

# The BSERVER



The Newsletter of the Twin City Amateur Astronomers, Inc.

October 2001 Volume 26, Number 10

## Club Notes

— Sandy McNamara

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**T**HE YEAR is passing quickly! IF members are interested in having a social gathering to celebrate the

Christmas holiday season, we will require someone to offer to host one. If you would be willing to offer a gathering place for perhaps a dozen friendly people (who bring food <g>) some time in

December please let any board member know before December first. Also, we will soon be starting a search for a speaker for the February banquet. If you would have any suggestions, again, please contact any board member.



We are finalizing plans to begin the telescope/mirror making class being offered by Joseph DeHoff. This will be an easy

project for beginners to make a completely safe solar viewing telescope. Contact Joe (josephd@connecting-point.com) or any board member for information on joining the class.

**GENERAL MONTHLY MEETING** - Meetings are held on the second Monday of each month beginning at 7 PM at the ISU Planetarium. Attendees at the last meeting had fun practicing star hopping to some notable deep sky objects using copies of star charts and Telrad

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### A BPL/TCAA Production

## M. Messier Lives Upstairs Duct-Taped to the Ceiling!!

See p. 3 for details...

# TCAA Calendar

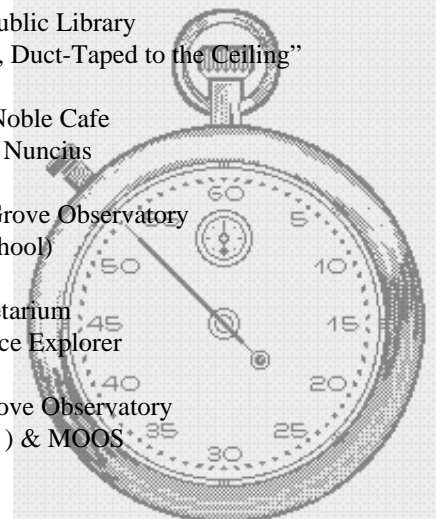
Tuesday, 30 October, 7 PM, Bloomington Public Library  
Public Lecture: "M. Messier Lives Upstairs, Duct-Taped to the Ceiling"

Monday, 5 November, 7:30 PM, Barnes & Noble Cafe  
TCAA Reading Group: Selection: Siderius Nuncius

Wednesday, 7 November, 5:30 PM, Sugar Grove Observatory  
Observing Session (Brigham Elementary School)

Monday, 12 November, 7:00 PM, ISU Planetarium  
TCAA Monthly Meeting. Topic: Deep Space Explorer

Saturday, 17 November, 4:30 PM, Sugar Grove Observatory  
Observing Session (Trinity Lutheran School) & MOOS



## 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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#### 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

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templates. Planetarium director Tom Wilmitch assisted in explaining the meaning of some of the star-charting lingo with use of the planetarium projector system and coordinate overlays. The next meeting is scheduled for November 12; the program will include a demonstration of the new computer program "Deep Space Explorer".

SGO UPDATE - Along with fall harvest comes the influx of cute but destructive field mice into warmer and dryer places. Please be aware that the annual fall "mouse treats" have been placed inside the building as of mid October. They are out of the way of routine users but please leave alone any small green blocks you might find tucked into a corner on the floor and supervise any children you might bring into the building to insure they do not pick them up.

MOOS - We keep getting rained out on the "official" days (the Saturday closest to new moon at Sugar Grove Observatory) but several members have been enjoying impromptu gatherings at SGO throughout the month as weather permits. If you have email access, you can join the TCAA email group at Yahoo (to subscribe to the list, just send a blank message to TCAA-subscribe@yahoogroups.com) to get quick information on who is doing what. Most people try to send out a brief note when they plan to go out for a while.

TCAARG - The next reading group selection is a translation, with historical explanations and commentary, of the classic "Starry Messenger" by Galileo. The book, "Sidereus Nuncius or The Sidereal Messenger by Galileo Galilei" translated by Albert Van Helden is only about \$10 at Barnes and Noble. The TCAARG meets the first Monday of each month at the Barnes and Noble coffee shop starting at 7:30 PM. Having read the selected book is not a prerequisite for joining this informal discussion group.

