toggle planet orbits

/ : Toggle constellation diagrams
 Ctrl+A : Toggle atmospheres
 I : Toggle cloud textures
 Ctrl+L : Toggle light pollution
 Ctrl+S : Toggle textured and point stars
 Ctrl+E : Toggle eclipse shadows
 ; : Show equatorial coordinate sphere
 [: Decrease limiting magnitude] : Increase limiting magnitude
 { : Decrease ambient illumination } : Increase ambient illumination
 , : Narrow field of view
 . : Widen field of view

Spaceflight:

F1 : Stop
 F2 : Set velocity to 1 km/s
 F3 : Set velocity to 1,000 km/s
 F4 : Set velocity to speed of light
 F5 : Set velocity to 1,000,000 km/s
 F6 : Set velocity to 1 AU/s
 F7 : Set velocity to 1 ly/s
 A : Increase velocity (exponentially)
 Z : Decrease velocity (exponentially)
 Q : Reverse direction
 X : Set movement direction toward center of screen

Number pad:

4 : Yaw left
 6 : Yaw right
 8 : Pitch down
 2 : Pitch up
 7 : Roll left
 9 : Roll right
 5 : Stop rotation

Joystick:

X axis : yaw
 Y axis : pitch
 L trigger : roll left
 R trigger : roll right
 Button 1 : slower
 Button 2 : faster

Other:

D : Run demo
 F8 : Enable joystick
 F10 : Capture image to file
 ENTER : Select a star or planet by typing

Some of the nicer touches worth singling out include the ability to toggle atmospheres and clouds; a seemingly seamless zoom out to a galactic view (cleverly done by merging the Hipparcos data with, once it runs out, a texture of a spiral galaxy); and the ability to tinker with Celestia to your heart's content.

Tinkering is for those power-users who have not reached the lofty heights of the developer, but still want to have a feeling of control. In Celestia, one may play deity by editing the databases for planets (which includes moons and artificial satellites), stars, star names, asterisms (which includes constellations), and galaxies. These databases are text files, and so may be opened with any text editor. With a little effort, one can not only tweak the universe, but create an entirely new universe in your own image.

It is even possible to script Celestia. A script is a small program, written in an English-like (and in this case Celestia-specific) language, that lets you automate part of a program. For instance, the reason why Celestia displays Io upon start up is because of the presence, in the file start.cel, of these lines:

```
select { object "Sol/Jupiter/Io" }
follow {}
goto { time 5 }
```

These lines tell Celestia to select Io, then follow it, and finally go to it, in 5 time units.

There are, inevitably, bugs in Celestia (as there are in any software), but the user community is enthusiastic, and the developers are extremely receptive to new ideas. Check it out, and enjoy the ride!

A Celestia Gallery

- Celestia



The Earth, in all its glory. Not only do all of the planet/moon/asteroid textures look this good, if you don't like them, you can substitute your own, instead.



Follow that Hubble! Thanks to the superb model, you can even look inside the HST! Notice the thin layer of atmosphere around the Earth. It's that attention to detail that counts...



Celestia, when it is first launched. Be sure and check this out on the web site, to get the full color effect!

Summertime = Globular Clusters

— Sandy McNamara

As is typical of Illinois, we skipped much of Spring (substituting a monsoon season instead) and are heading into Summer already. Warm days, cold lemonade, long lazy evenings ... and lots of globular clusters to find in the skies. The brighter clusters, M3 in Canes Venatici, M4 in Scorpius, M5 in Serpens, M13 in Hercules, and M22 in Scorpius are easily visible in even the smallest binoculars (and to the naked eye for keen eyed observers under dark skies) while many more reveal themselves with only slightly more assistance from larger binoculars or a small telescope.

Globular clusters (GCs) are spherical shaped systems of between 100,000 to a million stars, gravitationally bound into a single group about 100 light years across. Modern scientists have discovered 200 or so GC belonging to our Milky Way, half of which reside in the constellations of Ophiuchus, Scorpius, and Sagittarius. Most other galaxies have globular cluster systems as well, some of them, such as galaxy M87 in Virgo, having several thousand.

