



# THE *Prairie Astronomer*

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## President's Message

*by Dave Knisely*

If the weather improves a bit, the club has two interesting activities during August. First, the **Perseid Meteor shower** watch will be held at the site on the peak nights of **August 11th and 12th**. The chance of observing a meteor storm (and hopefully not a thunderstorm) should make for a good turnout. The moon rises after midnight, so we should have a fairly good view. The second event is the annual **Prairie Astronomy Club Picnic** and star party on Saturday, **August 14th** at Hyde Observatory. We will begin to gather at the observatory around 4:30 p.m. or so, with the picnic starting promptly at 6:00 p.m. It is a pot luck, with the club once again providing the pop. We will also have star parties on the nights of the 13th and 14th, weather permitting, so mark the second week of August on your calendar for some fun and (hopefully) some good observing.

We have had a few reports of problems with people at the Atlas site. Some of these people may have been outsiders, but others may be club members or guests. Remember, if someone is present at the site who is not a current member or a guest of a member who is at the site, they should be asked to leave. I have seen incidents in other organizations between just a few individuals that ends up dividing or destroying the entire club. These incidents could have been prevented by some simple understanding and common courtesy. To this end, I have drafted a set of guidelines which may help prevent some of these problems in the future. Most of them are just common sense, but sometimes people need to have things stated formally in order to get the message. I would like everyone to read these proposed guidelines carefully, and have comments, suggestions, or additions ready for discussion at the July 27th meeting, so we can decide exactly what we need to do (if anything). If you wish, you can contact one of the club officers privately to express your opinion. It is probably best if we act now, before something unfortunate happens which causes bad feelings or results in damage or injury. Thank you all, and we will see you at the meeting.

[NOTE: The proposed guidelines are on an inserted page of this newsletter]

# International Meteor Organization 1993 Meteor Shower Calendar

## Part Two

### Orionids

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Active: October 2—November 7

Maximum: October 21 ( $\lambda=208.4^\circ$ )

ZHR = 25

Radiant:  $\alpha=95^\circ$ ,  $\delta=+16^\circ$

$\Delta\alpha=+1.2^\circ$ ,  $\Delta\delta=+0.1^\circ$

diameter:  $10^\circ$

$V = 66$  km/s

$r = 2.9$

TFC:  $\alpha=100^\circ$ ,  $\delta=+39^\circ$  and  $\alpha=075^\circ$ ,  $\delta=+24^\circ$  ( $\beta > 40^\circ$  N)  
 $\alpha=080^\circ$ ,  $\delta=+01^\circ$  and  $\alpha=117^\circ$ ,  $\delta=+01^\circ$  ( $\beta < 40^\circ$  N)

With its near-equator radiant, the Orionids provide a moderate spectacle for much of the globe, and observations can be carried out from around midnight or a little before from most places. The waxing crescent Moon will present few difficulties near the main maximum (there are several sub-maxima which are usually noted too, in a similar fashion to the linked stream the Eta-Aquarids both of which are believed to have originated in Comet P/Halley), and some dark-sky watching should be possible after moonset until about October 24 or 25, depending on location.

The radiant itself is complex and benefits from telescopic watching, as the structure and sub-maxima are extremely difficult to pin down by visual or photographic data alone. This is particularly true as the  $r$ -value may vary quite considerably at different points within the sub-maxima. A good geographical spread of observers is also necessary to ensure as complete coverage as possible.

Like their May counterpart the Eta-Aquarids, Orionid meteors are swift, can be bright and are often trained, so they well repay the effort needed to see them.

### Taurids

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#### \* *Taurids South:*

Active: September 15—November 25

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Maximum: November 3 ( $\lambda=220.7^\circ$ )

ZHR = 10

Radiant:  $\alpha=050^\circ$ ,  $\delta=+14^\circ$ ,

\*  $\Delta\alpha$ ,  $\Delta\delta$ : see Table 6

Radiant area:  $\alpha=10^\circ \times \delta=5^\circ$

$V = 27 \text{ km/s}$

$r = 2.3$

TFC: pairs of fields  $15^\circ$  east or west of the double radiant at  $\delta=+17^\circ$  ( $\beta > 30^\circ \text{ N}$ ) or  $\delta=+06^\circ$  ( $\beta > 40^\circ \text{ S}$ )

