This month the Journal Roundup includes a few tasty tidbits off one of the national computer bulletin boards. If you have a computer with an INTERNET or BITNET connection you may be able to access these yourself. Lots of the postings are dull or pretentious, but there is some good stuff there, too. For example, Tom Clarke from the University of Central Florida posted his misadventures in mirror cleaning.

It seems Tom owned a rather dirty eight-inch Newtonian (he kept it on his porch in Florida). One day he decided to get the dirt and mildew off the mirror using liquid chlorine pool cleaner, figuring it was good for mildew — so why not — after all aluminum is protected by an oxide layer. Well, the reason why not is that when he put the cleaner on the mirror the aluminum coating immediately started to dissolve! He was able to save about 50% reflectivity by fast action, namely rinsing it with water - and lots of it. Obviously Tom is not a chemist or he would know that while aluminum oxide does protect the aluminum below from most chemical attacks, it can still take part in oxidation / reduction reactions; and it does not take long to react away the thin coat of oxide and the aluminum below. The hypochlorite in pool cleaner happens to be one of those things with which aluminum oxide does react. The cool thing is that he chose to share his misfortune with us so it doesn't happen to other people; not everyone is so adept at swallowing their pride! So, thanks Tom, and better luck in future cleaning endeavors.

In a response to Tom's posting, another person pointed out that this would not even be a good way to clean the aluminum off a mirror that is about to be recoated. Strong bases like hypochlorite also attack the glass and might etch it unevenly.

Another interesting posting came from Jaakko Oksa in Finland. This posting says that using any cyanoacrylate glue near mirrors is a bad idea. It seems that a vapor is released on curing that can fog the mirror. Jaakko was using Superglue (both Superglue and Loctite are cyanoacrylates) on his telescope spider and logged his secondary mirror. The fog would not come off with water or alcohol, but acetone did do the trick.

There are also postings of interesting news that you might get in the newspaper, but at a very reduced level of accuracy and detail. Or you could wait for three months for the good coverage in Sky and Telescope or Astronomy. Or, you could get that information right now off the network. For example, just about everyone knows that an icy minor planet (read "proto-comet") was found last summer with one of the Mauna Kea telescopes. If you got a good news report you would know it was around 120 miles in diameter and at about 4 billion miles mean orbital distance from the Sun. But on the network not only did the coordinates of the proto-comet show up, in case you wanted to have a look at this 23rd magnitude object, but also partial orbital elements were given! I expect the full coordinates will be posted soon.

Lots of people know the Moon needs 29 days to circle the Earth. (Actually 29.5 days on average.) But did you know the longest and shortest lunar months this century? There is a surprising variation due primarily to the influences of the Sun and Jupiter. The longest lunar month is 29 days 19 hours 54 minutes, while the shortest is only 29 days 6 hours and 35 minutes. Someone put it on the network for the rest of us to read.

There are also amateur reports on these bulletin boards. For example, people from Austria, Ireland and Belgium all suffered through a clouded out lunar eclipse in December. We weren't the only ones. There were also accounts of watching comet Swift-Tuttle the same weekend we had the star party at Imlay City. One group from Manitoba thought they saw both an ion and dust tail using a C-8. Either they have much better skies or much better imaginations! As I recall we had only a hint of a dust tail, even in the big scopes.

J. D. McDonald reported his personal first observation of dust lanes in M33 with an eight-inch. Dave Nash from Illinois replied back that in good conditions in California he has seen spiral structure in M31, M33 and M51 in a 10-inch f/4.5 (wanna bet its a Coulter?) without using filters. He has also seen the dust lane in NGC 4565. Kinda makes you want to go out and try it, eh?

Of course there has been news in the journals lately, too. Working in my usual order of Earth out to infinity, it seems the SDI folks have finally seen the light and intend to cooperate with the observing community in regard to a test launch of a Russian nuclear reactor. This reactor, TOPAZ II, is entirely unshielded and gives off lots of gamma rays.

