Sky Diagram

Each day is represented by a line (Sundays) or a string of dots (other days) running across the chart. The hours in each day are represented by the lines and dots running vertically. The other lines on the chart represent the time of the labeled event on each day. The line labeled 7 PM RA' gives the right-ascension which is directly overhead at 7:00 PM EST on each day. The center of each X on the chart is placed at the time of a minimum of Algol. For example, on November 27, there is an Algol minimum at 5:30 AM moonrise at 7:00 AM sunrise at 7:50 AM moonset at 4:00 PM; sunset at 5:00 PM; and at 7:00 PM, right ascension 22h 55m is transiting.
Warren Astronomical Society Paper

The WASP is the official publication of the Warren Astronomical Society. Each new issue of the WASP is made available at the Macomb meeting on the third Thursday. Non-members will be charged $1.00 for each new issue. Back-issues when available, are free. Requests by other clubs to receive the WASP and all other correspondence should be addressed to the editor. Articles for inclusion in the WASP are strongly encouraged and should be submitted to the editor on or before the first Thursday of each month.

Editor: Jeff Bondono 731-4706
51054 Kingwood
Utica, MI 48087

Tom MacLaney
Mike O'Dowd
Ken Kelly

Stargate Observatory

Stargate Observatory is owned and operated by the Warren Astronomical Society in conjunction with Rotary International. Located on the grounds of Camp Rotary on 29 Mile Road, 1.8 miles east of Romeo Plank Road, Stargate features a 12.5 inch F17 club-built Cassegrainian telescope under a steel 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. The observatory chairman is:

Robert Halsall 781-6784

Lectures

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. Upcoming lecturers are:

Francis Stabler 11-17/18 12-30/31
Riyad Matti 11-24/25 1-5/6
Scott Jorgensen 12-2/3 1-12/13
Frank McCullough 12-9/10 1-19/20
Dan Ciwertiwicz 12-16/17 1-26/27
Jeff Bondono 12-23/24 2-3/4

The Call List is a list of people who wish to be informed of spectacular and unexpected astronomical events. Anyone who notices such an event calls the next person on the call list, who informs the next person, etc. A call list member can specify that he or she not be called at certain times. Any Society member is welcome to join the call list and can do so by notifying Jeff Bondono, 731-4706.

Several subgroups exist for those interested in specialized aspects of astronomy. Those interested in any of these subgroups should contact the chairperson, listed below:

Solar: Ed Cressman 645-1831
Lunar/Planetary: Alan Rothenberg 344-2854
Cosmology: Mike O'Dowd 268-7125
Deep Sky: Doug Bock 750-9369

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

Warren Astronomical Society
P.O. Box 474
East Detroit, MI 48021

Send membership applications and dues to:
Ken Strom
61601 Spring Circle Trail,
Romeo, MI 48065

1989 Officers
President: Marty Kunz 477-0546
1st V.P.: Daniel Ciwertiwicz 526-4878
2nd V.P.: Robert Halsall 781-6784
Secretary: Tom MacLaney 541-8198
Treasurer: Ken Strom 652-1744
Librarian: Tom MacLaney 541-8198

Membership is open to all. Dues are as follows:

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

Among the many benefits of membership are: Discount magazine subscriptions:

Sky and Telescope: $16.00 (12 monthly issues)
Astronomy: $14.00 (12 monthly issues)
Deep Sky: $8.00 (4 quarterly issues)
Telescope Making: $8.00 (4 quarterly issues)
Odyssey $12.50 (12 monthly issues)

Free copy of each WASP newsletter.
Free use of Stargate Observatory.
Special interest subgroups.
Call list - don't miss unexpected events.
Free membership in Astronomical League.
**Schedule of Events**