SPECIAL PRESENTATIONS - Jean Memken, Michael Rogers & Co. will be presenting a program at the Bloomington Public Library on October 30th on the life and work of Charles Messier. Further info is elsewhere in this issue but I can guarantee the program will be both educational and extremely entertaining for all age groups.

*Make a date with*

# StarDate

*on*

## WGLT, 89.1 FM

*Weekdays @ 6:58AM & 6:58PM*

*Sponsored by the TCAA*

*Partners in Astronomy Education  
with the ISU Planetarium*

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**309-438-5007**

## M. Messier Lives Upstairs, Duct-Taped to the Ceiling

**What:** A special TCAA/BPL presentation, offering a fascinating, light-hearted look at the life and discoveries of one of Europe's most famous comet-hunters and astronomers.

**Who:** Charles Messier, born in France in 1730, discovered 15 comets in his lifetime. He was the first to compile a catalog of comets, galaxies, nebulae, and star clusters, the Messier List. Charles Messier has been honored by the astronomical community with the naming of an asteroid, moon crater, and a constellation after him.

**When:** Tuesday, 30 October, 2001, 7:00 PM

**Where:** Bloomington Public Library Community Room



## The TCAA Monthly Meeting!

**What:** Beginner's Corner, A Demo of Deep Space Explorer, What's Up this Fall, Cloud Commiserations, SER's Famous Cookies (tm)

**Who:** Everybody

**When:** Monday, 12 November, 2001

**Where:** ISU Planetarium

Apart from the TCAA Reading Group and the Members-Only Observing Sessions (MOOSs), the monthly meeting is \*the\* best time and place to get together with other people in the area who are interested in astronomy. If that describes you — and if you're reading this newsletter, you surely are — then mark your calendar now!!

## Fall Classics

— Sandy McNamara

FILLING a mostly barren portion of the southern fall skies is the constellation Pisces, the Fishes. Pisces, one of the 12 constellations of the Zodiac, was seen by the ancient Greeks as two Fish, joined by a knot at their tails; the knot originally being the variable star Mira, “the wonderful”, in Cetus. Pisces, which contains no stars brighter than 4th magnitude occupies the area both below and to the east of the Great Square of Pegasus, forming a V-shaped wedge between Pegasus and Cetus. Surrounded by the more easily traced constellations of Pegasus, Andromeda, Triangulum, and Aries, its main claim to fame is that around March 21st of each year, the sun crosses here on its way from the south to the north of the celestial equator. This point is called the “vernal equinox” and is the zero hour point for marking right ascension in the plotting system used to map the skies (somewhat as Greenwich, England is the zero starting point for measuring longitude around the Earth).

Pisces offers a wealth of faint galaxies to those with 10-in or larger telescopes but also has some suitable for smaller ‘scopes. The constellation also contains some fine double stars, several of which are beautiful color contrast pairs.

Perhaps the easiest portion of Pisces to locate in the skies is the asterism referred to as the “Circllet of Pisces”. Look just below the Great Square of Pegasus for a small circle of five or six 4th and 5th magnitude stars. Faint but distinctive, the Circllet is only about 5 degrees across so it just fits into the view of many binoculars and finderscopes. If you stretch the circle out to include a few fainter stars visible in dark skies, the easternmost star in the (ovalett??) is TX Psc, a deeply colored red carbon star, one of the brightest of this type in the sky. In spite of this, the color is sometimes disappointing to beginners — it appears more as a deep golden or reddish-orange color to many observers.

At a dark sky site such as Sugar Grove



*M74, the lone Messier object in Pisces*

Observatory, refer to a star atlas or perhaps the monthly sky charts published in [Sky & Telescope](#) or [Astronomy](#) magazines to trace the line of stars forming the western fish for 35-40 degrees (about 4 fist widths) eastward from the Circllet to reach 4th mag alpha Psc, the “knot” joining the two fish at their tails.