(Continued on page 6)
The WASP
Volume 25, Number 1 — January 1993

Published by:
Warren Astronomical Society, Inc.
P.O. Box 1505
Warren, Michigan 48090-1505

1993 OFFICERS
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1st Vice President: Marty Kunz  477-0546
2nd Vice President: Jeff Bondono  731-4706
Secretary: Nancy Rowe  544-9081
Treasurer: Mike O'Dowd  268-7125
Librarian: Louis Namee  777-0742

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 7:30 p.m.

General meeting on first Thursdays:
Cranbrook Institute of Science
500 Lone Pine Road
Bloomfield Hills, Michigan

Business meeting on third Thursdays:
Macomb Community College
South Campus, Building B, Room 209
14500 Twelve Mile Road
Warren Michigan

MEMBERSHIP AND DUES
Membership in the Society is open to all. Annual dues are:
Student $12.00
College $17.00
Individual $25.00
Additional Family Members $ 5.00 per person
Senior Citizen $17.00

Among the many benefits of membership are:
- Discount magazine subscriptions:
  Astronomy $16.00 (12 monthly issues)
  Sky and Telescope $20.00 (12 monthly issues)
- Free copy of each WASP newsletter.
- Free use of Stargate Observatory.
- Special interest subgroups. (See subgroup chairpersons.)
- Call list - don't miss unexpected events.
- Free membership in Astronomical League.
- Free copy of Reflector (Astronomical League newsletter).
- Free use of W.A.S. library. (See Librarian.)
- Rental telescopes. (See Observatory Chairperson.)

Send membership applications and dues to:
Mike O’Dowd  268-7125
4734 Brockham Way
Sterling Heights, Michigan 48310

WARREN ASTRONOMICAL SOCIETY PAPER
The WASP is the official monthly publication of the 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. Requests by other clubs to receive the WASP and 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. For further information on contribution, see the “Instructions for Authors” box on page 4 of Volume 23, Number 5.

Send articles to the editor:
Douglas E. Goudie  (313) 680-0434
2420 Alexander
Troy, Michigan 48083-2405
Internet: cl771@cleveland.freenet.edu
Bitnet: cl771%cleveland.freenet.edu@cunyvm

Disclaimer: The articles presented herein represent the opinions of the their authors and are not necessarily the opinions of the Warren Astronomical Society or its editor. The WASP reserves the right to edit or deny publication of any submissions.

STARGATE OBSERVATORY
The observatory is owned and operated by the Society. 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 f/17 club-built Cassegrainian telescope under a steel dome. The observatory is open to all club members in accordance to the "Stargate Observatory Rules." Those wishing to use the observatory must call the Observatory Chairperson (2nd Vice President) by 7:00 p.m. on the evening of the session.

LIBRARY
The Society maintains a library of astronomy-related books and periodicals at the Macomb County Community College meeting room. See the Librarian for rules or to check out a book.

SUBGROUPS
Special interest subgroups exist for those interested in specialized areas of astronomy. Contact the chairperson of each subgroup for more information on that group.
Computers: Larry Kalinowski  776-9720
Lunar / Planetary: Riyad Matti  548-7511
Solar: Ed Cressman  645-1837
Telescope making: Jim Houser  294-1952

CALL LIST
The Call List is a list of people who wish to be alerted of spectacular and unexpected astronomical events. Anyone who notices such an event calls the next person on the call list. That person in turn calls the next person, etc. A call list member can restrict callings to certain available times. Any Society member is welcome to join the call list.

To join the call list, please notify Marty Kunz at  477-0546.
Computer Chatter
By Larry F. Kalinowski

February already.... I'm still wondering what happened to 1992. Not only do the years start slipping by at a faster rate now, but the end of the year seems to move faster than the beginning.

Just briefly, IBM made a reference to a sixth generation microprocessor, with ten million transistors, due to emerge in about 18 months. Since IBM prefers to call its 586 the "Pentium" microprocessor, maybe the sixth generation unit should be called the "Hexium." The 486 has 1.2 million transistors and the Pentium is expected to have 3.1 million. It's due to be released shortly.

Last month's computer show in Warren was quite a show. There were 110 tables with assorted software and hardware, according to Walter Wawrzynski.

In photography, the CCD seems to be making a breakthrough for amateur astrophotographers. It's inherent ability to "filter" the background skyglow, just by subtracting a test exposure of the background sky, has become a boon to citybound amateurs. They're reaching magnitudes unheard of with standard commercial film and skyglow filters.

