Don't you wish you could get Astrophysical Journal so you would know the latest and greatest in the world of astronomy? The problem is that those journals cost several hundred dollars a year. The solution? This column will regularly cover events reported in Nature and Science, two of the premiere research journals. A lot of material in these journals is good, but just not of interest to us amateurs; that I won't tell you about. But a lot of what is reported, while hard to understand, is fascinating; and it is this material that I will try to distill and present to you in the pages of our WASP.

For instance, even though your local paper may not have carried the story, the folks at JPL have discovered ice continents on Saturn's moon Titan. A system of oceans and continents has never been found except on earth, until now. This cloud covered giant, 1.25 billion miles from earth, has at least one ice/rock/carbon dioxide continent rising out of a satellite wide ocean of liquid hydrocarbons. This ocean and even much of the continent would be vapor on earth, but not at the chilly 354 degrees below zero temperature on Titan. The JPL team looked through the clouds on Titan using radar waves from the newly upgraded deep space communications antenna.

When Voyager passed by Titan it took some great pictures, but nothing that told us about that moon's surface. All Voyager could see was that the atmosphere contained mostly nitrogen with a mixture of hydrocarbon 'smog' in it. However, in a way Voyager is still responsible for the discovery of the ice continents. NASA upgraded the deep space antennas in order to talk to Voyager, 4.5 billion miles away at Neptune. The improved sensitivity made it possible to take the most distant radar picture ever, and see the continents on Titan.

Remember supernova 1987A? At the time astronomers were puzzled because the progenitor star was not the red giant that theory said it should be. Well some thought and small modifications to the theory led to a greater understanding of supernovas. Now 1987A is providing some new puzzles. Early this year the pulsar remnant was spotted (that's good), and it had a .5 Millisecond pulse length(!) (that's very puzzling). Current theory states that millisecond pulsars "spin-up" by accretion of material from a neighbor star. Thus all millisecond pulsars are supposed to be old. Enter the 1987A pulsar; it is the fastest pulsar ever discovered and it is just 2 years old! Not only that, the 1987A pulsar is spinning so fast that most models of what a neutron star is like inside predict that the star should literally fly apart.

This puzzle is made more mysterious because no one has seen the pulsar since it's discovery. There are reasons why this might be so, but until the original observation is confirmed, even the pulse rate will be controversial. One exciting thing to come out of this quandary is a new theory that the pulses come from vibrations of the surface of the pulsar. Such vibrations would rapidly fade away, explaining why it has not been seen since. We can only hope that in time this enigmatic supernova will once again show us something new about the universe.

Clear Skies!
The Warren Astronomical Society, Inc., is a local, non-profit organization of amateur astronomers. The Society holds meetings on the first and third Thursdays of each month, starting at 7:30pm.

**1st Thursday - Cranbrook Institute of Science**
500 Lone Pine Road
Bloomfield Hills, MI

**3rd Thursday - Macomb Community College**
South Campus
Building B, Room 216
14500 Twelve Mile Road
Warren, MI

Membership is open to all. Dues are as follows:

- Student .... $10
- College .... $15
- Senior Citizen .... $15
- Individual ....$20
- Family .... $25

**Editors:**
Jeff Bondono
Tom MacLaney
Daniel Cwiertniewicz
Mike O’Dowd
P.O Box 474
East Detroit, MI 48021

The WASP is the official publication of the Warren Astronomical Society and is available free to all club members. Non-members will be charged $1.00 for each new issue, previous months issues are free. Requests by other clubs to receive the WASP and all other correspondence should be addressed to the editor. Articles should be submitted at least one week prior to the general meeting.

**Observatory Chairman:**
Robert Halsall / 781-6784

Stargate Observatory is owned and operated by the Warren Astronomical Society in conjunction with Rotary International. Located on the grounds of Camp Rotary, Stargate features a 12.5 inch club-built Cassegrainian telescope under an aluminum dome. The observatory is open to all club members in accordance with the "Stargate Observatory Rules". Those wishing to use the observatory must call the Observatory Chairman by 7:00 pm on the evening of the session.