Alpha Psc is a close double star which will probably require at least a 4-in telescope to split and is a test for good seeing conditions as well as good collimation of your telescope. Its close separation of less than 2 arc seconds requires high magnification to split (I could barely do so at 300x in my 8-in SCT). A far easier double is the pretty zeta Psc, about 12 degrees E of alpha in the straggling line of the western fish. It can be split in even the smallest telescopes to show a nicely matched magnitude duo

The lone Messier object in Pisces, M74 (NGC 628), can be found 1 1/2 deg E and 1/2 deg N of mag 3.5 eta Psc in the straggling line of the northern fish. Perhaps the easiest way to locate eta Psc is by first finding the distinctive arc of 3 stars just south of Andromeda/Triangulum, which form the horns of the ram in the constellation Aries. Follow the line from alpha Ari (mag 2) through beta Ari (mag 2,5) eastward about twice the distance between the two to land on eta Psc (while you are in the area, take a peek at gamma Ari, the third star in the ram’s horn; it is another nice and easy double star).

In my 8” SCT at 70x, M74 shows up as a mod large, dim, formless, hazy patch of nebulosity. M74 has a reputation of being one of the more difficult Messier objects to log for those trying to complete this observing award. A face on spiral galaxy,

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it has a low surface brightness and details are difficult to see even in larger telescopes.

Continue up the line of the northern fish to find psi-1 Psc, about midway between M74 and alpha Andromeda (at the NW corner of the Pegasus square). This is yet another nice matched pair of stars, which is relatively easy to split, even with the smallest telescopes.

Inside the Pisces "V", Galaxy NGC 524 is located approx 3 degrees NE from the nice double star zeta Psc. It shows as a mod bright, small, round glow at 68x in my 8" SCT; 200x reveals the brighter nucleus brightening to an almost stellar core with faint field stars whose magnitude almost matches that of the galaxy core touching N and E sides of galaxy halo. Those of you with access to larger telescopes can try searching for at least 4 more dim (mag 12-14) galaxies, which are within the same med power eyepiece field of view.



NGC 488

Galaxy NGC 488 can be found 2 degrees E and 2 degrees S of zeta Psc. The 8-in 'scope at 70x shows a faint, round nebula with no obvious central brightening at the core.



Object	Type	RA	Dec	Mag	Size/Sep
psi-1 (74) Psc	DS	0106	2128	5.6/5.8	30"
zeta (86) Psc	DS	0114	0735	5.6/6.5	23"
NGC 488	Gal	0122	0516	10.3	5.2' x 4.1'
NGC 524	Gal	0125	0933	12.0	3'
NGC 628 (M74)	Gal	0137	1547	10.0	10.2' x 9.5'
alpha (113) Psc	DS	0202	0246	4.2/5.1	1.7"

Note for those of you working on various observing projects: NGC 628 is included with the Messier list; NGC 488 and NGC 524 are included on the Herschel 400 observing list; alpha Psc, zeta Psc, psi-1 Psc, and gamma Ari are included in the AL double star observing list.



# Leonids — The Event of the Year!

## — NAMN

*The North American Meteor Network is an internet-based organization that encourages amateur visual meteor observing in Canada and the USA. This article is reproduced, with permission, from their newsletter NAMN Notes. Be sure and visit [www.namnmeteors.org/](http://www.namnmeteors.org/) for more information*

**W**hat is this shower? The Leonids are a sight of a lifetime when they storm, and they are predicted to storm in large numbers this year. These meteors are debris from Comet 55P/Tempel-Tuttle.

### i) The Parent Comet...

The comet was discovered on December 19th, 1865, by Ernst Wilhelm Liebrecht Tempel in Marseilles, France. Tempel was born in 1821 in Nieder-Kunersdorf, in Saxony. He trained as a lithographer, and took up astronomy as a side interest. When he moved to Venice, he purchased a 4 inch refractor, and started looking for comets from a balcony of a Venetian palace. He found his first in 1859, also the year in which he became the first observer to note the nebula around the star Merope in the Pleiades. In 1860, he moved to Marseilles, France, obtained employment at the observatory, and went on to discover 8 more comets, including the famous Tempel-Tuttle as we now know it. In 1871 he moved to Milan, Italy, taking a job as an assistant to Schiaparelli at the Brera Observatory. He discovered 3 more



*Ernst Wilhelm Liebrecht Tempel*

comets at Milan. In late 1874, he moved to Florence and the Arcetri Observatory, and using larger telescopes, found 1 more comet. In all, he was the first discoverer of 13 comets. Tempel died in 1889, and was buried near the tomb of Donati, whose name is also famous for comets.