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>Thu Dec 7</td>
<td>7:30 WAS meeting at Cranbrook</td>
</tr>
<tr>
<td>Sun Dec 10</td>
<td>Mercury and Uranus are 2 degrees apart</td>
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<tr>
<td>Wed Dec 13</td>
<td>Geminid Meteor Shower peaks 7:00</td>
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<tr>
<td>Thu Dec 14</td>
<td>Cosmology meeting (No big-bang models) at Glenn Wilson's home</td>
</tr>
<tr>
<td>Sat Dec 16</td>
<td>Mercury and Saturn are 2.5 degrees apart</td>
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<tr>
<td>Wed Dec 20</td>
<td>Ceres at opposition</td>
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<tr>
<td>Thu Dec 21</td>
<td>7:00 WAS Christmas banquet at Warren Chateau</td>
</tr>
<tr>
<td>Fri Dec 22</td>
<td>Ursid Meteor Shower peaks</td>
</tr>
<tr>
<td>Sat Dec 23</td>
<td>Mercury at greatest elongation</td>
</tr>
<tr>
<td>Wed Dec 27</td>
<td>Jupiter at opposition</td>
</tr>
<tr>
<td>Thu Jan 4</td>
<td>Reminder: NO CRANBROOK MEETING THIS MONTH</td>
</tr>
<tr>
<td>Thu Jan 11</td>
<td>7:00 Cosmology meeting (Big Bang) Contact Mike O'Dowd for details</td>
</tr>
<tr>
<td>Thu Jan 18</td>
<td>7:30 WAS meeting at Macomb Community College</td>
</tr>
</tbody>
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**Minutes of Meetings**

Macomb - Oct 19, 1989

This was our yearly business meeting - the most important meeting of the year. The main order of business was holding our annual elections. These went fairly smoothly, even though few people were willing to run for offices. Those who did run were elected by acclamation, and were as follows:

- President - Marty Kunz
- 1st VP - Ken Kelly
- 2nd VP - Bob Halsall
- Treasurer - Jeff Bondono
- Secretary - Dan Cwiertniewicz

Congratulations to them all, and good luck for the coming year.

The outgoing officers gave their reports on the events of the last twelve months. Marty has been pleased with the club's activities over the half year he has held office and is looking forward to more. Bob Halsall said the design on the declination motor at Stargate is almost finished, and Mike O'Dowd will build it. The cleanup this summer helped make the observatory a better place to work. Ken Strom announced our budget be $1474.00, which is as good a figure as we've had for a long time — most of this came from the raise in membership dues. Tom MacLaney mentioned several new clubs we trade newsletters with, and the increase in library's stock.

Other matters at this meeting included some recent events, and the upcoming banquet. Dan C. and James Kunert hosted about 50 Boy Scouts, and entertained them with slides and solar photography presented by Ed Cressman. Marty mentioned the solar observing at the latest Star Trek convention, which again was a success. Looking ahead, he also announced that the Cranbrook facilities had been rented for the night of the January meeting; the membership voted to cancel that meeting, but may reconsider if an alternate location can be found.

Alan Rothenberg brought up the topic of our banquet awards. They include the Armchair Astronomer, Amateur of the Year, Distinguished Service, and the E. John Searles Awards. Anyone who knows of candidates for any of these should contact Alan.

The meeting began at 7:55 pm. The first piece of business was Dan Cwiertniewicz's resignation from his present office and the secretariaship he was elected to at the last meeting. Any one who would like to step into his shoes should contact the board.

Bob Halsall said the telescope drive is ready except for a transformer, which should be no trouble to obtain. Alan Rothenberg demoed a pair of 'torch glasses', containing a small lightbulb at each temple. These were later raffled off, and Francis Stabler was the lucky winner.

Ed Cressman spoke on the new project he is starting with the Solar group - counting sunspots. He made a articles on the topic available, and anyone who wants to participate can speak with him. The results will be sent on to the appropriate organizations. Marty discussed the recent changes on Jupiter - evidently quite striking. Finally, Bob Halsall showed his piggyback slides of the lunar eclipse.

