



# THE *Prairie Astronomer*

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## President's Message

MIDCON 93 Wrapup

*by Dave Knisely*

Well, MIDCON 93 is history, and from all present reports, **it was a success**. 83 registrations were taken, and around 100 people attended the banquet, which is considerably better than some Mid-States conventions I have attended. The ten talks presented were very interesting, especially Professor Dort's presentation on the Merna Meteor Crater. Even the rain held off for the picnic, although the later observing session and Saturday night star party were canceled by the weather.

The Astrotrivia competition was won by **our club's team**, "The Prairie Dawgs", and the Astrophotography contest was won by Brenda Culbertson of NEKAAL in Topeka. The Mid-States Region Amateur of the Year award went to our own **Rick Johnson**, for his long time service to our hobby. **CONGRATULATIONS RICK!** We now have two club members who have received this prestigious award. Doug Bell won the big door prize of the Telrad and the two volume set of Uranometria 2000, and a number of other club members won prizes as well.

Our banquet speaker, **Jack Horkheimer**, presented a riveting talk covering not only his role as STAR HUSTLER, but a good deal about the way comets have affected history. The computer CD-ROM/Image Processing workshop on Sunday morning was also well attended and informative. One can definitely say that those who came to the convention got a lot for their \$25. We have already received more than a few compliments from members of other clubs about the way the convention ran, and I feel this is primarily due to the dedication of our members who helped with and attended MIDCON 93.

In particular, I want to thank **Ron Veys** for his crucial role as convention chairman. He was the one who really made this convention fly, from the earliest planning stages last year, to the final session on Sunday. His organization, planning, and hard work, along with his ability to deal with last minute problems, made this gathering a success, and we all owe him a debt of thanks.

I also want to thank the following individuals and note just a few things they did:

- Rick and Holly Johnson:** (for publicity, graphics, and a lot of cookies, cupcakes, and lemonade)
- Jack Dunn:** (for lasering, for getting Horkheimer to come, and for keeping him happy)
- Lee Thomas:** (for watching our finances and the registration desk)
- Erik Hubl:** (for keeping me calm and getting me out of a real "paper" jam)
- Micheala Brown and family:** (for the picnic, playing with signs in the rain, and more cookies and cupcakes)
- Earl and Marge Moser:** (for valuable past experience and for being good hosts to everyone)
- Caroll Moore:** (for getting me a pair of needle nose pliers, and for being the real link to Wesleyan)
- Dave Scherping:** (for being a good "judge" of Astrotrivia)
- Russ Copple:** (for keeping the Astrophotography pictures from falling to new lows)
- Doug Bell:** (for giving us all something to think about when it comes to light pollution)
- Bev Hetzel:** (for giving Ron's voice a rest during the business meeting)
- John Bruce, Steve Bornemier, Tom Miller, Jerry Williams, and all those who got the site ready for the rain.**
- Ron Debus:** (for giving us a sign)

If I forgot anyone, I am really sorry, but I am still a big foggy due to lack of sleep (and lack of memory). Thank you all, and we will see you at the meeting.

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The Prairie Astronomer is published monthly by the Prairie Astronomy Club, Inc., and is free to all club members. Membership status and expiration date are listed on the mailing label. Membership dues are: Regular Members...\$10/yr; Family Memberships...\$12/yr; Address all new memberships, renewals, or questions to THE PRAIRIE ASTRONOMY CLUB, INC., P. O BOX 80553, LINCOLN, NE 68501. For other club information contact one of the following: Dave Knisely (Beatrice)223-3968, Ron Veys (Lincoln)486-1449, Lee Thomas(Lincoln)483-5639, John Lortz (Omaha)496-1122. All newsletter comments and articles should be sent to Newsletter Editor JOHN LORTZ, 11684 Meredith Ave., OMAHA, NE 68164 no later than 10 days before monthly club meetings. Club meetings are held the last Tuesday of each month at Hyde Observatory in Lincoln, NE.

# Perseid Meteor Shower Alert!!!

by *Dave Knisely*

The recent return of comet Swift-Tuttle (the parent comet of the Perseid meteor shower) has raised the possibility of unusually intense Perseid meteor activity this August.

Joe Rao, senior meteorologist of COMPU-WEATHER, has concluded that, "The chance of a very significant, if not substantial display of Perseid Meteors may occur in 1993. For the first time since the Leonids of 1966, there exists a very real prospect of a full-fledged "Storm" of meteors...". Rao has performed calculations which indicate the orbits of the comet and Earth have been getting closer together over the past few centuries.