**Lectures at Stargate:**
Lectures are given at Stargate Observatory each weekend. The Lecture will be either Friday or Saturday night, depending on the weather and the lecturer’s personal schedule. Lecturers should check with the ranger at Camp Rotary early in the week to determine whether the scouts will be staying at the camp, and to inform the ranger of the day and time of the lecture. If you cannot lecture on your scheduled weekend, please make arrangements to switch weekends with another lecturer, or call the chairman as soon as possible. The lecturers for the coming month are:

- Dan Cwiertniewicz  Sep 22/23
- Jeff Bondono  Sep 29/30
- Francis Stabler  Oct 6/7
- Riyad Matti  Oct 13/14
- Russ Patten  Oct 20/21
- Frank McCullough  Oct 27/28

**Coming Attractions**

- **September 28** WASP staff will meet at Dan Cwiertniewicz’s home. Contact Dan for details.
- **September 30** Deep Sky Group will meet at Doug Bock’s home. Contact Doug for details.
- **October 5** Monthly Meeting at Cranbrook Institute of Science
- **October 12** Cosmology meeting on "The Nature of Light". Meeting will be held at Al Vandelmaire’s home. Contact Al for details.
- **October 19** Annual Business meeting at Macomb College. Voting for next year’s officers will take place.
MINUTES

MACOMB MEETING-AUG. 17, 1989

The meeting came to order at 7:40 with Bob Hal-sall calling for members to appear at Stargate for a Rotary picnic. Solar observing and showing the observatory would be the order of the day.

Among the other newcomers was a reporter from the Warren Weekly. He said that his article on the club would appear in the Aug. 28th issue.

Ken Strom mentioned the Deep-Sky Group meeting he attended along with Doug Bock. They observed an aurora lasting about half an hour.

Amateur video began the evening's program. Your secretary presented some time-lapse footage of the recent lunar eclipse, and Ken showed a focal footage of the same subject taken through a 4-inch SCT.

Alan Rothenberg received some deserved recognition for his many efforts with the media at this and other events. His award was a "Mr. Microphone" from Ken and much applause.

Just before the break, Paul Strong invited people to a 'open house' at Macomb Student Union to watch the coverage of Voyager at Neptune.

After the club regathered, Marty Kunz announced star parties and other events coming up around the Midwest. He also gave details on this year's Stellafane.

The eclipse theme concluded with Riyad Matti's slides, and Paul provided the close with a film on JPL activities. The meeting was called at 9:40.

CRANBROOK MEETING-SEPT. 7, 1989

The meeting began at ten to eight. Ken Strom displayed the "Observe" manuals he has from the Astronomical League. If interested, contact him.

Barb Clark announced another Star Trek convention for the weekend of October 14-15. Our last appearance was successful, so we should try this again.

Our Christmas banquet is not far off, and Frank McCullough has been checking out several facilities in the area. So far, he likes Warren Chateau best. The decision will probably be made in the next week or so.

The next Macomb meeting will include officer elections for next year. Marty Kunz is planning to run for president, but Dan Cwiertniewicz and Tom MacLaneey will not be in this year's race. Barb Clark was nominated and seconded to take Dan's place as 1st VP.

Various aurorae have been seen in the last few weeks. Frank gave a particularly vivid account of one seen near Alpena; evidently a very colorful display.

Not so colorful was Marty's report on the latest Stellafane; brown was the dominant motif. Lots of people, but better organization seemed to be needed. Marty also showed slides of a museum in St. Johnsbury, VT and the Warren Tank Plant.

The rest of the program consisted of slides of the lunar eclipse from many people, and broke up at 9:40.

COMET OKAZAKI-LEVY-RUDENKO (1989r) from IAUC 4841

H. Kosai, National Astronomical Observatory of Japan, reports the independent photographic discovery of this comet by Kiyomi Okazaki, as noted below. The following precise positions also have been reported:

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K. Okazaki (Kahoru-machi, Yamagata-ken, Japan). 0.25-m Schmidt camera +T-Max 400 film. Comet diffuse with central condensation. C.Pollas (Observatoire de laCote d' Azur, Caussols). 0.90-m Schmidt telescope. J.Tatum (Victoria).