Comet Tempel-Tuttle was also discovered by Horace Parnell Tuttle of Harvard College Observatory, Cambridge, Massachusetts, USA on January 6th, 1866. Tuttle was an assistant astronomer at the Harvard College Observatory. He discovered his first comet in 1857, which turned out to be periodic Comet Brorsen. In 1858 he made a first discovery of Comet 1858 I, now called periodic Comet Tuttle. He went on to a total of 4 comet discoveries, and 9 co-discoveries. The most famous of these comets are 1862 III Swift-Tuttle, the parent of the Perseid meteors, and 1866 I

Tempel-Tuttle, the parent of the Leonid meteors. In 1862, Tuttle left Harvard, served in the infantry in the American Civil War, then transferred to the navy. He served on the U.S.S. Catskill, an iron-clad ship engaged in the blockade of Charleston Harbor in South Carolina. By day he acted as paymaster... and by night he made observations of comets! After the navy, he worked with the U.S. Geological Survey, and helped define the boundary line between Wyoming and the Dakotas. Tuttle died in 1923 and was buried in an unmarked grave at the Oakwood Cemetery in Falls Church, Virginia.

### ii) The Early Leonid Observations...

There are many old descriptions of the Leonid meteors, as they have been observed for over 1000 years, long before

their cometary origin was known. In his book 'The Story of the Heavens' published in 1886, Sir Robert Ball wrote:

"On the 12th of October, in the year 902, occurred the death of a Moorish king, and in connection with this event an old chronicler relates how 'that night there were seen, as it were lances, an infinite number of stars, which scattered themselves like rain to right and left, and that year was called the Year of the Stars.'"

We now know, due to calendar allowances, that this referred to the Leonids, and is one of the first recorded instances of the shower.

November of 1833 sparked the current birth of meteor astronomy as we know it. A Leonid storm was widely observed in North America. Observations of the event



*1833 Leonid Storm (Karl Jauslin)*

led to Denison Olmsted's theorizing that the meteors had originated from a cloud

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of particles in space - and a specific radiant point for the meteors. Old records were looked at, and von Humboldt's observations of 1799 from South America discovered. The possibility of annual activity in November was realized. In 1837, Heinrich Olbers reported a period for the Leonids of about 33 or so years.

Hubert A. Newton examined many old records, and identified many years of Leonid activity. He predicted the next return 33 years later, in 1866, and a meteor storm occurred. Sir Robert Ball wrote:

"Such was the occurrence which astonished the world on the night between November 13th and 14th, 1866. The meteors were distinguished not only by their enormous multitude, but by their intrinsic magnificence. I shall never forget that night... I was engaged in my usual duty at that time of observing nebulae with Lord Rosse's great reflecting telescope... The late Earl of Rosse... joined me at the telescope, and, after a brief interval, we decided to cease our observations of the nebulae and ascend to the top of the wall of the great telescope... There, for the next two or three hours, we witnessed a spectacle which can never fade from my memory. The shooting stars gradually increased in number until sometimes several were seen at once... All of the tracks of the meteors radiated from Leo... Occasionally luminous trains would linger on for many minutes after the meteor had flashed across, but the great majority of the trains in this shower were evanescent. It would be impossible to say how many thousands of meteors were seen, each one of which was bright enough to have elicited a note of admiration on any ordinary night."

Giovanni Schiaparelli of Italy commented in a letter written in 1867 that Comet Tempel-Tuttle was probably related to the Leonid meteor stream. Camille Flammarion wrote that "for the swarm of shooting stars of November... Le Verrier has calcu-

lated that it entered for the first time into our system in the year 126 of our era, at a point near where the planet Uranus was then situated, and that it is this planet which has transformed the parabolic into an elliptic orbit. If the planet had not been there, the meteors would have continued their course".

iii) Observations This Century....

In 1933, no storm was observed.

In 1966, however, a brief storm was observed on November 17th over the central and western United States. Dennis Milon is quoted on <http://leonid.arc.nasa.gov/history.html> regarding the observations from Kitt Peak, Arizona:

"The meteors were so intense that we were guessing how many could be seen in a one-second sweep of the observers head."

A peak rate of about 40 meteors per second was reached at 5.54 a.m. local time. This works out to 2400 meteors per minute, or 144,000 meteors per hour!