After the break, Frank McCullough gave details on next month's banquet, scheduled for Dec. 21. It will be held at Warren Chateau, starting at 7:00pm. with dinner at 8:00. He passed around a signup sheet for people to indicate their preferences for buffet or sit-down style dinner. For those interested in helping to plan, a meeting will be held on Nov. 12 to get the banquet program in order. This was followed by a showing of a videotape from the Universe series, covering all sorts of astronomical subjects.
Come One! Come All!

MEMBERS - NON MEMBERS - FAMILIES
THE WARREN ASTRONOMICAL SOCIETY

CHRISTMAS BANQUET

at Warren Chateau
6015 S. 10 Mile Rd.
Warren, MI 48091
759-6500

Raffle - Door Prizes - Awards Presentation

**** SPECIAL CHRISTMAS PROGRAM ****

ALL SOCIETIES WELCOME!

Thursday, December 21, 1989
7:00 Cocktail hour
8:00 Dinner

Dinner Selections $6.50
(You get both choices if wanted)

BEEF TENDERLOIN
DINNER
&
GOURMET
CHICKEN
Both served w/ special sauces

Dinner includes (All you can eat)
Soup & Salad, Spaghetti,
Vegetables & Rolls
Beverage & Dessert
Complimentary Glass of Wine
Tax & Tip included in price

$5.00 DEPOSIT (RESERVED SEATING)
RSVP or For more information call: 689-8034 (FRANK McCULLOUGH)
678-5719 (WORK)

(please no walk-ins)
A Guided Tour of Several Open Clusters
by Jeff Bondono

Our tour this month takes us to the part of the sky near the Cassiopeia/Perseus border. Since we are looking almost directly away from the center of our galaxy, we will be viewing clusters which are located in the next spiral and outward from the one in which we reside. We reside along the inner edge of the arm called the Orion Arm. This arm runs in our sky from Cygnus to Orion and Canis Major, and contains most almost all of the naked-eye stars, as well as many deep-sky objects. The Ring, Dumbbell, Orion, and North American Nebulas are all located in the Orion Arm. So are all of the nearby open clusters, like the Pleiades, the Hyades, the Big Dipper, and M34, to name just a few. The next arm outward is called the Perseus Arm, and all of the clusters in this article except Stock 2 are located in that arm. All of the sketches and observations were made by me using an 8 inch F6 Newtonian. See the October, 1989 WASP for a list of abbreviations used in this article, and an explanation of the table at the end.

Start your tour at Delta Cassiopeiae, the 2nd star from the E in the 5 brightest stars which form the familiar letter-W-shaped asterism of Cassiopeia. From there, move 38' N and 55' E and you should see a 3' triangle-shaped cluster NGC 581, which is M103. To confirm that you have the right cluster, there is a dipper-shaped asterism of 4 stars about 15' to the NE of it. M103 is the last object in the original Messier catalogue. I see it as a 6' fan-shaped grouping of about 15 stars, the brightest of which is 7m. The star at the center of the NE edge of the cluster is a red star. There is an easy double (Sigma 131 = 14'141pa) in the NW corner of the cluster.

From M103 move 15' E just past the dipper. Then move 35' N to Trumpler 1. This cluster is a small inconspicuous 2' fuzzball at LP, but it resolves pretty easily under HP. In light-polluted Madison Heights, I made out 6 of the stars, and in still better Utica I can see 11.

75' E of Trumpler 1 is the bright, large, and conspicuous cluster N6C 663. This is probably the easiest and most obvious cluster in our tour. It is 13' in size and contains about 45 stars. The stars in this cluster seem to me to be grouped in pairs and triplets more strongly than in the average cluster. On the night that I first used my telescope, I 'discovered' this cluster, so it holds a special significance to me. Unfortunately, about a week later, when I bought a more complete star atlas, I found that it had already been discovered by someone else long ago, but that won't dampen my enthusiasm for my discovery. Several catalogued double stars are located within NGC 663. Along them is Sigma 152(9.2' 105pa,
the E-more of the two brightest stars on the W edge of the cluster), Sigma151 (7.38 pa, just S and slightly W of Sigma 152), and Sigma153 (7.669 pa, the bright star on the N-central edge of the cluster).