Comet Okazaki-Levy-Rudenko (1989r) from PC· VAN

T = 1989 Nov. 11.892 ET Peri. = 150.626 e = 1.0 Node = 274.784 1950.0 Incl. = 90.113 q = 0.64156 AU
A GUIDED TOUR OF SEVERAL OPEN CLUSTERS
By Jeff Bondeno

This article is the first in a series which will provide guided tours of the open clusters in several parts of the sky. I will select one small area each month, and each tour can hopefully become a template for one night’s observations at the telescope. The tour in this article covers the NE corner of Cygnus. This part of the sky is on the meridian at about 10:40 PM EDT on September 15-16, which makes it well placed for evening viewing. A table at the end of each article will list the catalogue data for the clusters in that article. The directions for finding each cluster will be geared toward someone who uses an equatorially mounted telescope, but will not require the use of setting circles. I intend to include clusters which are easily located and observable by beginners, and also those which will challenge seasoned observers. All of the sketches and observations in this article were made by me using an 8 inch F6 Newtonian.

Our starting point will be the reddish 4m star Xi Cygni, which is pointed out in Figure 2. Move 55' E of Xi Cyg, and you’ll see two 8m stars which are about 3' apart aligned E-W. Move about 10' further E, then 100' N to the first 7m star you come to. To be sure you have the correct 7m star, compare the field against my sketch, noting the scale of my sketch. That 7m star is right in the center of NGC 7039, a 25' cluster of 11m and fainter stars. The bright stars you see easily in the LP field are foreground stars, not cluster members. The cluster members are much fainter. In moderately light-polluted skies I can only see the true cluster stars in LP once I’ve used HP and familiarized myself with the cluster. HP shows several distinct concentrations which are all part of this cluster. The largest consists of about 25 stars in the 10' surrounding that 7m star. There are two other concentrations of stars; one to the E and one to the S of that central knot. The N edge of the cluster contains scattered stars.

The next three clusters are very faint, and if you’re a beginner, I’d recommend skipping them.

Just 20' N of NGC 7039 is Barkhatova 12, which I have not ever been able to see. Help me if you can. According to its position, it should be right on the single star I can see, which is included in my sketch.

50' N of NGC 7039 is Barkhatova 13. At LP I see very few of the cluster stars, but at HP, a few 10m stars and about 25 12m and fainter stars become evident in a 10' area.

Go back to the bright central star of NGC 7039. 115' N of that star you’ll come across a close pair consisting of a 5m and 6m star aligned N-S, separated by 3' (be sure the pair is aligned N-S because there is a nearby 6m 7m pair aligned E-W). 20' E of that star is a 10m star. Switch to HP centering on that star, and study the view fora while. Collinder 432, also known as IC 1369 will appear. This is invisible to me at LP, but HP shows 18 stars in a 5' area. My sketch shows the 5m and 6m stars just outside the circled field.

Return to the bright central star of NGC 7039 one more time, then move about 25' E to the 6m

Throughout the articles, I will be using these abbreviations:

N,S,E,W = north, south, east, and west.

' = arc-minutes (sixtieths of a degree).

m = magnitude, for example, 5m means 5th magnitude.

LP = low power eyepiece. HP = higher power eyepiece.

5'140pa = the approximate measurements of a double star. In this example, the two stars are separated by 5 arc-seconds in position angle 140 (that is, the direction from the brighter to the fainter star is 140 degrees from N, with 90 degrees being E.)
star which is shown on my sketch at right-ascension 2114. Move 80' N from here and you'll find a 5' triangle of 8m stars. This is the NE leaf of what I call the Four Leafed-Clover. The entire clover is about 40' in size. The NE leaf is made of bright stars, the SW leaf is made of fainter stars, and the SE leaf is made of a very sparse grouping of faint stars. The NW leaf is the highlight of this area, though. It looks like a 15' rich cluster to me. At LP it appears as a nebul- lous glow, and HP resolves at least 30 stars. When I look at this 15' area, I'd swear it is a cluster but I do not find it in any sources I've run across yet. It seems to be detached from the rest of the field, it is made of stars of similar magnitude, the magnitude of those stars is about right for the size of the cluster, and it seems too rich to be a chance coincidence of faint nearby and bright further stars. See what you think and let me know. About 20' NW of that faint grouping is a 15' open triangle of 10m and fainter stars, which is also shown on my sketch. 30' E of that is a pretty arc of 10m stars that loops between 2 6m stars, which appears pictorially at the NW edge of my sketch.