In 1998, a surprise shower of fireballs was seen. A summary can be found at <http://star.arm.ac.uk/~ambn/abstract309.html>, from a paper by Asher, Bailey and Emel'yanenko titled 'Resonant meteoroids from Comet Tempel-Tuttle in 1333: the cause of the unexpected Leonid outburst in 1998'. This unexpected bombardment of fireballs happened about 16 hours before the predicted peak of the Leonid shower! It must be remembered that, in spite of all kinds of predictions by professional researchers, that we still do not know everything about meteors! This is why it is so important to watch on a number of nights - from wherever you happen to be around the globe.

In 1999, a storm of Leonid activity was observed from western Asia, Europe, and

Africa, with ZHR rates of about 3700 meteors per hour. Details are given in the IMO analysis at <http://www.imo.net/articles/shower/leo99.html>. The IMO states that the Leonid storm component had 'an unusual magnitude distribution with a lack of both very bright and very faint meteors'.

In 2000, rates were not as high. Three peaks were observed, but with ZHR rates only about 130, 290 and 480 meteors per hour respectively, as per the IMO analysis.

iv) Leading Up to Recent Analyses...

According to Gary Kronk on his "Comets and Meteor Showers" website:

"The most ambitious study of the relationship between Tempel-Tuttle and the Leonids was published in 1981. Donald K. Yeomans... mapped out the dust distribution surrounding Tempel-Tuttle by 'analyzing the associated Leonid meteor shower data over the 902-1969 interval'. He noted that most of the ejected dust lagged behind the comet and was outside its orbit... Yeomans suggested this indicated 'that radiation pressure and planetary perturbations, rather than ejection processes, control the dynamic evolution of the Leonid particles'. Concerning the occurrence of Leonid showers, Yeomans said 'significant Leonid meteor showers are possible roughly 2500 days before or after the parent comet reaches perihelion but only if the comet passes closer than 0.025 AU inside or 0.010 AU outside the Earth's orbit'. He added that optimum conditions will be present in 1998-1999, but that the lack of uniformity in the dust particle distribution still makes a prediction of the intensity of the event uncertain."

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v) Predictions for This Year...

There are a number of models predicting the activity of the Leonid meteors this year. It will only be after the event has occurred that we will know which model best fits the activity seen! Hence it is really important for all observers to monitor the nights around November 17th and 18th and 19th - before the maximum, during the maximum, and after the maximum. Surprises can always occur. Consider the fireballs of 1998 - they arrived the night before anyone was expecting major Leonid activity!

According to the Armagh Observatory website - the predictions of Robert McNaught of Australia and David Asher of Armagh - the times of maximum Leonid activity and the estimated meteor rates are as follows, quoted from [www.arm.ac.uk/leonid/encounters.html](http://www.arm.ac.uk/leonid/encounters.html)

Date Time ZHR rate Visible from

1. Nov. 18 10.01 UT 2,500/hr ? N. & Central America ie. debris shed by the comet in 1767, 7 'revolutions' ago in its trip around the sun
2. Nov. 18 17.31 UT 9,000/hr Australia & E. Asia ie. debris shed by the comet in 1699, 9 'revolutions' ago in its trip around the sun
3. Nov. 18 18.19 UT 15,000/hr W. Australia, E., SE & Central Asia ie. debris shed by the comet in 1866, 4 'revolutions' ago in its trip around the sun

(Peaks have been numbered 1, 2 & 3 for quick reference to other models mentioned below, for the same debris streams.)

The time is given in UT, Universal Time. This is the time in Greenwich, England - so count over the hours to get to your own time zone! For observers on Eastern Standard Time, it is 5 hours earlier - ie. for the

above, using the 24 hour system: 05.01, 12.31 and 13.19, or in normal clock time: 5.01 am, 12.31 pm, and 1.19 pm. For observers on Pacific Time, it is 8 hours earlier - ie. for the above, using the 24 hour system: 02.01, 09.31 and 10.19, or in normal clock time: 2.01 am, 9.31 am, and 10.19 am. Time is tricky - so be careful. You can see from these times that North America only gets 1 peak at night.

Note that Australia and Asia are on the other side of the International Date Line - so the storming predicted over there actually happens in the pre-dawn hours of November 19th, not the 18th.

