

# The OBSERVER

The Newsletter of the Twin City Amateur Astronomers, Inc.

November 2003 Volume 28, Number 11



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## A Message from The President

—Dan Meyer

**H**ELLO, Twin City Amateur Astronomers!

The past six months have been very interesting for me. I have been working long hours, playing music in a few different bands, and helping a few friends with

some big projects. It seems as though I have had very little time to act like a president. A 10 month glitch in my internet service has not helped the situation one bit. I can now honestly say that

I have overcome these obstacles and will be able to act a little bit more like a leader than a last minute organizer.

Well what do I need to do? I could organize a field trip to Yerkes? I could declare

war on other clubs with better telescopes? Maybe I could make the clouds go away? I've been doing the things that have to be done. But I'm ready to dedicate a little bit more to the club. I have the time and ability now. We have a wonderful facility with really nice equipment. We should try

to use it better. There are clubs that dream of having a facility this good. A members' astrophotography course? Maybe we could start a members' observing program. It could be as simple as having members

that need help finding things in the sky receive the help from other members. This would not be a class or a certificate. Just a nice time looking at the universe. It might be cold this time of year, but we have

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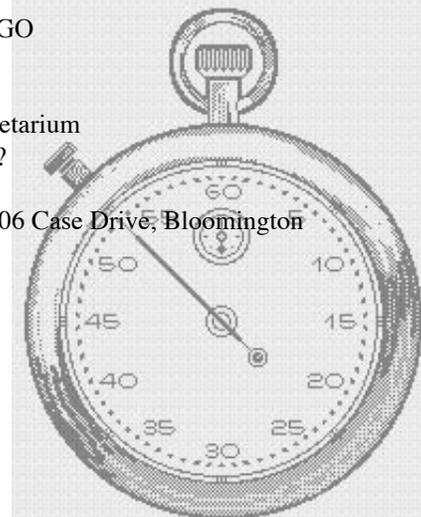
## TCAA Calendar

Saturday, 29 November, 2003, 6:00-8:00 PM, SGO  
Public Observing Session.

Monday, 8 December, 2003, 7:00 PM, ISU Planetarium  
TCAA Meeting. Topic: Where in the Universe?

Monday, 22 December, 2003, 6:00-8:00 PM, 2206 Case Drive, Bloomington  
TCAA Holiday Party. Details TBA.

Monday, 22 December, 2003, 1:03 AM  
Winter Solstice.



## 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 last weekend of each month. Items may be e-mailed to: mprogers@mac.com, or jmemken@ilstu.edu

#### Dues

\$40.00 per household, per year  
\$25.00 for members over 60  
\$25.00 for newsletter only  
\$ 2.50 for a single newsletter copy

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a dome and hot water. Add some warm clothing, maybe a warm blanket, and you could see some of the most spectacular objects in the sky. Plus there are bathrooms available 24 hours a day now.

As far as I'm concerned our club is very good at serving the public, with POS, educational programs, and school and youth group activities. We should continue that aspect of our club. However, I am interested in finding out what we can do for our members. If you have an idea, even if you think you are the only person who wants to do it, let someone in the club know, and let the president know, too. Our membership brochure says that members have pizza parties. As a member I have not yet had a pizza party. As a member I want a pizza party. How about this: a party needs probably 4 people or more to be considered a party. If any other members want to go to Lucca or some other pizza joint around town, post on our newsgroup (TCAA@yahoogroups.com). We can pick a time and place from there. Then we will go eat and talk about astronomy or anything else. If you don't have email, call me. My number is on the inside of the front cover of this newsletter. Any other ideas? How about a simple radio telescope at SGO?

During the first 6 months of my "term in office" I have been pretty quiet. I have never been president of anything before. Now I'm ready to do something big. Just tell me what you want. Otherwise I will announce dictatorship and assign a constellation to each member of the club with which they have to catalog every star in that constellation using a crayon on paper towels. Failure to comply would mean endless hours of torturous mirror grinding!!!! Just joking.

Other notes. A new computer has arrived at SGO. It was donated to the club by Andy Valentine, a good friend of mine who builds computers for a living. It is a Pentium3 500Mhz with about a 4GB

hard drive. I have loaded it up with a lot of astronomy software. Almost all of the software is shareware, there is a good image collection, and some animations, all astronomy related. This computer has enough power to "pilot" the LX200, or print a sky chart. If we could get internet access (I'm also working on that, more to come later), we could do some really neat stuff. CCD imaging, remote observing, etc... Does anyone have a printer or CCD camera they would like to add to the SGO collection?