According to Dr. Donald K. Yeomans of JPL in Pasadena, the present orbital separation is only 87,400 miles, which means the Earth will be traveling quite close to the most intense portion of the stream of meteoric debris which follows the comet in its path around the sun. This, combined with Comet Swift-Tuttle's release of much fine debris during its recent approaches to the sun, may raise Perseid meteor activity to a much higher level during this year's shower.

Although the display usually runs from August 9-14, producing a maximum hourly rate of 50-60 meteors near August 12, a brief and very intense peak of activity was noted by observers in the Orient during last year's shower, with hourly rates in excess of 450. In North America, visual observers reported broadcast FM scatter rates of around 230 per hour.

The approximate time for the storm (IF it happens) will be when the Earth crosses Swift-Tuttle's orbital plane on August 12 at 0115 hrs UTC, and rates

may greatly exceed a THOUSAND METEORS PER HOUR for a BRIEF period, probably under one hour long. This time favors European observers, but uncertainties in the path of the debris make it possible that the storm may occur at a somewhat different time, giving others in the Northern Hemisphere a fine display.

In any case, rates of well over 200 per hour may be common up to 24 hours before or after the predicted peak time. The moon will be a waning crescent, and thus will not greatly interfere with viewing, which should be the best after local midnight. So be prepared for what may turn out to be the best meteor shower in over 25 years!

For more information, see the August 1993 issue of SKY AND TELESCOPE magazine, available at many bookstores (in late July).

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## Some Meteor Background Information from the International Meteor Organization

1. Meteoroids are dust particles which vary in size from micrometer-sized particles to solid pieces of rock many meters in diameter which populate the space in the Solar System between the planets. The dust in the solar system is the debris left by decaying comets and broken-up minor planets. Comets, such as comet Halley, leave behind belts of meteoroidal debris along their orbit. These belts may become meteor showers on the Earth if the Earth encounters this stream of debris.

All the planets and their satellites are continuously bombarded by meteoroids which either burn up in the atmospheres or hit the surface and create craters, the same process

which lead to the creation of the craters on the lunar surface.

2. Perseid meteors enter the atmosphere at 60km/s. The parent comet, Swift-Tuttle orbits the sun every 135 years. During the meteor storm of 1966, meteor activity reached 40 meteors per second.

### Suggest References for Further Background Information:

Brandt, J.C., Rendezvous in Space: The Science of Comets, 1992, W.H. Freeman and Company, New York.

Dodd, R.T., Thunderstones and Shooting Stars, 1986, Harvard University Press, Cambridge, Mass.

Kronk, G.W., Meteor Showers: A Descriptive Catalogue, 1988, Enslow Publishers, Hillside, N.J.

Roggemans, P., Handbook for Visual Meteor Observations, 1989, Sky Publishing Corporation, Cambridge, Mass.

The International Meteor Organization is a global scientific organization which coordinates meteor research. It can be contacted through the following persons:

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## FROM THE ASTRONOMICAL SOCIETY OF THE PACIFIC

We wanted to let clubs know about a new project in astronomy education at the Astronomical Society of the Pacific (funded by the National Science Foundation.)

Project ASTRO is designed to explore the potential for amateur (and professional) astronomers to visit 4th to 9th grade classrooms and help get students excited about astronomy and science in general. "Visiting astronomers," equipped with activities and resources, would come to a school and assist with classroom learning, science projects, a science club, evening observing sessions, etc.

The initial testing will take place in California, but our ultimate hope is to develop materials and a program that could be used all around the country. As the first phase, we are hoping to benefit from the experiences of amateur astronomers who have tried such visits-more than once or twice-on their own.

We would like to ask them to fill out a brief questionnaire and help advise us on what went well and not-so-well during their visits.

Anyone who would like to participate in this research phase is asked to call 415-337-1100 or Fax 415-337-5205 or write to me, Andrew Fraknoi, Astronomical Society of the Pacific, 390 Ashton Ave., San Francisco, CA 94112.



# International Meteor Organization 1993 Meteor Shower Calendar

Compiled by Alastair McBeath based on contributions from Malcolm Currie, Dieter Heinlein, Andre Knoefel, and Ralf Koschack, prepared for Usenet and Compuserve by Andre Knoefel. **NOTE:** Since this is being published in the June newsletter, I have omitted references before July 1993, and will include the fall showers in the next newsletter. The article has been edited for the newsletter.