Just about 48' NNW of NGC 663 is NGC 654. It is a much smaller 5' cluster. In light-polluted skies, this cluster will appear as a very faint haze; at first, but after about a minute or so of study, several stars will be discernable. In darker skies, though, this cluster resolves into a dense grouping of faint stars.

Just about 30' SSW of NGC 663 is NGC 659. It is a 5' slightly nebulous spot in LP, but resolves into 14 stars at HP.

Now aim your scope at Xi Cassiopeiae, which is the bright star just a little over 1 degree SE of Delta, the star we began with. Move five and one-half degrees E and you should run into the 69' cluster Stock 2. It's the first field you'll run into with about 28 9m stars in it. I see at least 58 stars in this gorgeous, large cluster. Notice that on all sides of the cluster the number of stars decreases dramatically. As with M39 last month, simple visual inspection shows that this cluster is larger and more spread out that the others we've viewed so far, and it contains more bright stars than the others. These facts imply nearness, and Stock 2 is indeed very near to us... only slightly further than M39.
Leaving Stock 2 by moving 60' E, then 120' S to the Double Cluster, quite possibly the sky's most beautiful objects for small to medium-sized telescopes. The W-more cluster is NGC 869 and the E-more cluster is NGC 884. The clusters are not physically near each other in space (NGC 884 is further away). There are 700 12m or brighter stars in the two clusters. To date, my drawing only contains about 100, so it is quite incomplete and therefore not included. Due to the distance of these clusters and the dust between us and the clusters (this dims the stars by 1.6 magnitudes), a star like our Sun in the Double Cluster would appear as a 18m star. This, of course, means that the stars we view in the Double Cluster are all supergiants with luminosities thousands of times brighter than our Sun. Several red giants are also in the Double Cluster (especially in NGC 884) and the easiest to see is the red star is halfway between the two clusters. NGC 869 is slightly nearer, slightly younger, and is part of an association of young O and B stars which extends for at least 3 times the cluster diameter, called Perseus O-B 1. This association is easily visible in a finder scope, and includes the figure-8-shaped group of stars surrounding the Double Cluster.

Observing Tip: Observe each cluster for at least 5 minutes whenever you find one. More and more detail will become apparent as your eyes and mind learn the major features and are freed to find the lesser details. Beside that fact, after you've worked for, say, 5 minutes to find a cluster, it seems a shame to spend less time than that observing it. As you look at a cluster, try to associate it with something familiar. Connect the dots to make pictures and name the cluster according to the picture you see. The cluster then becomes more personalized and familiar to you. The words "NGC 1528", "NGC 7654", and "NGC 581, H18a" mean little to me, but names "Mushroom", "autumn salt-and-pepper", and "dipper & fan" immediately bring vivid recollections to my mind.

Sources:
2. Burnham, Robert J.; Burnham's Celestial Handbook; Dover Publications; 1978

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Q: How hot is it in a Quasar?

A: That all depends on the type of quasar. The inside of a 19" Quasar color set can vary from a mere 105 degrees F during a subdued show like Nova to a steami 220 degrees F during Dallas, while maintaining a comfortable 90 degrees F to the outside world. An astronomical quasar, on the, other hand, is a different issue entirely. Contrary to popular belief, several quasars are among the coolest dudes in the cosmos. They are often seen in large gangs in the early universe, strutting around with their wide-brimmed stellar disks on, while sipping from gravitational wells. It is believed that the Hubble Space Telescope will allow us to catch some of the more derelict quasars in the act of toking on cosmic jets. About the only quasars which are thought to get very hot are 3C 69.1 and 3C 69.2, and even they only rise to their most extreme temperatures in the privacy of their own local group.

Q: Why haven't more questions been submitted to the ASP Q&A column?

A: The Warren Astronomical Society is world-renowned for its high standards of membership. Before a person is accepted into the WAS, he or she must already know the answer to all possible questions. This lack of unknown answers explains the lack of submitted questions, and so the Q&A column is hereby terminated.

ASK THE WASP