ZHR refers to the Zenithal Hourly Rate, the number of meteors that an observer would see, on the average, per hour, with the unaided eye, if they were out under a dark country sky, and if the radiant, the area in the sky where the meteors seem to come from, was directly overhead. We will be close to new moon for Leonids, so that is good. Get out to a dark site to increase your meteor rates! However, your latitude will affect how high the Leonid radiant will get in your sky - and that will affect your rates as well.

A diagram showing these 3 Leonid 'dust trails' is on the Armagh website at <http://www.arm.ac.uk/leonid/info2001.html>. It is interesting to note that the dust trails for 1699 and 1866 will appear very close together for us from the earth's viewpoint - and it could be difficult to tell them apart! It is also noted on the site that smaller contributions of dust from the 10 revolution debris and the 11 revolution debris will add to meteors seen from the 9 revolution and 4 revolution debris! (It will be very interesting for those doing meteor photography or video to see if there is a noticeable difference in radiant position for these different overlapping dust trails, as seen from the earth!) And - the cumulative effect of all these meteor rates could be quite phenomenal.

Another Leonid model, that of Esko Lyytinen, Markku Nissinen and Tom Van Flandern, predicts, as quoted from <http://www.saunalahti.fi/~fmbb/astro/2001leonidstorm.htm>

1. Nov. 18 10.28 UT 2,000/hr N. & Central America (7-rev)
2. Nov. 18 18.03 UT 2,600/hr W. Australia, E., SE & Central Asia (9-rev)
3. Nov. 18 18.20 UT 5,000/hr W. Australia, E., SE & Central Asia (4-rev) & smaller peaks at:  
Nov. 18 12.00 UT 110/hr (6-rev)  
Nov. 18 14.10 UT 60/hr (5-rev)  
Nov. 18 19.10 UT 150/hr (10 rev)  
Nov. 18 19.10 UT 150/hr (11 rev)

Another Leonid model, that of Peter Jenniskens, predicts, as quoted from <http://leonid.arc.nasa.gov/1998.html>

1. Nov. 18 10.09 UT 4,200/hr N. America (7-rev)
2. Nov. 18 17.08 UT 1,800/hr Australia, E. Asia (9-rev)
3. Nov. 18 17.55 UT 2,700/hr Australia, E. Asia (4-rev) & smaller peaks at: Nov. 18 12.07 UT 40/hr Western USA/ Hawaii (6-rev)  
Nov. 18 13.57 UT 14/hr Western USA/ Hawaii (5-rev)  
Nov. 18 17.01 UT 170/hr Australia, E. Asia (10-rev)  
Nov. 18 17.21 UT 510/hr Australia, E. Asia (11-rev)

Another Leonid model, that of Peter Brown and Bill Cooke, predicts, in the September 2001 issue of the "Monthly Notices of the Royal Astronomical Society", as paraphrased by Gary Kronk at <http://comets.amsmeteors.org/meteors/showers/leonidprediction.html>

"that a 'broad and relatively strong' maximum will occur with a peak of possibly more than 1200 meteors per hour falling down between 10 and 12 UT. A much broader secondary maximum could occur around 17:30 UT with rates near 500 per hour."

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Looking at the article by Bill Cooke on the Space Environments & Effects Program website at [http://see.msfc.nasa.gov/see/Leonid\\_Forecast\\_2001.html](http://see.msfc.nasa.gov/see/Leonid_Forecast_2001.html), you can see this graphically by looking near the end of the article at the diagram "Revised Brown/Cooke 2001 Forecast". This multi-color graph gives a line for each of the debris streams - 1633, 1666, 1699, 1733, 1766, 1799, 1833, 1866 - and a line showing the total predicted activity as a result of the earth passing through all of this debris combined.

Can you see Leonid meteors at other times besides those listed above? Of course you can! As quoted from the Armagh website:

"You can view the background of the Leonid meteor shower at other times, basically between your own local midnight (exact time being latitude dependent) and morning twilight; it's just that you'll miss the encounters of the Earth with meteors from these particular dust trails if you're not in the parts of the world on these maps."

The maps - of where to be on the earth to see meteor storming due to the dust trails - are at <http://www.arm.ac.uk/leonid/info2001.html>. The total activity period for the Leonids is listed by the IMO, the International Meteor Organization, as November 14th to 21st. The dust trails are predicted to be seen at the specific times listed in the various models. We won't know whose model best matches the Leonid dust trail activity until after the meteors are seen! But the overall background Leonid meteor activity will be seen for a much longer period of time - before, during, and after the 'storming' due to the dust trails.

vi) Where Should You Go?...