Welcome to the 1993 International Meteor Organization (IMO) Meteor Calendar. Inside are presented notes on some of the more impressive, interesting, or favorably-placed meteor showers of the year, together with tables featuring details on all the showers currently known to the IMO which produce definite photographic, radio, telescopic, or visual activity. Although ideally meteor data should be collected at all times when conditions permit throughout the year, such protracted monitoring is often not possible, thus the Calendar provides a ready means of helping to determine when a particular effort may be most usefully made for those with a rather restricted observing schedule.

The IMO aims to encourage, collect, analyze, and publish combined meteor data obtained from sites all over the globe in order to further our understanding of the meteor activity detectable from the Earth's surface. Results from only a few localized places can never provide such total comprehension, and it is solely by the continued support of many people across the whole world that our first steps towards constructing a true and complete picture of the near-Earth meteoroid flux can proceed. This means that all meteorworkers, wherever they are and whatever methods they use to record meteors, should follow the standard IMO observing guidelines when compiling their information, and submit their data promptly to the appropriate Commission for analysis. Visual and photographic techniques have long been popular, and allow nightly meteor coverage (weather permitting), although both suffer considerably from the presence of moonlight. Telescopic observations are far less popular, though they provide data for meteors fainter than the visual limit, and permit accurate plotting of meteor paths, from which the identification, position, size, and structure of shower radiants can be derived. A telescope or binoculars can readily be used to watch the low activity visual streams—many of which yield far more telescopic meteors than naked-eye ones—as well as the major showers. Radio receivers can be utilized at all times, regardless of clouds, moonlight, or daylight, and provide the only way in which 24-hour meteor observing can be accomplished for most latitudes. Again, both major and minor night-time streams can be followed as well as a number of known daytime showers, not to mention all those which may still await discovery.

Remember that all of the above modes also allow the monitoring of the continuous background flux of sporadic meteors. Though often treated as of lesser regard than the showers, the sporadics give an essential calibration for all other activities, and are furthermore a fascinating subject of study on their own. However and whenever you are able to observe, we wish you all a most successful year's work and very much look forward to receiving your data. Clear skies!

## Highlights of the year

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### Alpha-Lyrids

**Active:** July 9—20, **Maximum:** July 15 ( $\lambda=113^\circ$ ) **Radiant:**  $\alpha=281^\circ$ ,  $\delta=+38^\circ$  **diameter:** 2deg **V** = approx 50 km/s **TFC:**  $\alpha=310^\circ$ ,  $\delta=+15^\circ$  and  $\alpha=254^\circ$ ,  $\delta=+14^\circ$  ( $\beta > 10^\circ$  S)

Observations of this telescopic shower—visual rates are usually so low as to be indistinguishable from the sporadic background—are needed on a regular basis, since at its discovery by Czechoslovak and Soviet observers in 1958, it was the most active telescopic shower, with average rates about 25 meteors per hour in larger binoculars. In 1969, activity was also good, but recently the level has been much lower. Whether this is due to the stream moving away from the Earth, or to a periodic nature, is unknown. Northern hemisphere observers are best able to cover the shower, with the radiant high in the sky all night, and the waning crescent Moon at the shower's predicted peak will give no real trouble.

### Perseids

**Active:** July 17—August 24 **Maxima:** August 12, 4h UT ( $\lambda=139.6^\circ$ ) and 15h UT ( $\lambda=140.1^\circ$ ) **ZHR** = 95 **Radiant:**  $\alpha=46^\circ$ ,  $\delta=+58^\circ$  **diameter:** 5deg **V** = 59 km/s  $r = 2.6$  **TFC:**  $\alpha=019^\circ$ ,  $\delta=+38^\circ$  and  $\alpha=348^\circ$ ,  $\delta=+74^\circ$  before 2h local time  $\alpha=043^\circ$ ,  $\delta=+38^\circ$  and  $\alpha=073^\circ$ ,  $\delta=+66^\circ$  after 2h local time ( $\beta > 20^\circ$  N)

In 1991, a short-lived outburst from the Perseids was detected visually and photographically from sites in Eastern Asia and by radio observers in other parts of the world. This event coincided almost perfectly with the time of the shower's first peak, discovered by the IMO from its analysis of 1988 observations.