Our scopes. We have had reports that the LX200 has not been performing as expected. The first solution we are going to try is collimation. It is my opinion that this should take care of any problems we are having. I have seen good images in this scope before, just not recently. It was brought to my attention that collimation and cleaning are the responsibility of the property manager and/or the observatory manager. These maintenance issues should be resolved by the time you read this. If collimation does not solve the problem, then we will seek further counsel, probably from Meade. IF Meade can't help us we can melt the mirror down and make trinkets out of it to sell at Astrofest next year. Seriously, if collimation and Meade can't help, then I will have the large project I am looking for. There have been suggestions that the metal frame supporting the LX200 is causing a lot of the vibration problems. I think that makes sense. Maybe we could dampen the frame. If we have to replace the frame, we should. I think there are some serious observers in this club that would make better use of the facility if we could fix the vibrations in the mount. Once again if there are any suggestions, you can address them any of three ways. TCAA@yahoogroups.com, Come to our monthly meeting. (2nd Monday of every month), or contact the president.

That is all for this month. Hope to see your paper towel star charts soon.

## Observing Programs II

– William Carney

I HOPE LAST MONTH'S ARTICLE peeked your interest in starting an observing program. This month, I thought I would explain the programs in a little more detail and even give a few tips. The program which most members have heard about is The Messier Club which is one of the Deep Sky programs of the Astronomical League. You can visit the Astronomical League at the following web address: [www.astroleague.org](http://www.astroleague.org).

For the Messier Club you must “independently locate, observe and log at least 70 objects for a regular certificate.” \* For a full certificate all 110 objects are needed. This list was created by a French astronomer Charles Messier in the mid to late 1700s for listing items in the sky to avoid while he was comet hunting. It just so happens that a lot of items on the list are the brightest and best objects visible in the northern skies. You are not to use a “GOTO” scope or have someone else find the object. You alone are required to find the object in the sky. This observing program is good for beginners or even advanced amateurs and you don't have to have your own scope. My entire Messier list was done with club scopes including the 16 inch reflector, 4 inch refractor but mostly with the 10 inch scope. The Astronomical League has a very good guide book on the Messier objects.

The Binocular Messier Club is a fairly recent addition to the programs in which you need to locate 50 of the 110 Messier objects with a pair of binoculars. This may seem impossible but it's really not. Any binoculars can be used from 20 to 80 mm in size. I am currently doing my Binocular Messier Club with my 10 x 50 binoculars. Some weeks ago I observed M 27 or the Dumbbell



Nebula thru my binoculars and not only saw it but actually saw a rectangle shape to the nebula with the 10 x 50's even with a half Moon out.

The Deep Sky Binocular Club is a little more challenging and has many items not on the Messier

list. You must observe some 60 objects and it is recommended that you have at least a 50 mm size or bigger binoculars. I have not yet started this one but am planning to use my new 15 x 70 mm binoculars for that project. It does help with both of these binocular projects to mount your binoculars on a tripod or something to steady it for observing and have darker skies. For both binocular programs I recommend the following books. “Exploring the Night Sky with Binoculars” by Patrick Moore. “Astronomy with Binoculars” by James Muirden and “Touring the Universe through Binoculars” By Philip Harrington

The Double Star Club is a good place to start looking at the various double stars in the night sky. You must observe some 100 double and multiple stars. This is one that could be done from a city location even with smaller telescopes. Scopes as small as a 3 inch refractor can be used. Most of these show some color and a lot are two stars of contrasting colors. Beta Cygnus (known as Albireo) is a famous one on the list, but I found that in working on the Urban Club, there were several more double stars in



the sky that are also just as pretty and a few look very much like Albireo in their colors.

\* From The Astronomy League's web page “Astro Note 12”. Visit their web site for others.

The Herschel 400 Club and the Herschel II club each have 400 objects

from the Herschel list to locate and observe. A telescope as small as a six or eight inch from dark skies is all you need to locate these items. You will need a good star chart or program and some of you may need to research on the internet to see what they look like. You can go to <http://www.seds.org>, which has a data base for information and pictures of celestial objects. Sir William Herschel discovered Uranus in 1781 and along with other members of his family listed many items in the sky which later became part of the New General Catalogue or NGC.

The ARP Peculiar Galaxies Club is a very challenging project in which you observe 100 objects from the ARP Catalog of Peculiar Galaxies. Most are from 12th to 18th magnitude. You can also image these with a camera or CCD. Dark skies and a good size telescope are needed as well as good charts or computer charting program.

The Caldwell Club which Sir Patrick Caldwell-Moore created has some quite beautiful and interesting objects. There are some 109 objects and it requires you to do some traveling since about 20 or so objects are in the southern skies. You are also required to draw each item. Thirteenth magnitude is about the dimmest on

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this list and quite a few items never made it to the Messier, Herschel, NGC or other lists.

The Southern Skies Binocular Club has a list of over seventy items in the southern skies to observe with binoculars. For northern residents like you and me, that means a long trip. But you really can do this project in just a few nights anytime of the year, given good weather, of course. So next time you go on a vacation or eclipse trip, take your binoculars and spend a few nights out observing. A 10 x 50 mm binoculars is about all you need.