Another interesting comet will reach Perihelion on March 3, 1993. It's called P/Comet Schaumasse (1992x). Right now, its brightness is nothing to speak of at 12.6, but it has a magnitude coefficient of 30. A high coefficient means extremely volatile activity as it nears the warmth of the Sun. It will only be around magnitude 8.4 near perihelion but high activity could swing it's brightness into the naked eye range. By the time you read this, the comet should be nearly overhead in Perseus and heading toward Auriga during the evening. These orbital are from IAU circular #5666:

- T: 1993 Mar 3.9608
- e: 0.0704849
- q: 1.202158
- Node: 81.053
- Peri: 57.482
- Absolute Mag.: 7.0
- Equinox: J2000.0
- Mag. Coefficient: 30.0

The best time to see Mercury will occur during this month, on the 21st. It'll be just above the treetops, about 10 degrees above the southwestern horizon during twilight, not directly below Venus but slightly to the right.

The next computer show is on Sunday, January 24, at the U.F. & C.W. Hall, 876 Horace Brown Drive, one block east of 175 and two blocks south of 13 Mile Road in Madison Heights. The 600 DPI laser printer is growing stronger in sales.

If it captures the hearts of a lot of computer users, you and I will be able to afford to buy the old 300 DPI units for a song.

If you're a die-hard Star Trek fan, you might be interested in becoming a regular member of the USS Intrepid. That's the title of a Star Trek group that meets regularly at the Dearborn Civic Center. The next meeting will be on Sunday, February 1. The group alternates meetings between the first Sunday and the first Saturday of the month. Call Lt. Commander Michael Best at 459-2378 after 6 p.m. weekdays for more information. Visitors are welcome.

See you at our next computer meeting on January 28 at my place, 8:00 p.m. You can reach me a 776-9720 for more information. Clear skies.
Compton Gamma Ray Observatory Status
November 11, 1992

Battery performance continues to be monitored very closely, with power configurations adjusted as necessary. The observatory is functioning normally with primary systems powered from modular power subsystem 2, which is performing very well. Modular power subsystem 1 continues to support a reduced load of mainly heaters. A Tracking and Data Relay Satellite (TDRS) ground station is under development at Tidbinbilla, Australia, as part of an effort to increase real-time data collection from Compton via three TDRSs. All science instruments are performing nominally.

Galileo Mission Status
December 30, 1992

The Galileo spacecraft is operating normally in the dual-spin mode and is transmitting coded telemetry at 1200 bits per second. It is about 16.5 million kilometers (10.25 million miles) from Earth, and about 1.52 million kilometers (94 million miles) from the Sun.

Yesterday, December 29, after approximately 20 hours of warming in sunlight, the deploy-motor motors were turned on to "wind up" the system and then pulsed to "hammer" it in an effort to free the stuck ribs of Galileo's high-gain antenna. The procedures began at 6:55 a.m. PST and continued until 2:48 a.m. PST this morning, December 30. A total of 2160 pulses were executed by the motors during this period. The stuck ribs were apparently not freed. This morning the spacecraft was returned from the warming attitude to the normal cruise mode.

No spacecraft activities are scheduled during the holiday weekend. Activities will resume next week.

Hubble Space Telescope Status
November 11, 1992

Controllers are still investigating an anomaly involving a gyro, which occurred November 18. The spacecraft continues to operate and perform routine science operations. Initial telemetry indicated that the gyro lost synchronization and motor current. A later review of all monitors points to an interruption of power to Gyro 1. It has been commanded off for further study. Candidate causes of the gyro anomaly include other anomalies within the control electronics unit (such as a failed fuse). An assessment of safely restarting Gyro 1 is in progress. Other actions being evaluated include 1) changes to HST safemode configuration memory to remove access to Gyro 1, and 2) test and activation of backup safemode software which increases vehicle protection when in a three-gyro configuration. Gyros 2, 3, and 5 are operating normally. Safemode will protect HST in the near term should another gyro failure or other anomaly occur. These gyros are part of HST’s pointing control subsystem, which maintains the spacecraft’s positional stability and aligns the spacecraft to point to an remain locked on any specific target.