\* ***Taurids North:***

Active: September 13—November 25

Maximum: November 13 ( $\lambda=230.7^\circ$ )

ZHR = 8

Radiant:  $\alpha=060^\circ$ ,  $\delta=+23^\circ$

$\Delta\alpha$ ,  $\Delta\delta$ : see Table 6

Radiant area:  $\alpha=10^\circ \times \delta=5^\circ$

$V = 29 \text{ km/s}$

$r = 2.3$

TFC: as Southern Taurids

These two streams form a complex associated with Comet P/Encke. Both radiants are difficult to define precisely, and usually only visual or telescopic plotting permits easy differentiation between the two showers. Further work of this sort will no doubt be beneficial to our understanding of the Taurids, and the brightness of many shower members coupled with their low relative velocity makes them ideal targets for photography.

Combined activity from these sources remains at about 3—4 meteors per hour from roughly late October to late November, while both maxima are broad and flat, lasting for about a week or more with nearly constant ZHRs. This steady activity and slow apparent speed means that these are excellent showers for newcomers to practice their visual meteor plotting techniques on, choosing areas of sky some  $20^\circ$  —  $30^\circ$  east or west of the radiants.

This year, lunar conditions are especially conducive to watching the Northern Taurid peak, with New Moon on November 13. The near-ecliptic radiant positions for both shower branches mean all meteoricists can observe the streams, though the northern hemisphere is rather more favored, however, with suitable radiant zenith distances for most of the night. Even in the southern hemisphere, though, a good 3—5 hours around local midnight sees the constellation of Taurus well above the horizon from many areas.

## Leonids

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Active: November 14—21

Maximum: November 17, 20h UT ( $\lambda=235.71^\circ$ )

ZHR: periodic—up to storm levels, recently 10—15

Radiant :  $\alpha=152\text{deg}$ ,  $\delta=+22\text{deg}$   
 $\Delta\alpha=+0.7\text{deg}$ ,  $\Delta\delta=-0.4\text{deg}$   
diameter: 5deg  
 $V = 71 \text{ km/s}$   
 $r = 2.5$

TFC:  $\alpha=140\text{deg}$ ,  $\delta=+35\text{deg}$  and  $\alpha=129\text{deg}$ ,  $\delta=+06\text{deg}$  ( $\beta > 35\text{deg N}$ )  
or  $\alpha=156\text{deg}$ ,  $\delta=-03\text{deg}$  and  $\alpha=129\text{deg}$ ,  $\delta=+06\text{deg}$  ( $\beta < 35\text{deg N}$ )

The Leonid stream is perhaps most famous for its periodic storms occurring at roughly 33-year intervals when its associated comet, P/Tempel-Tuttle, returns to perihelion. This situation is due to happen again in the years 1998—2000, and Leonid activity is expected to increase in the next few years as the comet approaches. Clearly, we have the best opportunity ever to follow these changes in the coming years more fully than has been previously possible, and to take advantage of these circumstances in a special International Leonid Watch project that has been set up with IMO help to coordinate world-wide professional and amateur Leonid studies. All observing methods should be pursued to ensure that no detail is missed, with data collection already begun in 1991, intended to continue into the next century.

In 1993, circumstances are excellent for all watchers whether north or south of the equator, since the Moon is a waxing crescent throughout the shower's activity, and will have set by the time the radiant rises, around midnight or so, from most latitudes.

### December Monocerotids

Active: November 27—December 17  
Maximum: December 10 ( $\lambda=258.7\text{deg}$ )  
ZHR = 5  
Radiant:  $\alpha=100\text{deg}$ ,  $\delta=+14\text{deg}$   
 $\Delta\alpha=+1.2\text{deg}$ ,  $\Delta\delta=0.0\text{deg}$   
diameter: 5deg  
 $V = 42 \text{ km/s}$   
 $r = 3.0$

TFC:  $\alpha=088\text{deg}$ ,  $\delta=+20\text{deg}$  and  $\alpha=135\text{deg}$ ,  $\delta=+48\text{deg}$  ( $\beta > 40\text{deg N}$ )  
or  $\alpha=120\text{deg}$ ,  $\delta=-03\text{deg}$  and  $\alpha=084\text{deg}$ ,  $\delta=+10\text{deg}$  ( $\beta < 40\text{deg N}$ )

Visual rates from this shower are usually low, and although it can be observed by radio, it is telescopic observers who are encouraged to particularly cover the stream at present. Details concerning the shower are rather uncertain, and even the maximum data and radiant position may have changed somewhat from the above values.