The Galaxy Groups and Clusters Club is a step beyond the Herschel club in which you have 250 galaxy groups and clusters to observe. This one you can also do with a CCD camera. It is designed to challenge and enhance your observing skills and it will surely challenge them. Again a dark sky site and larger telescope is needed with good charts.

A non Deep-Sky program called The Meteor Club is one that does not require any telescope, binoculars or other equipment except a pen/pencil, piece of paper and a blanket or chair to sit back and look at the night sky. It does help to be away from city lights with this project. You must observe for 36 hours and record any meteors that are seen.



The Lunar Club is also one of the few clubs that can be done from an urban location. In fact you don't really need perfectly clear nights to observe features. Often you can see detail on the surface of the Moon thru light thin clouds. You don't even need a large telescope. I did my project with the clubs four inch refractor. A good hint for this one is to use a good Lunar chart and a correct image diagonal.

Most lunar charts are correct image charts and it's hard to follow at the scope without a correct image diagonal. You can also use a computer program especially for Lunar plotting. You will need to master a technique similar to star hopping that I call "crater hopping". That is, you start from large well known objects like Tycho or Kepler and you go to the next smaller

object in the direction you looking for, thus "crater hopping" to your object.

A small note on this, some craters are only visible for a day or so each month because of the shadow zones. There are several

books that are

useful including "Atlas of the Lunar Terminator" by John Westfall, "Observing the Moon" by Peter Wlasuk and "Photographic Atlas of the Moon" by S.M. Chong.

Check back next month for the rest of the programs along with some additional resources.



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# General & Board of Directors Meeting Minutes

— Carl Wenning, Secretary

## TCAA General Meeting November 10, 2003 ISU Planetarium

TEN MEMBERS OF the TCAA assembled to hear “Space Music” to be presented by Rebecca Wenning on November 10. President Dan Meyer called the meeting to order at 7:00 p.m. He started the meeting by giving a brief overview of recent celestial and TCAA events. He then noted upcoming events. At approximately 7:15 p.m. he turned the meeting over to Rebecca who played a series of short audio vignettes including a number of rarely heard pieces and a number of classics. Of especial interest were an organ fugue by William Herschel (the discoverer of Uranus) and two pieces of “space music” composed by Dan Meyer himself. Rebecca prefaced each musical piece with information about the composer or the musical piece. Everyone appeared to have a great time. The meeting adjourned at about 8:15 p.m.

## Minutes of the TCAA Board Meeting November 12, 2003 Miller, Yockey & Brown, Bloomington

President Dan Meyer, Treasurer Duane Yockey, Secretary Carl Wenning, and ISU Planetarium Director Tom Willmitch met to discuss the possibility of TCAA support for the ISU Planetarium. Dan called the meeting to order at 6:14 p.m. The meeting started with Tom painting a picture of planetarium finances and attendance, and framed this picture with additional information about growing economic concerns within the University. The planetarium has fiscal problems that stem primarily

from elementary schools restricting field trips. In addition, the planetarium must now pay 1/3 of Tom’s salary in addition providing for the purchase of materials and equipment, and payment of student help. Tom noted that during the past two years he has had to draw down resources from the Planetarium Friends and Gift Shop agency accounts in order to cover year-end deficits. Covering deficits is especially important because the University is making administrative cuts, and it is not impossible that the planetarium could be closed as a cost saving measure – especially if it doesn’t meet the demand for self-support. Tom sees a temporary need to raise perhaps \$2,000 to \$3,000 for each year to keep the Planetarium out of the red until school attendance rebounds.

Dan noted that the TCAA and the ISU Planetarium have had a “great relationship” for nearly the past 40 years, and would like to see it continue. He raised the concern, however, about limitations on fund raising efforts on behalf of the planetarium imposed by the 501(c)3 not-for-profit status. Duane and Carl noted that the status only affects political activity. After discussing a number of ideas for possible fund raising efforts, Tom departed and the assembled Board members continued the discussion.

It was the solid consensus that the TCAA help out the planetarium. It was decided that:

1) a formal agreement would be arranged

with the Planetarium to ensure a proper understanding of fund raising commitment, and  
2) a coordinating committee of 3-6 members will be formed from among the TCAA (1-2 members), ISU Planetarium Friends (1-2 Friends), and Challenger Learning Center (1-2 staff members) to advise and assist with fund raising efforts on behalf of the ISU Planetarium.

Support will be provided by either pursuing or helping Tom to pursue the following general avenues to increased income:

- Promotion of individual ISU Planetarium Friends memberships among TCAA members and, when feasible, the general public.
- Promotion of planetarium gift shop sales.
- Promotion of the public’s attendance at public planetarium programs.
- Promotion of direct fund raising through grant seeking.
- Promotion of school attendance for private showings.
- Assistance with planetarium special events such as astronomical events and light shows.