Move back to the NE leaf of the four-leafed-clover. From there, move 25' E and 60' N to a solitary 5m star. Go about 30' N past that star, then 180' (3 degrees) E to NGC 7092, which is M39. Don't worry about missing it... if you've seen any of these clusters so far you won't be able to miss M39. There are nine 6m and 7m stars in this 30' cluster. The brightest stars in the cluster form a triangle shape with one point pointing to the WSW, one to the N, and the brightest pointing to the ESE. Notice that there are few faint stars in this cluster. Take the time to compare the HP view of this cluster with those that we've been looking at so far. You can tell from simple visual inspection that this is a nearby cluster. It is large, sparse, and composed of bright stars. A glance at the table below shows that it indeed is a nearby cluster. We see the same attributes in other nearby clusters like the Pleiades and Praesepe.

Again, the next three clusters are very faint, and might best be skipped by beginners. As you move W out of M39, there is a 6m star on the edge. 20' W of that star is another 6m star. 50' W of that second star is a 10' equilateral triangle of 9m stars. 5' SE of the S-most star in that triangle is the only clusterish grouping I see in the neighborhood of Barkhatova 15. My sketch of Barkhatova 15 shows that triangle, by the way, to help you find the area I'm talking about. I see a 5' by 7' oval with only one 10m member, but 20 fainter stars in HP. The oval runs from the WNW to the ESE. The reason I'm not sure that this is the actual cluster is that the cluster is 36' in size, according to source 3, and the position of the area I'm pointing out is at right- ascension 2124.5. Help me if you can.

NGC 7067 is also shown on the same sketch. It is 20' SSE of the triangle of 9m stars, just W of a 9m star. The LP field consists of a 15' N-S chevron shape of 13 stars pointing to the W. The 2.5' cluster is on the N point of this chevron, in which I see 5 stars.

On the E edge of NGC 7067 is a 9m star. 20' E of that star is another 9m star. 5' SSE of that star is NGC 7071. It is a 2' nebul- lous patch at LP which turns into a 3' by 1' grouping of about 10-15 stars aligned E-W in HP. Another similar but brighter grouping is 5' SW of NGC7071 ... be careful not to confuse the two.

Using your finder scope, go back to M39 (about 80' NNE from here). Move yourself to the point halfway between the 6m star on the W edge of the cluster and the 6m star 20' W of it. Then move 110' S to a greenish 4m star (71 Cyg) with a 6m star just 5' S of it. 30' N of that 4m star is NGC 7082. To help you identify it, there is an 8m star on the N edge, an 8m star on the E edge, and 2 8m stars on the W edge separated by about 4' in pa 60. I find this to be a gorgeous medium-rich 25' cluster of about 30 stars. There are several clumps of stars in this cluster, the prettiest of which surrounds that pair of stars on the W edge. The bright est star on the W edge of the cluster is slightly reddish, and if you study the cluster carefully, you'll see several other colors of stars.

Return to that 4m star 30' S of NGC 7082. 20' W is a 7m star. 30' WNW is a 5m star. 30' WSW is a 15' chain of three 9m stars running NW-SW. Just 10' E of the S end of that chain is NGC 7062. There is a 10m star at the E and Wedge of this 5' cluster, and a speckling of 25 12m and fainter stars between those two. That
makes it a fairly dense grouping of stars, and it makes a very pretty sight in HP. The 1'5'chain of 3 stars is shown near the W edge of my sketch.

110' due S of NGC 7062 is a 7m star with a 9m companion about 9' to its E. Just 10' N of that 7m star is our final cluster, Barkhatova 14. I see a very faint 8' grouping of about 20 very faint stars here, and it is definitely easier to see at HP. On a very transparent night from Utica, I could barely see a glow in the LP field. It consists of a hollow circle of stars with a clumping just outside the circle to the SW. One star is 11m and the rest are 12m and fainter. On my sketch, the 7m star is just inside the S edge of the field.

The last few table columns require some explanation. The Class is composed of two parts. The roman numeral represents the way the cluster stands out from the field stars, or its "detachment". A class I cluster is easiest to pick out from the field stars, and a class IV cluster is the most difficult. The Arabic numeral which follows indicates the range of brightness in the constituent stars. A class 1 cluster has a small range in brightness, and a class 3 cluster has a small range. The nbr-of-stars field lists the approximate number of stars which are true physical members of the cluster. Do not expect to see all the stars which are counted in this column. As many of them may be below the magnitude limitations of your telescope. The clust-magn field is the total magnitude for the cluster, and can be very misleading since a small cluster with a faint total magnitude can have a brighter surface area than a large cluster with a bright total magnitude. The age field gives the approximate age of the cluster, in millions of years.