The times of both peaks are given above for 1993, neither falling too favorably for land observers in the northern hemisphere this year, but all meteor workers at suitable sites should be alert in case any other unusual activity occurs at times away from these maxima. Telescopic observers using small binoculars should check for possible sub-radiants not detectable visually, as these may tie in with the shower's activity profile variations.

Another important aspect of the shower which often receives little attention is the decline in activity after the best rates are achieved. As the Moon is at Last Quarter on August 10 this year, there is an excellent opportunity to cover this period in detail in moon-free conditions. Standard IMO visual watches for low-rate circumstances, or telescopic observations (fainter Perseids are usually more abundant in this declining phase), should be carried out from about August 14 or so though to the shower's end for this purpose.

### Kappa-Cygnids \_\_\_\_\_

**Active:** August 3—31 **Maximum:** August 18 ( $\lambda=145.7^\circ$ ) **ZHR** = 5 **Radiant:**  $\alpha=286^\circ$ ,  $\delta=+59^\circ$  **diameter:** 6deg  
 $V = 25 \text{ km/s}$   $r = 3.0$  **TFC:**  $\alpha=305^\circ$ ,  $\delta=+40^\circ$  and  $\alpha=240^\circ$ ,  $\delta=+60^\circ$  ( $\beta > 00^\circ$ )

New Moon on August 17 almost ideally favors this minor shower this year, though it can be considered accessible only to watchers north of the equator. Its  $r$ -value suggests telescopic observers may benefit from its presence, though visual and photographic workers should note that occasional slow fireballs from this source have been reported too. There has been some suggestion of a variation in its activity at times, perhaps coupled with a periodicity in fireball sightings, but we are a long way from even beginning to understand all the nuances of this stream—provide us with more data, please!

### Pupp/Velids \_\_\_\_\_

**Active:** September 28—December 30 **Maxima:** several **Radiant:** varies:  $10^\circ$   $V = 41 \text{ km/s}$   $r = 2.9$  **TFC:**  $\alpha=90^\circ$  —  $150^\circ$ ,  $\delta=-20^\circ$  —  $-60^\circ$  choose pairs of fields separated by about  $30^\circ$  in  $\alpha$  moving eastwards as the shower progresses

\* **Lambda-Velids II:** **Active:** January 18—26 **Maximum:** January 21 ( $\lambda=301.7^\circ$ ) **Radiant:**  $\alpha=133^\circ$ ,  $\delta=-46^\circ$   $\Delta\alpha=+0.7^\circ$ ,  $\Delta\delta=-0.2^\circ$  **diameter:** 5deg  $V = 35 \text{ km/s}$   $r = 3.0$  **TFC:** As Pupp/Velids

This is an extremely complex system of streams, visible primarily to those south of the equator. Up to ten possible sub-streams have been identified, several of these with radiants so closely clustered together that visual observations are incapable of sensibly separating them, hence the somewhat vague Pupp/Velid details above. Telescopic reports should be more helpful in this regard. The best-placed of any in 1993 is the Lambda-Velids II, whose peak falls virtually at New Moon in January. Activity from these showers can be followed for almost the entire night from suitable locations, though rates are generally low. A series of maxima seem to occur in early to mid December, when higher ZHRs may be recorded, and some bright fireballs may be seen around this period too.

The complex may well be associated with asteroid 2102 Tantalus, perhaps giving observers in December the chance to see meteors produced by two asteroids—the Pupp/Velids and the Geminids. Observers should waste no clear nights near New Moon from late September to late January to obtain plenty of results on these meteors.

### Abbreviations

- =====
- $\alpha$ ,  $\delta$ ,  $\Delta\alpha$ ,  $\Delta\delta$ : 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.

# Observing Chairman's Report

by Dave Knisely

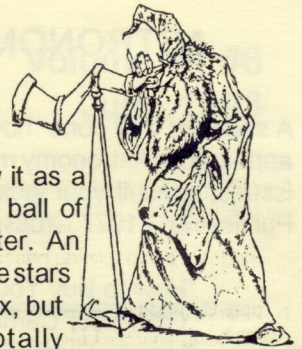
THE NEXT SCHEDULED STAR PARTY WILL BE HELD FRIDAY, JUNE 16 AT THE ATLAS SITE. Start your mid-summer observing with the bright "added" Messier galaxy, M102, located 3.25 degrees south and 2.5 degrees west of Iota Draconis. It appears as a small faint fuzzy oval in a three inch aperture. A six or eight inch will show its oval form well, and will hint at pointed ends and a brighter center. Apertures larger than 16 inches may show hints of a narrow dark lane, but it is vague at best.