It was further decided that fund raising efforts would begin immediately with information about the ISU Planetarium’s financial plight appearing in the December *TCAA Observer*. In addition, Tom Willmitch will prepare an article about the financial needs of the planetarium, and encourage a visit to the Gift Shop during the next TCAA meeting on December 8<sup>th</sup>.

Tom has also been asked to make a short presentation and a direct appeal to the TCAA membership at the Annual meeting in February. During the interim, Carl will attempt to assemble a coordinating committee with the advice and consent of Dan. The meeting was adjourned at 7:42 p.m.



## The Sun Goes Haywire

— science.nasa.gov

**I**MAGINE YOU'RE IN California. It's July, the middle of summer. The sun rises early; bright rays warm the ground. It's a great day to be outside. Then, suddenly, it begins to snow--not just a little flurry, but a swirling blizzard that doesn't stop for two weeks.

That's what forecasters call unseasonal weather.

It sounds incredible, but "something like that just happened on the sun," says David Hathaway, a solar physicist at NASA's Marshall Space Flight Center.

Only a few weeks ago solar activity was low. The face of the sun was nearly blank--"very few sunspots," says Hathaway--and space weather near Earth was mild. "Mild is just what we expect at this point in the 11-year solar cycle," he explains. "The most recent maximum was in 2001, and solar activity has been declining ever since."

Then, suddenly, in late October the sun began to behave strangely. Three giant sunspots appeared, each one larger than the planet Jupiter. In California where smoke from wildfires dimmed the sun enough to look straight at it, casual sky watchers were startled by the huge blotches on the sun. One of them, named "sunspot 486," was the biggest in 13 years.

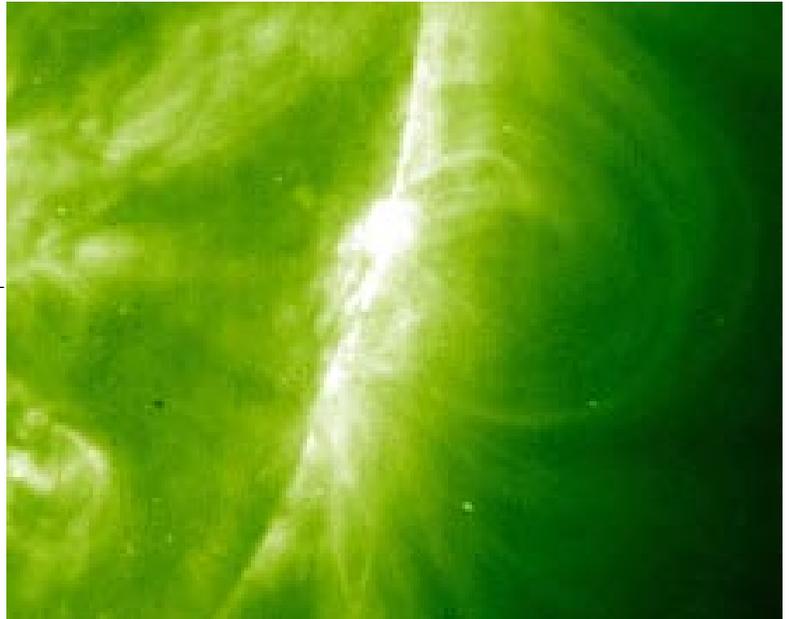
Sunspots cause solar flares and, usually, the biggest flares come from the biggest spots. The three giant sunspots unleashed eleven X-class flares in only fourteen days--equaling the total number observed during the previous twelve months. "This was a big surprise," says Hathaway.

The effects on Earth were many: Radio blackouts disrupted communications. Solar protons penetrated Earth's upper atmosphere, exposing astronauts and some air travelers to radiation doses equal to a medical chest X-ray. Auroras

appeared all over the world--in Florida, Texas, Australia and many other places where they are seldom seen.

Researchers rank solar flares according to their x-ray power output. C-flares are the weakest. M-flares are middling-strong. X-flares are the most powerful. Each category has subdivisions: e.g., X1, X2, X3 and so on. A typical X-flare registers X1 or X2. On Nov. 4th, sunspot 486 unleashed an X28 flare--the most powerful ever recorded.