Investigations of globular clusters by Harlow Shapley in 1917 led to the discovery

that the center of our galaxy is lying at a considerable distance in the direction of Sagittarius and not close to our solar system as had been thought previously. Formed early in the history of our galaxy, GCs contain some of the oldest stars known and the astrophysical study of GCs forms an important and major part of modern astronomy. Currently there is a major controversy over the age estimates for these systems

being larger than the age of the universe determined from its expansion rate. Evidently, either the stellar astronomers or the cosmologists getting the data from the Hubble Space Telescope are being affected by some 'error' which as yet has not been



Howard Shapley

identified. The universe cannot contain objects older than it is itself!

For backyard astronomers, these GCs are fascinating to observe. Even binoculars can locate many GCs as "fuzzy stars". In small telescopes, they usually appear as softly glowing circles of unresolved haze. Often described in my observing notes as "fuzz balls", they can resemble the appearance of many comets so much that the "ferret of comets", Charles Messier, listed 29 of them in his list of 109 deep sky objects. (One of these, M54, has

the distinction of being the first extragalactic GC ever discovered: recent research indicates that this GC actually belongs to what may be the closest neighbor of our own Milky Way: the Sagittarius Dwarf Elliptical Galaxy discovered in 1994.) Larger telescopes and higher magnification begin to resolve some of the stars in these clusters. Items to look for when observing GC are: How bright is it (can you see it with direct vision or is "averted vision" required; can you compare it with other objects observed)? How big is it (ie, how much of your eyepiece field of view

does it cover)? What shape is it (round, elliptical)? How concentrated is it (loose, moderate, or highly concentrated)? Is any part of the cluster resolvable into stars either at the outer edges or at the center (remember to check this at various mag-

nifications)? Is the center brighter? Is the center denser? A few typical examples for you to try your skills on follow:

Any GC list has to start with the famous M13 in Hercules. Beginners can first fol-



M13

low the "Arc to Arcturus" to locate the kite shaped constellation of Bootes; the "keystone" of Hercules is about 20 degrees east from the top of the Bootes "kite". M13 is easily located on the western side of the keystone, about 1/3 of the way from eta to zeta HER. Binoculars and small telescopes show a bright round glow while a 6-in telescope begins to resolve stars around the edges at about 65x. At higher magnifications in a 12-in telescope, this GC fills the field of view with beautiful "arms" of stars spreading out in all directions

The obligatory visit to M13 done, we jump down to the distinctive fish hook of Scorpius hugging the southern horizon. The huge, loose cluster M4 is only 1.3d (about 2 eyepiece field of view "hops" in many mod power eyepieces) W of bright Antares, the orange-red "rival of Mars" which marks the heart of the Scorpion. At a distance of only 7000 light years, it is one of

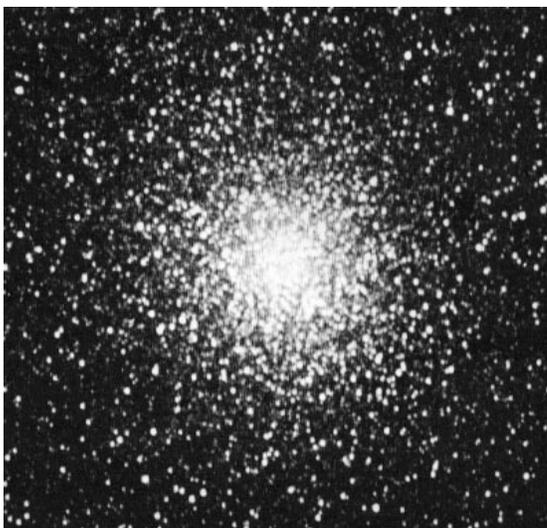
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the nearest GC and even a small telescope will show some of the cluster's individual stars. Hiding between M4 and Antares, sl over a half degree NW of Antares, is the 9th magnitude GC NGC 6144. This GC wouldn't be difficult to see elsewhere but is sometimes hidden in the glare if you have bright Antares in your field of view. Nudge your telescope so Antares moves eastward out of the way. Compare M4 with the smaller cluster M80, which can

be found about 4 degrees NW of Antares, halfway along a line from Antares toward beta SCO. Globular clusters are classified visually by how loose they appear from class I (most compact) to class XII (least compact); M4 is a class IX while M80 is a class I.