The Telescopic Commission Director suggests the peak may now occur on December 16 ( $\lambda$  approx.  $264\text{deg}$ ) from a radiant at  $\alpha=117\text{deg}$ ,  $\delta=+20\text{deg}$ . A good data set would undoubtedly help to resolve this. Observable for the major part of the night from much of the globe, the Monocerotids are free from moonlight in 1993 near the peak, as New Moon falls on December 13.

## Geminids

Active: December 7—17

Maximum: December 13, 22h UT ( $\lambda=262.0^\circ$ )

ZHR = 110

Radiant:  $\alpha=112^\circ$ ,  $\delta=+33^\circ$

$\Delta\alpha=+1.0^\circ$ ,  $\Delta\delta=-0.1^\circ$

diameter: 4deg

$V = 35 \text{ km/s}$

$r = 2.6$

TFC:  $\alpha=087^\circ$ ,  $\delta=+20^\circ$  and  $\alpha=135^\circ$ ,  $\delta=+48.5^\circ$

before 23h local time

$\alpha=087^\circ$ ,  $\delta=+20^\circ$  and  $\alpha=129^\circ$ ,  $\delta=+20^\circ$

after 23h local time ( $\beta > 40^\circ \text{ N}$ )

or  $\alpha=120^\circ$ ,  $\delta=-03^\circ$  and  $\alpha=084^\circ$ ,  $\delta=+09.5^\circ$

( $\beta < 40^\circ \text{ N}$ )

Probably the finest annual shower presently observable, the entire activity period is free from lunar interference this year, providing a splendid opportunity to observe throughout the shower for once. Southern hemisphere observers suffer to a degree, as the radiant is low or below the horizon before midnight, but this is a splendid stream of often bright, medium-speed meteors, and well-rewards even these watchers. In 1990, the Geminid maximum occurred at  $\lambda=262.25^\circ$ , and if this repeats in 1993, the shower will reach a peak on December 14 around 3h UT, rather than that given above. In either case however, European and African observers will be the fortunate witnesses, assuming no more recent changes in the stream have taken place. Some mass-sorting across the stream means that fainter telescopic meteor rates are at their highest almost  $1^\circ$  of solar longitude ahead of the visual peaks mentioned earlier, and telescopic results show these meteors radiate from an elongated region, with up to three possible sub-centers. Further data for this topic would naturally be most valuable, though all forms of observing method can be employed for the Geminids.

### Abbreviations

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- $\alpha$ ,  $\delta$ ,  $\Delta\alpha$ ,  $\Delta\delta$ : Coordinates for a shower's radiant position, usually at maximum;  $\alpha$  is right ascension, and  $\delta$  is declination.  $\Delta$  indicates the change in either  $\alpha$  or  $\delta$  per day.
- $r$ : Population index, a term computed from each shower's meteor magnitude distribution.  $r=2.0-2.5$  is brighter than average, while  $r$  above 3.0 is fainter than average.
- $\lambda$ : Solar longitude, given for the equinox 2000.0.
- $V$ : Atmospheric or apparent meteoric velocity given in km/s.
- ZHR: Zenithal Hourly Rate, a calculated maximum number of meteors an ideal observer would see in a perfectly clear skies with the shower radiant overhead. This figure is given in terms of meteors per hour.
- TFC: suggested telescopic field centers.  $\beta$  is the observer's latitude (" $<$ " means "south of" and " $>$ " means "north of"). Pairs of fields must be observed, alternating about every half hour, so that the positions of radiants can be defined.