"In 1989 a flare about half that strong caused a widespread power blackout in

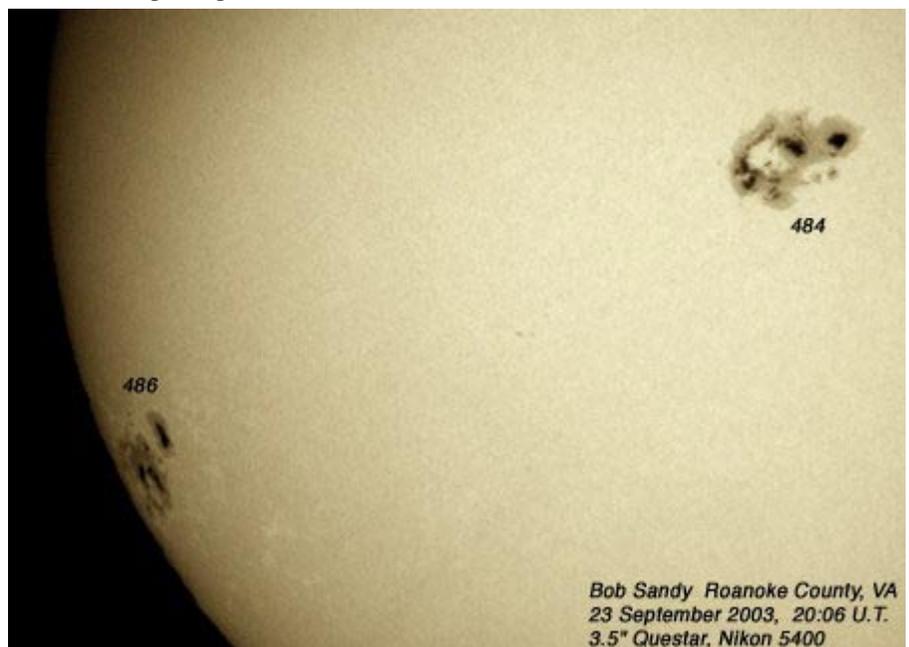


An extreme-ultraviolet telescope onboard the orbiting Solar and Heliospheric Observatory (SOHO) captured this false-color movie of the Nov. 4, 2003, X28 superflare near the sun's limb.

Quebec," recalls Hathaway. Last week's blast was aimed away from Earth, so its effects on our planet were slight--a bit of good luck.

All this happened two years after solar maximum, which raises a question: is

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Astrophotographer Bob Sandy of Virginia took this picture of giant sunspot 486 emerging over the sun's limb on 23/10/03. It is preceded by another giant spot, 484.

Bob Sandy Roanoke County, VA  
23 September 2003, 20:06 U.T.  
3.5" Questar, Nikon 5400

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something wrong with the solar cycle? Is the sun going haywire?

“Nothing’s wrong,” reassures Hathaway. The sun isn’t about to explode, nor is the sunspot cycle broken. “These latest sunspots were whoppers,” he allows, “but sunspot counts averaged over many weeks are still declining as predicted. We’re still on course for a solar minimum in 2006.”

Indeed, it’s possible that what we’ve just experienced is a normal part of the solar cycle, speculates Hathaway. “There’s a curious tendency for the biggest flares to occur after solar maximum--on the downslope toward solar minimum. This has happened during two of the last three solar cycles.” The plot below illustrates his point.

Consider the year 1984, says Hathaway. Sunspot counts were plunging, and the sun was rapidly approaching the 1985-86 solar minimum. Suddenly a giant sunspot appeared, Jupiter-sized like sunspot 486, and unleashed two dozen M-flares and three X-flares, including a remarkable flare registering X13. People then probably wondered too if the solar cycle was broken.