Globular clusters abound in this part of the sky, and a good place to start is the spectacular object M92. Located three degrees south and 3.5 degrees west of Iota Herculis, this group is easily visible in binoculars, and is resolvable at least partially in a six inch. It is more compressed than M13, but is spectacular at high power.

In Ophiuchus are a number of bright globulars which should be observed. M12 is a pretty cluster located four degrees east and four south of Lambda Ophiuchi, and although visible in binoculars, it takes moderate apertures to resolve well. A ten inch resolves it fully, making it seem a bit loose at 240x. M107, located 2.5 degrees south and 1.25 west of Zeta, is much more difficult to resolve. An eight inch at high power may make it look a bit grainy towards the edges, while a ten inch will reveal 30 to 40 very faint stars in the outer halo.

In Scorpius is the spectacular globular M4, located a degree west of Antares. Visible in binoculars, this object is partially resolvable in a four inch, and is noted for the line of stars which runs through the center. This line makes the object appear like a barred spiral galaxy when observed at low power. Larger instruments reveal thousands of faint stars in a rich but not terrible compressed group. Somewhat fainter is M80, located 1.8 degrees

west and 1/3 degree north of Rho Scorpii. Small telescopes show it as a fairly small faint fuzzy ball of light with a brighter center. An eight inch will show some stars in the outer haze at 250x, but the center is totally unresolved. A ten will show more stars but the core remains small, bright, and unresolved except for a few brighter stars across the face of the group.



Three large open clusters make fine targets for binoculars or small telescopes. IC 4665 is a large group located about one degree north and a half east of Beta Ophiuchi, and is easy to resolve. It is roughly circular, and contains about 30 fairly bright stars, with large instruments revealing a rich background of very faint stars and a little dark nebulosity in the area. IC 4756, located four degrees west and 1.5 north of Theta Serpentis, is slightly oval in form, and is quite large and easy to pick up in binoculars, containing many bright stars. The third cluster is NGC 6633, located five degrees east and three south of 72 Ophiuchi. It appears in binoculars as a small fuzzy ball with hints of stars. An eight inch aperture will reveal 50 or 60 stars in the group, with some having noticeable color.

As a final target, try looking at the bright globular cluster M5, located 1/2 a degree north and 1/4 west of 5 Serpentis. It is very bright and dense, and shows stars in a good four inch, with larger instruments making it a spectacular ball of thousands of stars. It has a nearly stellar core, which is visible at high power in an eight or ten inch reflector.

## ASTRONOMY MAGAZINE ARTICLES OFFER HELP FOR BEGINNERS

A series of well done "how to" articles of particular interest to beginning amateur astronomers, have appeared in Astronomy magazine over the past year. They are listed below. If you do not have the back issues, consult your local library, find a friend who does, or purchase them directly from Kalmbach Publishing, 21027 Crossroads Circle, Waukesha, WI 53187. 800-533-6644.

- "How to Buy Your First Telescope," an insert in Nov. '91.
- "Give Your Camera a Piggyback Ride" by John Sanford, Jan '92
- "How to Clean Your Optics" by Michael Porcellino, March '92.
- "How to Collimate Your Telescope" by Michael Porcellino, April '92.
- "Polar Aligning Your Telescope" by Michael Porcellino, May '92.
- "Getting the Exposure Right" by Alan Dyer, Sept. '92.
- "Buying Binoculars for Astronomy," Nov. '92.
- "Build an Astrophoto Platform" (barn door mount) by John Iovine, Nov '92.
- "Taking Pictures With Your Telescope" by Alan Dyer, Dec. '92.

This list is from the "Beginners Info" column in STAR FIELDS, the newsletter of the Amateur Telescope Makers of Boston (ATMoB). For a comprehensive catalog of articles, photos and features about other subjects, consult the handy Quick Reference Guide to Astronomy Magazine 1973-1990 written by Jack Hobart and available from Geomages Publishing Co., PO Box 45677 Los Angeles, CA 90045 or purchase it from Kalmbach Publishing, 21027 Crossroads Circle, Waukesha, WI 53187. 800-533-6644.

### PLEASE NOTICE

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

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

**Next Meeting June 29, 1993**