# SKY & TELESCOPE NEWS

JULY 17, 1993

## SPOT ON URANUS

When Voyager 2 flew past Uranus in January 1986, it sent back images of a largely featureless orb. Now astronomers find that the planet's atmosphere might not be so bland after all. Walter Wild and colleagues from the University of Chicago and the University of Arizona obtained near-infrared images of Uranus that show a dark smudge about 35° south of the equator, reminiscent of the Great Dark Spot detected by Voyager 2 during its encounter with Neptune in 1989.

Wild used an adaptive-optics camera and one of the six 1.8-meter mirrors that make up the Multiple Mirror Telescope on Mount Hopkins in Arizona. The instrument compensated for image motion induced by atmospheric turbulence, yielding an angular resolution of about one-half arc second. In addition to the dark spot, the images show a bright region and a subtle, irregular dark band near the pole.

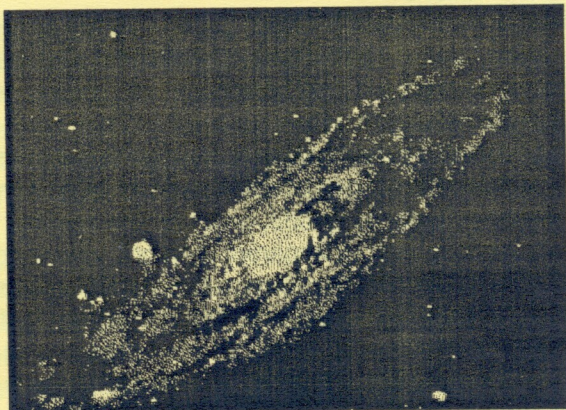
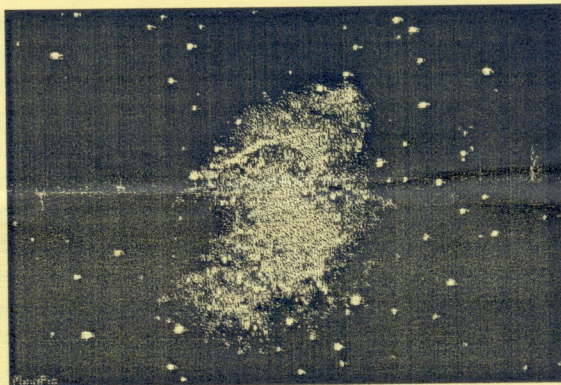
## SPACE ANNIVERSARIES

Some may remember it well, but it was 24 years ago this week that Neil Armstrong and Buzz Aldrin landed on the Moon. Furthermore, it was 17 years ago that Viking 1 landed on the surface of Mars. Both events occurred on July 20th, which is now called National Space Day, with the entire week celebrated as Spaceweek.

## IAPETUS IN SHADOW

And while on the topic of space-related anniversaries, Stanley Kubrick's film 2001: A Space Odyssey is now 25 years old. Curiously, the home of the giant, black monolith in Arthur

C. Clarke's book version of 2001, Saturn's moon Iapetus, will undergo a rare celestial event. On the night of July 20th, this icy moon will slip through the shadow of Saturn and its rings. Between 21:30 and 22:00 hours Universal time, the 11th-magnitude object will fade out completely; the fade-out will be visible from the Eastern Hemisphere. Those of us in the Western Hemisphere will be able to watch Iapetus' emergence from the shadow. At about 5 hours Universal Time on July 21st, Iapetus will begin to brighten as it slides out from the shadow of the planet; the shadow of the rings will keep it fainter than 11th magnitude. However, the exact brightness profile remains uncertain. For more details, see the July issue of SKY & TELESCOPE.



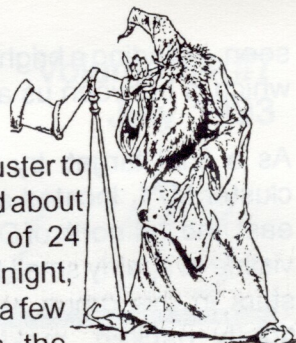
# Observing Chairman's Report

by Dave Knisely

**THE NEXT SCHEDULED STAR PARTIES ARE AUGUST 13TH AND 14TH AT THE ATLAS SITE.** Start your late summer observing with the pretty open star cluster M6. Located five degrees north and one east of Lambda Scorpii, this object is vaguely visible to the unaided eye as a fuzzy patch. A good pair of binoculars or small telescope should resolve this group well, with a six inch at low power making the cluster look a bit like the outline of a butterfly. Nearby, about four degrees east and 2.5 north of Upsilon Scorpii, is the brighter but somewhat more sparse cluster, M7. It is quite large, with even small apertures revealing 15 to 20 bright stars.