Your priority as to where to observe Leonids from should be - first and fore-

most - a site where the skies will be clear! Many observers plan to travel - but all observations worldwide are valuable, as data are needed from as many different longitudes as possible to get complete global coverage.

vii) What Should You Record?...

What should you record? Check out our NAMN Observing Guide at <http://www.namnmeteors.org/guide.html> If you need a set of star charts showing the constellations, sky coordinates, and the magnitudes of stars useful in judging the brightness of the meteors you see, print yourself off a set from <http://www.namnmeteors.org/charts.html>.

For a set of star charts to use in judging how good your perception is, and how good your sky is (your limiting magnitude, LM), print off a selection of charts from <http://www.imo.net/visual/major01.html#able2>.

For the storm components of the Leonids, plan now. Life will be fast and furious - and your normal observing methods may not work.

Check out Sirko Molau's meteor storm simulation. It can be downloaded from <ftp://ftp.imo.net/pub/software/metsim/> Give some thought now as to how you would deal with this. If you continue to record visually, you may have to estimate batches of meteors per time unit, and give up estimating magnitudes. You may decide to forego visual counting - and take timed photographs instead. You may decide to run a video camera. If recording by camera or video - be sure to accurately note your start and stop times - in order for your data to be useful scientifically.

For more information on meteor photography, check out <http://www.imo.net/photo/index.html>

For more information on video recording, check out <http://www.imo.net/video/index.html>. Keep in mind that only a handful of observers around the globe have the special 'intensified' video cameras that are talked about. However - due to the special nature of this year's Leonids - if you have a video camera of any kind, use it! All video coverage of this event, from as many observers around the globe as possible, will be useful. For more information, or questions concerning recording meteors by video, contact the IMO, International Meteor Organization, Video Commission Director, Sirko Molau, at [video@imo.net](mailto:video@imo.net).

viii) Where in the Sky Should You Look?...

For the 'storm' components of the Leonids, we doubt that you will have a problem recognizing the Leonid meteors. However, in the quiet nights leading up to the maximum, and after the main weekend, you may need some info on where to look. A map showing the movement of the Leonid radiant over time can be found at <http://www.imo.net/calendar/cal01.html#Leonids>.

The Leonids (LEO) will have a general radiant at 153 degrees, ie. RA 10h 12m, Dec +22, which is about 2 degrees down to the right of the star zeta Leonis, the star called Adhafera, up in the 'sickle' of Leo. No matter where in the sky you see them, if you trace back the path of a Leonid meteor, it will seem to come from this area.

The radiant is an area, not just a point in the sky. In fact, with the earth intersecting several dust trails this year, there will be slight differences in radiant position. These may or may not be noticeable by a visual observer - but would show up in

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detailed photographic or video observations.

These are very fast meteors, with a velocity of about 71 km per second. Get comfortable in your lawnchair, and center your gaze about 50 degrees up in the sky. As these meteors are very fast, the fainter ones may be difficult to detect for beginning observers. If you concentrate on one direction in the sky, instead of moving all over, you will have a better chance of seeing more meteors, especially the fainter ones. And - a dark country sky is important!

#### ix) How to Stay Tuned to Leonids as They Happen...

To stay tuned to the shower activity as it happens around the globe, watch our "Meteorobs" email list (<http://www.meteorobs.org/subscribe.html>), the best source in town! Consider subscribing so that you too can hear the latest Leonid happenings! We are interested in hearing all Leonid meteor reports! Drop an email either to the list or to our NAMN Coordinator at [SC.meteors@home.com](mailto:SC.meteors@home.com)

## A Leonid Checklist...

### — NAMN

**W**HAT do you need to observe the Leonids? The following is a basic checklist for those planning to observe this incredible meteor shower:

#### **Warmth and comfort gear:**

- a reclining lawnchair so you can lie back in comfort
- a foam mat to put on your lawnchair to insulate your back
- a heavy sleeping bag
- extra blankets
- a tarp to put over your sleeping bag to keep frost or dew off
- long underwear, then layers of warm clothing
- a warm coat
- warm wool socks - take your boots off
- warm mittens or gloves, extra mittens
- wool hat
- a scarf to wrap around your neck and face
- handwarmers
- cookies for a 3 a.m. snack
- thermos of tea or coffee