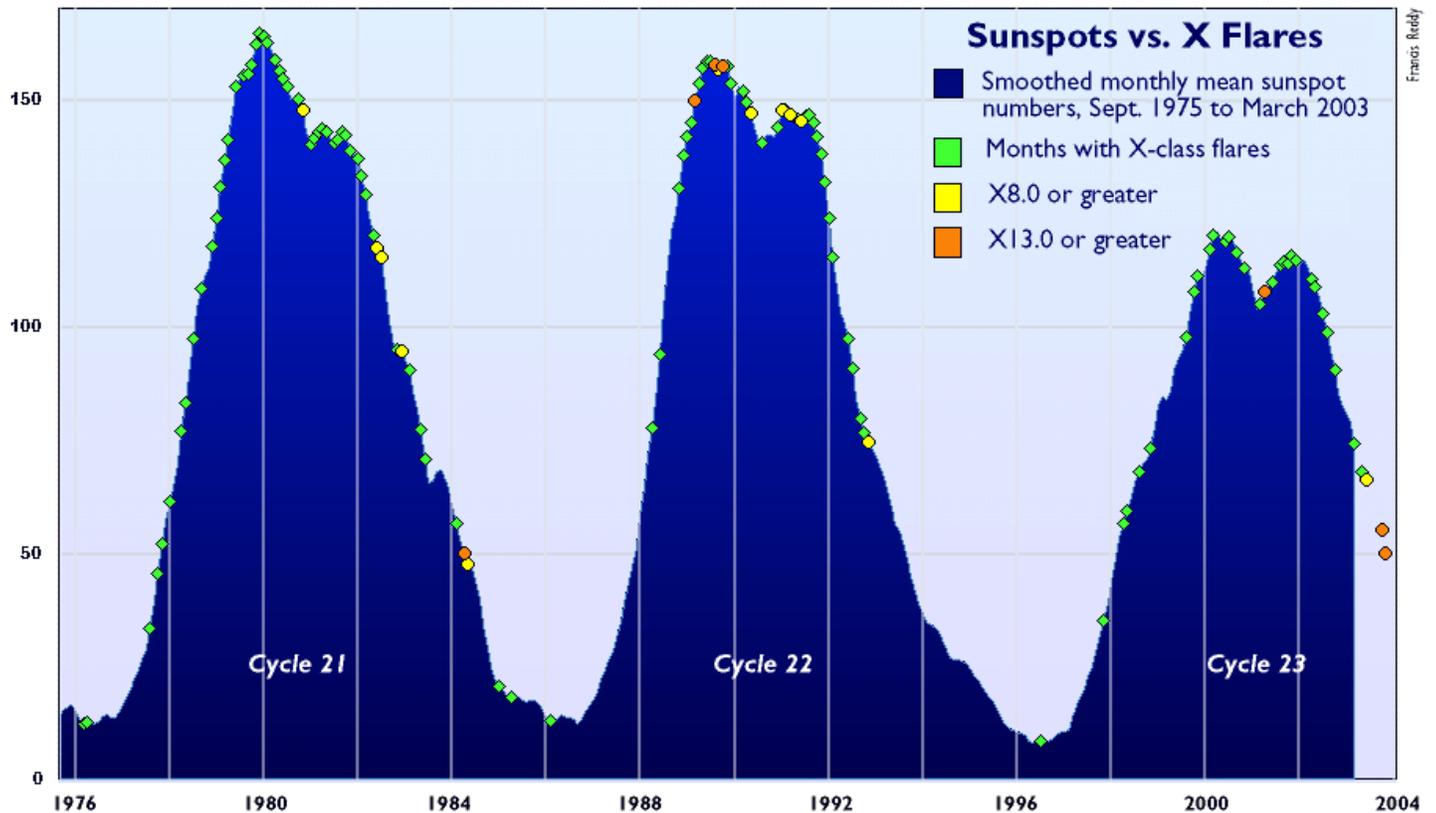
“It’s hard to be sure what’s normal and what’s not,” notes Hathaway. “Astronomers have been observing x-rays from the sun for only 35 years--or three solar cycles. We can’t draw good statistical conclusions from so few data.”

One thing is certain, though: flurries of solar activity can happen at any time. The

next time, says Hathaway, could be just a week or so away.

Sunspot 486 and its companions are on the far side of the sun now, carried around by the sun’s 27-day rotation. “We suspect they’re still active,” says Hathaway, because the Solar and Heliospheric Observatory--a sun-watching satellite--has photographed clouds of gas being thrown over the sun’s limb by unseen explosions. Unless these sunspots dissipate, which could happen, they will reappear on the Earth-facing side of the sun beginning as early as Nov. 14th.

And then...? No one knows. “We might get some more unseasonal space weather,” says Hathaway. But this time he won’t be surprised.



Using data archived by NOAA’s Space Environment Center, Francis Reddy created this plot of sunspot number and X-class solar flares during the last three solar cycles.

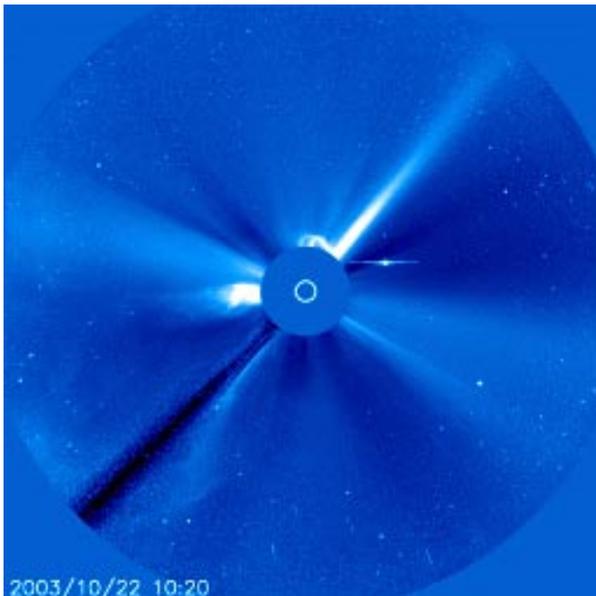
# Solar Superstorm

— science.nasa.gov

Newly uncovered scientific data of recorded history's most massive space storm is helping a NASA scientist investigate its intensity and the probability that what occurred on Earth and in the heavens almost a century-and-a-half ago could happen again.

In scientific circles where solar flares, magnetic storms and other unique solar events are discussed, the occurrences of September 1-2, 1859, are the star stuff of legend. Even 144 years ago, many of Earth's inhabitants realized something momentous had just occurred. Within hours, telegraph wires in both the United States and Europe spontaneously shorted out, causing numerous fires, while the Northern Lights, solar-induced phenomena more closely associated with regions near Earth's North Pole, were documented as far south as Rome, Havana and Hawaii, with similar effects at the South Pole.