Over in Sagittarius is probably the best nebula in the summer sky, namely, M8. It is often visible to the unaided eye as a small hazy patch just southeast of 4 Sagittarii, and is best seen at low powers. A 60 mm refractor will show it as a diffuse blob of light next to a sparse open cluster, NGC 6530, while larger apertures will often reveal a faint arc of nebulosity to the southeast. Nebular filters enhance this object greatly, with large telescopes showing some faint outer nebulosity and dark detail. North of M8 is the Trifid Nebula M20. It is difficult to see in small refractors unless very low power is used, and even then, it only appears as a small puff of haze around a double star. An eight inch will show the three dark lanes radiating from the double star with averted vision, and the use of the Lumicon Deep-Sky filter will make them stand out slightly better. Very large telescopes will sometimes show some faint red color in the main nebula, with the other patch to the north being slightly bluish.

One easy globular cluster to resolve is M22, located about a half degree east of 24 Sagittarii. On a good night, a three inch will show a few very faint stars on the edges of this group. A six inch will make it look fairly impressive even at low powers, since the cluster is not very compressed.



The Swan, or Omega nebula, M17, is fairly easy to pick up in almost any telescope. It can be located in binoculars about five degrees north and just under two east of Mu Sagittarii, and appears in small apertures as a cigar-shaped fuzzy patch with a broadened hook-like end. Six or eight inch telescopes will bring out some additional detail, while a ten inch equipped with a nebular filter will begin to show the outer nebulosity which gives the object its "Omega" form. Well north of M17 is the diffuse nebula M16, sometimes known as the "Eagle". Most telescopes will reveal only a sparse open cluster in a hazy area, with large apertures making the haze seem brighter. The use of Lumicon's OIII filter will reveal much dark detail in the nebula, making it look a little like its pictures.

In Scutum is the bright open star cluster M11, located about 1.5 degrees west and a half south of Eta Scuti. This object is sometimes visible with the unaided eye, although a small telescope may have a little trouble fully resolving this tight cluster. In a six inch at about 100x, the view is spectacular, with over 100 stars being easily

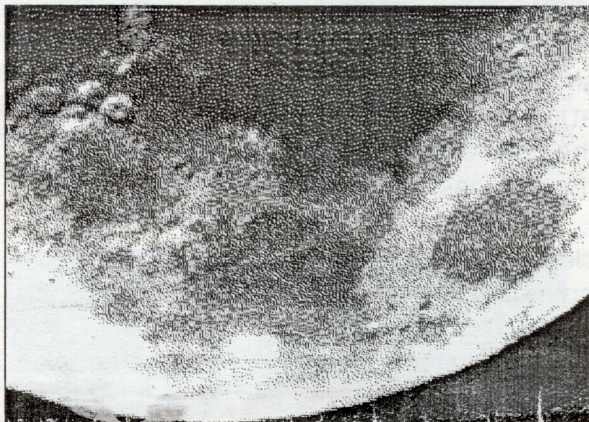
seen, including a bright central interloper which is between us and the cluster.

As a final target, try the faint globular cluster M71, located about 1.6 degrees east and 1/4 north of Delta Sagittae. It is visible in a fairly small telescope, but the stars in this group are quite faint and tightly packed, making resolution in anything under a six inch very difficult. A ten inch aperture at high power will make the group appear spectacular, with irregular chains of faint stars.



## FOR SALE:

Atlas Eclipticals and Atlas Borealis. Like-new condition. Set, \$40.00 Call Ed Seifert in Springfield at 1-253-2792



## PLEASE NOTICE

If there is an asterisk on your mailing label it is time for you to renew your PAC membership!

### The Prairie Astronomer

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NOTE: Because of a technical problem the calender insert does AGAIN not appear in this month's newsletter

## Next Meeting July 27, 1993