Magellan Mission Status
January 4, 1993

The Magellan spacecraft continues to operate normally, performing a reaction wheel desaturation in each 3-hour orbit, a star calibration on every other orbit, and transmitting a carrier signal (plus X-band telemetry) which is precisely tracked by the DSN stations to extract gravity data.

The spacecraft is about halfway through a 4-week command sequence which allowed control of the mission through the holiday period.

Air conditioning and power was lost at the Denver Mission Support Area over this past weekend, so the display terminals were shut down. Magellan continued to be tracked by the DSN stations, and telemetry on the status of the spacecraft was monitored and maintained on the Central Database at JPL.

A check of critical data this morning revealed that the Star Data Invalid Counter had incremented by only three, indicating good star calibrations and attitude control. Another triple spurious shutoff of the TWTA occurred this morning, but this has become routine. Telecommunications are satisfactory, with X-band telemetry at 1200 bps.

The spacecraft has completed 6470 orbits of Venus834 so far in Cycle-4, which will end on May 25, 1993. The mid-way point of Cycle-4 will be on January 19.

Mars Observer Mission Status
January 5, 1993

The Mars Observer spacecraft is being prepared for the outer cruise flight sequence. Adjustments to point the high-gain antenna directly at the Earth are continuing through January 6, 1993, at which time the antenna will be powered on to begin receiving and sending engineering and science data.

The spacecraft team reports that all science subsystems and instruments are performing well. The camera "bakeout" to prepare the instrument for operation will continue through January 14, followed by a focusing test on January 18.

Today the spacecraft is about 43 million kilometers (27 million miles) from Earth, traveling at a speed of about 36,000 kilometers per hour (23,000 miles per hour) relative to Earth. The spacecraft is traveling at a heliocentric velocity of about 97,000 kilometers (61,000 miles per hour). One-way light time is approximately 128 seconds.

Ulysses Mission Status
January 5, 1993

All spacecraft and science operations are performing well. Ground controllers are carrying out routine data-gathering activities and experiment reconfigurations as required. The 34-meter ground antennae are being used for ranging when the spacecraft is sending data at a low bit rate. Seventy-meter antenna ranging passes are also performed periodically.

Earth-pointing maneuvers were carried out on December 27 and 30, 1992, and on January 3, 1993. The next maneuver is scheduled for January 7, 1993.

(Continued on page 5)
Big Bang Theory Passes Toughest Test

By Paula Cleggett-Haleim, Headquarters, Washington, D.C. and Randee Exler, Goddard Space Flight Center, Greenbelt, Maryland

January 7, 1993 — The Big Bang Theory passed its toughest test yet with the latest results reported from NASA’s Cosmic Background Explorer (COBE) team at the American Astronomical Society meeting in Phoenix, Arizona today.

Precise measurements made by COBE’s FIRAS of the afterglow from the Big Bang - the primeval explosion that began the universe approximately 15 billion years ago - show that 99.97 percent of the early radiant energy of the universe was released within the first year after the Big Bang itself.

“Radiant energy” is energy emitted in any form of light, from x-rays and gamma rays to visible and infrared light or even radio waves. COBE’s Far Infrared Absolute Spectrophotometer (FIRAS) was designed to receive the microwave and infrared energy from the Big Bang.

“The Big Bang theory comes out a winner,” said COBE Project Scientist and FIRAS Principal Investigator Dr. John C. Mather of NASA’s Goddard Space Flight Center, Greenbelt, Maryland. “This is the ultimate in tracing one’s cosmic roots,” Mather said.

All theories that attempt to explain the origin of large scale structure seen in the universe today now must conform to the constraints imposed by these latest measurements.

This includes theories that postulate large amounts of energy released by such things as black holes, exploding supermassive stars or the decay of unstable elementary particles. In other words, there were not a lot of “little bangs,” as suggested by some theories.

The Big Bang Theory predicts that the spectrum of relic radiation should be that of a perfect “black body” unless there were major energy releases more than a year after the explosion. (A black body is a hypothetical cosmic body that absorbs all radiation falling on it, but reflects none whatsoever. A black body emits at the same temperature at every wavelength.) These latest FIRAS results reveal that later energy releases did not occur.