What happened in 1859 was a combination of several events that occurred on the Sun at the same time. If they took place separately they would



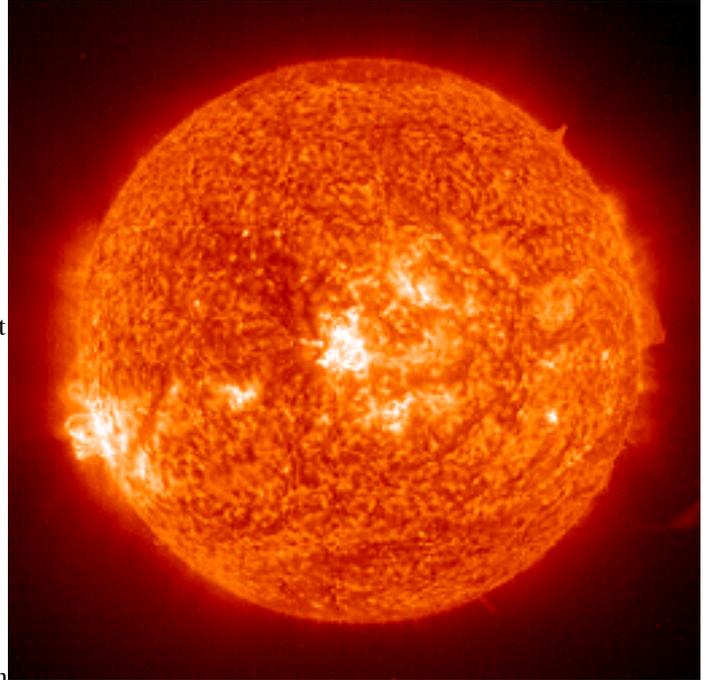
SOHO corona-graphs captured this movie of a coronal mass ejection (CME) heading toward Earth on Oct. 22nd.

be somewhat notable events. But together they caused the most potent disruption of Earth's ionosphere in recorded history. "What they generated was the perfect space storm," says Bruce Tsurutani, a plasma physicist at NASA's Jet Propulsion Laboratory.

To begin to understand the perfect space storm you must first begin to understand the gargantuan numbers with which plasma physicists like Tsurutani work every day. At over 1.4 million kilometers (869,919 miles) wide, the Sun contains 99.86 percent of the mass of the entire solar system: well over a million Earths could fit inside its bulk. The total energy radiated by the Sun averages 383 billion trillion kilowatts, the equivalent of the energy generated by 100 billion tons of TNT exploding each and every second.

But the energy released by the Sun is not always constant. Close inspection of the Sun's surface reveals a turbulent tangle of magnetic fields and boiling arc-shaped clouds of hot plasma dappled by dark, roving sunspots.

Once in a while—exactly when scientists still cannot predict—an event occurs on the surface of the Sun that releases a tremendous amount of energy in the form of a solar flare or a coronal mass ejection, an explosive burst of very hot,



An ultraviolet-wavelength picture of the sun taken by the ESA/NASA Solar & Heliospheric Observatory (SOHO) on 23/10/03

electrified gases with a mass that can surpass that of Mount Everest.

What transpired during the dog days of summer 1859, across the 150 million-kilometer (about 93 million-mile) chasm of interplanetary space that separates the Sun and Earth, was this: on August 28, solar observers noted the development of numerous sunspots on the Sun's surface. Sunspots are localized regions of extremely intense magnetic fields. These magnetic fields intertwine, and the resulting magnetic energy can generate a sudden, violent release of energy called a solar flare. From August 28 to September 2 several solar flares were observed. Then, on September 1, the Sun released a mammoth solar flare. For almost an entire minute the amount of sunlight the Sun produced at the region of the flare actually doubled.

"With the flare came this explosive release of a massive cloud of magnetically charged plasma called a coronal mass

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ejection,” said Tsurutani. “Not all coronal mass ejections head toward Earth. Those that do usually take three to four days to get here. This one took all of 17 hours and 40 minutes,” he noted.

Not only was this coronal mass ejection an extremely fast mover, the magnetic fields contained within it were extremely intense and in direct opposition with Earth’s magnetic fields. That meant the coronal mass ejection of September 1, 1859, overwhelmed Earth’s own magnetic field, allowing charged particles to penetrate into Earth’s upper atmosphere. The endgame to such a stellar event is one heck of a light show and more -- including potential disruptions of electrical grids and communications systems.

Back in 1859 the invention of the telegraph was only 15 years old and

society’s electrical framework was truly in its infancy. A 1994 solar storm caused major malfunctions to two communications satellites, disrupting newspaper, network television and nationwide radio service throughout Canada. Other storms have affected systems ranging from cell phone service and TV signals to GPS systems and electrical power grids. In March 1989, a solar storm much less intense than the perfect space storm of 1859 caused the Hydro-Quebec (Canada) power grid to go down for over nine hours, and the resulting damages and loss in revenue were estimated to be in the hundreds of millions of dollars.