#### **Recording tools:**

- paper and pencil and meteor recording sheets

- spare pencils
- preferably, pocket tape recorder, with paper as a backup
- if recorder, spare tapes and spare warm batteries
- red flashlight (and a spare)
- watch or clock set to Universal Time
- star charts showing 'standard stars' to judge meteor magnitude
- star charts to estimate LM, limiting magnitude of sky

#### **To take still photos of Leonids:**

- a camera with bulb, ie time exposure, setting
- a normal or wide angle lens
- a tripod
- a cable release
- fast film, preferably ASA 400 or higher
- some method of keeping frost or dew off your lens
- a watch to time your photos (important)
- a notebook to record your exposure start and stop times

#### **To help spread the words:**

- bring your friends and family - the Leonids could be a once-in-a-lifetime experience!



## Treasurer's Report — August 2001

— Duane A. Yockey, Treasurer

OPERATING FUND BALANCE – August 31, 2001 - **\$1,594.11**

### Income

Tim & Karen Winter (dues) -	\$ 25.00
Tori & Tiffany Connelly (dues) -	\$ 25.00
Allen & Martha Yarmer (dues) -	\$ 25.00
Kal Kumar (dues) -	\$ 25.00
Sarah Glenwright (dues) -	\$ 25.00
Michael Rogers (dues renewal) -	\$ 25.00
Laura Furman (dues renewal) -	\$ 25.00
Kaila Walstrom (dues renewal) -	\$ 25.00
Marge Horsley (dues renewal) -	\$ 25.00

### Expenses

None!! - \$ 0.00

OPERATING FUND BALANCE – September 30, 2001 - **\$1,819.11**

OBSERVATORY FUND BALANCE – August 31, 2001 - **\$ 99.65**

### Income

Interest (July, Aug. & Sept.) - \$ 0.26

### Expenses

None!! - \$ 0.00

OBSERVATORY FUND BALANCE – September 30, 2001 - **\$ 99.91**

TOTAL TCAA FUNDS – September 30, 2001 - **\$1,919.02**

### OFFICIAL LIST OF KEYHOLDERS (PAID \$10 DEPOSIT):

Jim Swindler (April 2001)  
 Duane Yockey (April 2001)  
 Sandy McNaMara (June 2001)  
 Dan Miller (August 2001)  
 Michael Rogers (August 2001)

## Etc., etc., etc.

—Michael P. Rogers

**M**EADE has just revamped their lineup of LX-200 telescopes, adding GPS and battery power capability (courtesy of 8(!) C-cells), and a much larger database of deep sky objects. But the big news is that the primary mirror now *locks*: for anybody who's ever focused a Schmidt-Cassegrain Telescope and beheld the image moving out of the field of view, this is a welcome addition. The new telescope also sports an electric microfocuser. Nice touches, IMHO.

Why do I bring this up? Two meetings ago, there was a discussion of replacing the C-14 with an LX-200 12". The latter represents a slight decrease in aperture, but a focal-reducer could set that aright. More significantly, the LX-200 has full slewing controls; there is no cost-effective way to retrofit these into the C-14. Dan and Duane are going to check into the feasibility of the club acquiring an LX-200.

A few people have expressed interest in the ATM class mentioned last month. Hopefully at the monthly meeting, we'll be able to get a final tally, and possibly set up dates/times.

We have 3 requests for observing sessions for November: Trinity Lutheran School (17/11/01) and Brigham Elementary in Bloomington (6/11/01), and Johns Hill Magnet School (13/11/01) in Decatur. Please consider coming out to help! Bring a telescope if you have one; or just act as a guide. This can be a rewarding and enjoyable experience, but we need *\*your\** help!

The TCAA Reading Group has embarked on an exciting new text, a delightful translation of *Sidereus Nuncius*, *The Starry Messenger*, by Galileo. Copies should be available at the B&N front desk. We meet the first Monday of each month at the B&N Cafe at 7:30, and reading the book is *\*never\** a prerequisite for showing up!

## The Welcome Mat

Let's compensate for the weather by giving an extra warm welcome to our our newest member, astronomer and purported Beatle fan...



Sarah Glenwright  
Normal 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!!