Although overshadowed by the more well-known M13, M22 is, in my opinion, the prettiest GC in our northern skies. To locate it, sweep 2 degrees ENE from the star marking the top of the Sagittarius "teapot", lambda SGR. Before



M22

leaving this area, follow a little line of stars NW from M22 for just one degree (about 1 eyepiece field of view for most low power eyepieces) to locate another GC. Outclassed by its brighter neighbor, NGC 6642 is about half as bright and half as big as M22. In this GC rich area, M22 and NGC 6642 form one side of a compact trapezium of globulars that includes M28 (approx 1d NW of lambda SGR) and NGC 6638 (less than 1d E of lambda

SGR).
CHALLENGE: These may not be a difficult challenge for anyone using at least an 8-in telescope but I think two-for-one specials *are* fun. Look about 1/2 degree NW of the star marking the tip of the Sagittarius Teapot's spout, gamma SGR

to locate the pair of GCs NGC 6522 and NGC 6528. Typical GC "fuzz balls", the pair is separated by only 1/4 degree and are easily viewed in the same eyepiece field for comparison to each other.

OBJECT	CON	RA	DEC	MAG	SIZE	notes
NGC 6093 (M80)	SCO	16h 17m-22d 59m		7.3	5.1'	class I
NGC 6121 (M4)	SCO	16h 24m-26d 32m		5.8	22.8'	class IX
NGC 6144	SCO	16h 27m-26d 02m		10.0	3.2'	class XI
NGC 6205 (M13)	HER	16h 42m 36d 28m		5.7	16.6'	class V
NGC 6522	SGR	18h 04m-30d 02m		8.4	5.6'	class VI
NGC 6528	SGR	18h 05m-30d 03m		11.0	3.7'	class V
NGC 6626 (M28)	SGR	18h 25m -24d 52m		6.8	11.2'	class IV
NGC 6638	SGR	18h 31m-25d 30m		9.1	5'	class VI
NGC 6642	SGR	18h 32m-23d 29m		10.5	4.5'	class V?

[Note: for those of you working on various observing projects: NGC 6093, 6121, 6205, 6626, and 6656 are on the Messier list. NGC 6121, 6205 and 6656 are on the Urban Club. NGC 6144, 6522, 6528, and 6638 are on the Herschel 400 list

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TCAA Treasurer's Report – April, 2002

– L. Duane Yockey, Treasurer

OPERATING FUND BALANCE – March 31, 2002 - \$ 977.61

Income

Wallace Strow (dues renewal) -	\$	25.00
Kim McRoberts-Wilson (dues renewal) -	\$	25.00
Michael Rogers (dues renewal) -	\$	25.00
Karl Keist (dues) -	\$	25.00
Jim Stanlaw (dues) -	\$	25.00
Gerry Schroeder (dues) -	\$	25.00
John Manganaro & Linda Moorhead (dues) -	\$	25.00

Expenses

None!!

OPERATING FUND BALANCE – April 30, 2002 - \$ 1,152.61

OBSERVATORY FUND BALANCE – March 31, 2002 - \$ 122.25

Income

Donation (United Methodist Women) -	\$	10.00
LX-200 Donation -	\$	250.00
LX-200 Donation -	\$	200.00
LX-200 Donation -	\$	100.00

Expenses

None!!