The COBE scientists now can say that the temperature of the afterglow radiation is 2.726 degrees above absolute zero (273 degrees below zero on the Celsius scale) with an uncertainty of only 0.01 degrees.

Today’s announcement is the result of analyzing data from the FIRAS during its 10 months of observations. Hundreds of millions of measurements were combined to obtain these unprecedently precise values. “Making certain that all of the measurements were combined correctly required exquisitely careful work and lengthy analysis by a large team of COBE scientists,” Mather reported.

“We are seeing the cold glow still remaining from the initially very hot Big Bang. These results now limit the size of any ‘after shocks’ following the Big Bang. The closer we examine the Big Bang the simpler the picture gets,” said Mather.

“It took us 18 years of careful effort to reach this point, but now we can say that the Big Bang Theory has been tested against observations to a fine degree of precision,” explained Mather.

“Experimental evidence of the Big Bang was first found by Edwin Hubble in the 1920’s. He found that distant galaxies in every direction are going away from us with speeds proportional to their distance. Therefore, galaxies that are farther away are going faster. This is exactly the pattern that would occur if the entire universe originated in a single explosion, now called the Big Bang.

Papers on these results and their implications soon will be submitted to the Astrophysical Journal for publication.

COBE, launched November 18, 1989, is managed by NASA’s Goddard Space Flight Center, for NASA’s Office of Space Science and Applications, Astrophysics Division, Washington, D.C.
Hubble Discovers a Double Nucleus in Core of Active Galaxy

By Paula Cleggett-Haleim, Headquarters, Washington, D.C.; Jim Elliott, Goddard Space Flight Center, Greenbelt, Maryland and Ray Villard, Space Telescope Science Institute, Baltimore

January 7, 1993 - Astronomers, using the Hubble Space Telescope, now believe that a galaxy they have observed for a decade actually is composed of two merged galaxies and that the collision has provided new fuel for a massive black hole which is spewing out a jet of gas and other matter 240,000 light-years long.

The galaxy is Markarian 315 located about 500 million light-years from Earth. The collision and refueling theory emerged after the Hubble Telescope revealed that the galaxy has a double nucleus or two core-like regions.

The brighter core-like region is believed to harbor the massive black hole which accounts for the tremendous amounts of energy produced by the galaxy. The fainter nucleus is considered to be the surviving core of a galaxy that recently merged into Markarian 315.

"The galaxy's active core presumably harbors a black hole which has been re-fueled by the galactic collision," said Dr. Jack MacKenty, Assistant Scientist at the Space Telescope Science Institute in Baltimore.

"The Hubble images provide support for the theory that the jet-like feature may be a 'tail' of gas stretched out by tidal forces between the two galaxies as they interacted," explained Dr. MacKenty, Assistant Scientist at the Space Telescope Science Institute.

"The jet feature is most likely a remnant of a merger between Markarian 315 and a smaller galaxy," said MacKenty. This observation best explains the extraordinary 240,000-lightyear long jet-like feature of Markarian 315.

An image of the core of Markarian 315, taken with the Hubble Space Telescope's Wide Field and Planetary Camera shows a second, fainter nucleus located approximately 6,000 light-years (or two arc seconds in angular separation) from the galaxy's bright central nucleus. One light-year equals approximately 5.8 trillion miles (9.3 trillion km).

Galaxy mergers may be one mechanism for driving gas deep into the heart of a galaxy, astronomers believe. This raw material fuels massive black holes, theorized to be the 'central engines' in Seyfert galaxies and other active galaxies.

The Hubble Space Telescope's high spatial resolution allows astronomers to probe the cores of Seyfert galaxies in unprecedented detail. In exposures taken with ground-based telescopes, the companion nucleus is drowned out by the brighter Seyfert nucleus.

The report on this discovery is by Drs. John MacKenty and Andrew Wilson of the Space Telescope Science Institute, Baltimore; Richard Griffiths of The Johns Hopkins University, Baltimore and Susan Simkin of Michigan State University, East Lansing. The report was delivered at the 181st Meeting of the American Astronomical Society meeting in Phoenix, Arizona.