“The question I get asked most often is, ‘Could a perfect space storm happen again, and when?’” added Tsurutani. “I tell people it could, and it could very well

be even more intense than what transpired in 1859. As for when, we simply do not know,” he said.

To research the “perfect space storm” of 1859, Tsurutani and co-writers Walter Gonzalez, of the Brazilian National Space Institute, and Gurbax Lakhina and Sobhana Alex, of the India Institute of Geomagnetism, used previously reported ground, solar and auroral observations, and recently re-discovered ground-based magnetic- field data from Colaba Observatory in India. The findings were published in a recent issue of the *Journal of Geophysical Research*.



*These Northern Lights appeared over Wisconsin on Oct. 22, 2003. During the superstorm of 1859, such lights appeared as far south as Cuba and Hawaii. Photo copyright Chris VenHaus*

## TCAA Treasurer's Report – October, 2003

– L. Duane Yockey, Treasurer

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OPERATING FUND BALANCE – September 30, 2003 -	\$ 787.21
Income	
Todd Scarlett (student dues) -	\$ 25.00
Steve Olson (dues renewal) -	\$ 40.00
Shaukat & Farida Goderya (dues renewal) -	\$ 40.00
Karen & Tim Winter (dues renewal) -	\$ 40.00
Neale & Anne Lehmkuhl (dues renewal) -	\$ 40.00
Orlyn Edge (dues renewal) -	\$ 40.00
Roy Ostberg (senior dues renewal) -	\$ 25.00
Expenses	
None -	\$ 0.00
OPERATING FUND BALANCE – October 31, 2003 -	\$ 1,037.21
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OBSERVATORY FUND BALANCE – September 30, 2003 -	\$ 859.70
Income	
Jim Swindler (keyholder renewal) -	\$ 10.00
Expenses	
None	\$ 0.00
OBSERVATORY FUND BALANCE – October 31, 2003 -	\$ 869.70
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TOTAL TCAA FUNDS – October 31, 2003 -	\$ 1,906.91
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## The Observer Crossword

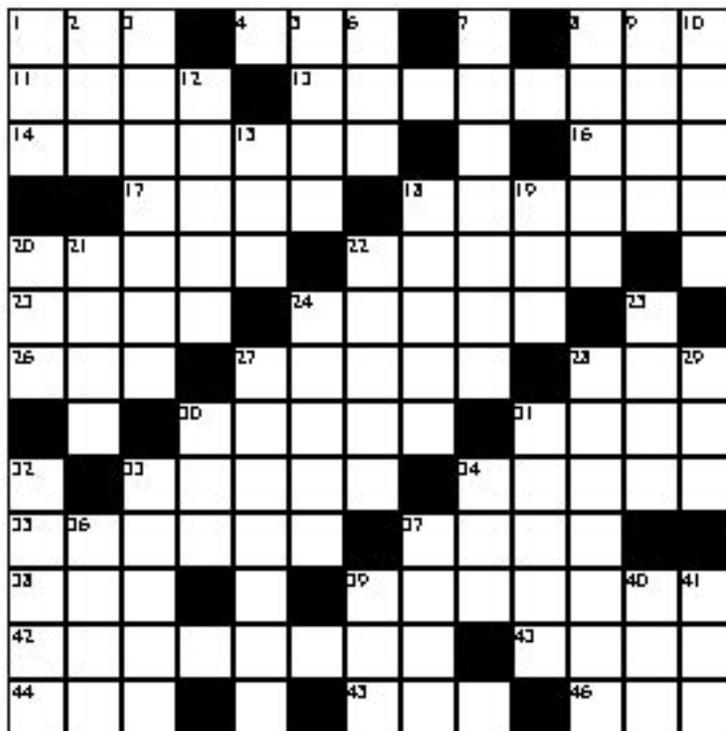
### —Observer Staff

## 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



## Stop the Presses!

— Observer Staff

CONSIDERING THAT THIS document is actually a creation of Kinko's, the headline is a bit off, but hopefully you get the idea...

The penultimate Public Observing Session of 2003 will be held on Saturday, 29 November 2003, at the Sugar Grove Observatory, starting at 6 PM. Duane Yockey is in charge, with a cast of thousands to help out (we hope!).

The last TCAA meeting of the year will take place on, as usual, the 2nd Monday of month (that is, the 8th of December), at the ISU Planetarium, at 7 PM. The Planetarium gift shop will be open, so get your daily required allowance of education and finish your holiday shopping at the same time. What a deal!



*Can you identify this object? The first respondent with the correct answer will receive accolades and adulation beyond all measure! Send those guesses/answers to [mprogers@mac.com](mailto:mprogers@mac.com) or [jmemken@ilstu.edu](mailto:jmemken@ilstu.edu).*

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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 \$40 to our esteemed treasurer:

Duane Yockey  
508 Normal Avenue  
Normal, IL, 61761

As always, thank you for your support!!