OBSERVATORY FUND BALANCE – April 30, 2002 - \$ 502.25

NOTES PAYABLE – (\$1,400.00)

TOTAL TCAA FUNDS – April 30, 2002 - \$ 254.86

Respectfully submitted,
L. Duane Yockey, Treasurer

The Observer Crossword

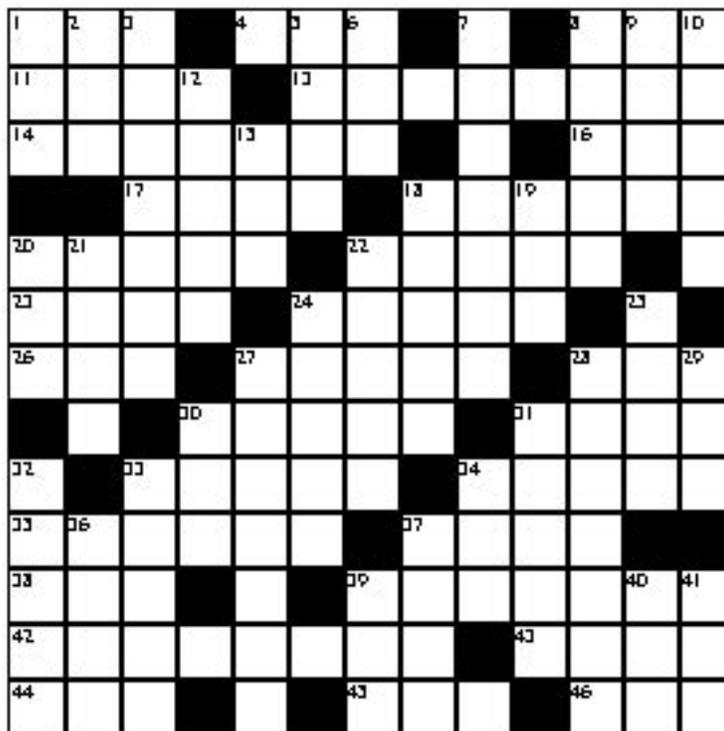
—Observer Staff

ACROSS

- 1 The unit of electrical resistance
- 4 Edmund Scientific eyepieces
- 8 Very skilled person
- 11 Great age
- 13 Unbreakable
- 14 Crumbly
- 16 Fastener
- 17 Keep away from
- 18 Nymph of Greek myth
- 20 Constellation : The whale
- 22 Operatic feature/bright region on Mars
- 23 As previously given
- 24 Physician
- 26 Son of Jacob
- 27 Thaws
- 28 Gone by
- 30 Altar stone
- 31 Crack
- 33 Worth
- 34 Clock pointers
- 35 Lacking movement
- 37 Island of Hawaii
- 38 Title of a knight
- 39 5th Greek letter
- 42 The Cosmos
- 43 Small yeast cake
- 44 7th Greek letter
- 45 Besides
- 46 Curved bone

DOWN

- 1 Idiot
- 2 Pronoun
- 3 Make moist
- 5 Furnace
- 6 Before
- 7 Alternative name for Alpha Scorpii
- 8 These radiation particles are helium nuclei
- 9 City in NW France
- 10 Having an edge
- 12 Book of the Bible
- 15 Passenger vehicle
- 18 4th Greek letter
- 19 Slender metal fastener
- 20 Spanish hero
- 21 Yellow cheese coated with red wax
- 22 City in central Belgium
- 24 Arising from a gene
- 25 Mild oath
- 27 Deserved



- 28 A “near-miss” eclipse
- 29 Roman goddess of plenty
- 30 Encountered
- 31 Indian form of address
- 32 Point in question
- 33 Lunar ‘seas’
- 34 Possesses
- 36 Hue
- 37 A type of star cluster
- 39 Ariane’s developer (abbr)
- 40 Japanese sash
- 41 Arrest



The Welcome Mat

Five new members grace our roster this month, pushing the number of family memberships to a lucky 77, and the total number of members to a number too large for our calculator! A warm June welcome to...



Gail Fisher
Eureka, IL

Michael J. & Jesse M. Petersen
Bloomington, IL

Jim & Deb Presley
Bloomington, IL



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!!