Observing tip: Always use your lowest-power eyepiece when finding a cluster (or any other object, for that matter). Your field of view will be larger in this eyepiece than in any other, and that will make it easier for you to find the correct piece of sky. Once you find a cluster (or the spot where the cluster should be), switch to a higher-power eyepiece to examine it in more detail. You'll be surprised at how many stars will be visible in a HP eyepiece than a LP eyepiece. I'd suggest that you learn the exact size of the field of view delivered by your eyepieces, especially the LP one you use to find objects. To do that, use the eyepiece you wish to measure and center your scope on any star near the equator. Turn off your clock drive, and move your scope (in right ascension ONLY) so the star is just barely out of the field of view on the E side (the scope should be pointing W of the star). Now watch the star drift into, across, and out of your field of view, and time how long it is within the field of view. Divide that number of seconds by 4 and you have the size of the field of view in arcminutes. My LP eyepiece, for example, takes 196 seconds and is therefore 49' wide. Now, whenever I read "move 60' N" in the instructions, I know to move 1.2 fields N.

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Figure 1

Drawn during September-October, 1978

Sources:
2. Burnham, Robert J.; Burnham's Celestial Handbook; Dover Publications; 1978
5. The Author
Stargate Observatory Rules

Lecturer and User Qualifications:
- Member in good standing for AT LEAST 3 months.
- Dues must be paid up to date.
- Successfully complete Observatory Orientation/training.
- Demonstrated competence using Stargate Observatory.

General Rules: Observing at Rotary: Members planning on using Stargate must notify the Observatory Chairperson before doing so. The chairperson will notify the Ranger at Rotary. If unable to contact the Chairperson, ask the President or 1st V.P. to call Rotary.

*Exceptions: Current Officers, Lecturers, and designated subgroup chairpersons.

Keys for Stargate: deposit ($10) and signature required (NO exceptions). Deposits from officers, lecturers and subgroup chairperson will be held by the Treasurer.

*At the discretion of the Observatory Chairperson, one or more sets of keys will be available to the general membership for sign-out for periods up to 2 weeks. A deposit is required and late fees will be assessed. Lost keys and keys more than one week late will be assessed at $10. Officer's keys are due at the end of their term of office. Lecturer's and subgroup chairperson's keys are due on December 31 or on request of the Observatory Chairperson.

Observatory code of conduct:
- Sign-in (logbook) and note condition of observatory.
- No alcoholic beverages permitted.
- No parking on the grass (Exception: while unloading equipment, IF soil is not too soft.)
- Take your trash home.
- Don't borrow items from Stargate without Chairperson's permission.
- Report any needed repairs or maintenance to Observatory Chairperson.
- No changes or repairs without OK of Observatory Chairperson; authorized repairs to be recorded in Maintenance log.
- Don't clean eyepieces.
- Key duplication prohibited.

Stargate Close-up Procedure
- Sign logbook
- Place telescope in a horizontal attitude on the west side of the pier.
- Cap tube and finders.
- Replace eyepieces in case.
- Turn off and unplug all electronic equipment.
- Leave dome opening facing EAST.
- Take your trash with you.
- Lock both doors.
- Turn outdoor lights back on.
- If after dark, hook chain across roadway entrance (don't lock)

Priority for Observatory Use
1. Scheduled lecturer (Friday and Saturdays)
2. Official club outings
3. Subgroup meetings
4. Scheduled school or similar groups
5. First-come basis (but please share!)

Note: The above rules are subject to revision
Announcements!

Elections are upon us again. Ken Strom, chair of the Nominating Committee wishes to inform everyone that nomination are being accepted for all positions. Currently nominated are:

- **Marty Kunz - President**
- **Barbara Clark - 1st Vice President**
- **Bob Halsall - 2nd Vice President**

Elections will be held at the October business meeting.

Observe Guides are available at every meeting. These wonderful booklets should be in everyone's collection. The available titles and prices are:

- **Observe Comets - $6.00**
- **Observe Herschel Objects - $4.00**
- **Observe Messier Objects - $4.00**
- **Observe Eclipses - $4.00**
- **Observe Meteors - $6.00**
- **Check a Supernova - $5.50**

If you are interested in purchasing any of these books see Ken Strom at the meetings.