...
Deep-Sky Objects

The term deep-sky object refers to a broad range of relatively dim and diffuse objects in the night sky. Deep-sky objects include all varieties of galaxies, bright and dark gas clouds, globular star clusters and open star clusters — virtually any distant, blurry blob of faint light in the sky. Once regarded as nuisances that impeded the then far more important discovery of new comets, these objects are in fact some of the most distant, beautiful and challenging objects to observe.

To be seen, deep-sky objects require dark skies and high transparency, preferably on a night near a New Moon. Some objects are within the light-grasp of binoculars, but most require a larger aperture - at least six-inches - before significant detail becomes apparent. A useful technique for observing deep sky objects is averted vision: looking directly at a dark section of sky while observing the object from the side of your eye.

Use these charts to find some deep-sky objects. At right is a detailed chart showing enough stars to "star-hop" to the objects. Inset is a low-scale chart showing the general region of sky.

Happy viewing!

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**February 1993**

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<th>Sunday</th>
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<td></td>
<td></td>
<td></td>
<td>12 - Juno is stationary</td>
<td>5 - Moon is 6° south of Mars</td>
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<td>19 - Full Moon</td>
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<td>15 - Moon is at perigee</td>
<td>11 - Saturn in conjunction with Sun</td>
<td>17 - Moon is 6° south of Jupiter</td>
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<td>17 - Moon is 2° north of Neptune</td>
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<td>6 - Mars is stationary</td>
<td>Asteroid Hebe is at opposition</td>
<td>19 - Moon is 2° north of Neptune</td>
<td>20 - Moon is 3° north of Uranus</td>
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<td>17 - Moon is 6° south of Mars</td>
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<tr>
<td>4 - Mercury at greatest eastern elongation (16°)</td>
<td>13 - Moon is at apogee</td>
<td>2 - Moon is 3° north of Mercury</td>
<td>5 - Venus is at greatest brilliancy (+4.6)</td>
<td>23 - Moon is 0.5° south of Venus</td>
<td>4 - Mercury is stationary</td>
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Eastern Standard Time. Sunrise and sunset data are based on the coordinates of the Hawthorn Hollow observing site, latitude 42° 52’ 30” N., longitude 82° 37’ 30” W. Times are reasonably accurate for the entire metropolitan Detroit area.
## Warren Astronomical Society Calendar 1993

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Event Description</th>
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<tbody>
<tr>
<td>Sunday Afternoons</td>
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<tr>
<td>Thursday</td>
<td>February 4</td>
<td>7:30 p.m. Solar Group at Ed Cressman's house when the weather is clear.</td>
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<tr>
<td>Tuesday</td>
<td>February 9</td>
<td>7:30 p.m. General meeting at Cranbrook Institute of Science.</td>
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<tr>
<td>Thursday</td>
<td>February 18</td>
<td>7:30 p.m. Board meeting at Marty Kunz's house (members only, officers required).</td>
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<tr>
<td>Thursday</td>
<td>February 25</td>
<td>8:00 p.m. Computer Group meeting at Larry Kalinowski's house.</td>
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<tr>
<td>Saturday</td>
<td>February 27</td>
<td>9:30 a.m. EMU Freeze-Out at Strong Hall Auditorium, Ypsilanti, Michigan.</td>
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<td>Admission: $3.00. Call N. Vance at (313) 487-4144 for more information.</td>
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<tr>
<td>Thursday</td>
<td>March 18</td>
<td>7:00 p.m. Business Meeting at Macomb Community College. Guest speaker: Roger Tanner</td>
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<tr>
<td>Saturday</td>
<td>March 20</td>
<td>7:00 p.m. Vernal Equinox Star party at Doug Bock's house (&quot;Northern Cross Observatory&quot;).</td>
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<tr>
<td>Saturday</td>
<td>March 20</td>
<td>7:00 p.m. 2nd Annual Messier Night, Lake Hudson State Recreational Area, Clayton, Michigan. (Cloud date March 27.) Sponsor: The Astronomical Societies of Lenawee and Hillsdale Counties, P.O. Box 229, Hudson, MI 49247. Phone: (517)448-7173 days or (517) 547-7402 evenings.</td>
</tr>
</tbody>
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