REFLECTIONS

of the University Lowbrow Astronomers

April
March 1999

University Lowbrow Astronomers
Ann Arbor, Michigan

The University Lowbrow Astronomers is a club of Astronomy enthusiasts which meets on the third Friday of each month in the University of Michigan's Physics and Astronomy building (Dennison Hall, Room 807). Meetings begin at 7:30 pm and are open to the public. Public star parties are held twice a month at the University's Peach Mountain Observatory on North Territorial Road (1.1 miles west of Dexter-Pinkney Road; further directions at the end of the newsletter) on Saturdays before and after the new Moon. The party may be canceled if it's cloudy or very cold at sunset. For further information call (734)-480-4514.

Credit: Malin Space Science Systems, MGS, JPL, NASA
Explanation: These brightly reflecting fields of snow or frost are on the slopes of a crater rim in the northern hemisphere of Mars. They are 500 meters or so long and have lasted through about eight months of the Red Planet's spring and summer weather. Recently imaged by the Mars Global Surveyor spacecraft, they also seem to be relatively uncrowded ... suggesting to some on April 1st, that lift tickets on Mars are extremely expensive. Of course, a vacation on the Red Planet could still offer some advantages to skiing and snowboarding enthusiasts. For example, Mars' low gravity - only about 3/8ths Earth's gravity - would definitely tend to reduce sore muscles and fall-related injuries. Happy April Fools day from APOD

More about Mars

Mars orbits 137 million miles from the Sun or at about 1.5 times the Earth-Sun distance. It has two diminutive moons, Phobos (21 km dia) and Deimos (12 km dia), extinct volcanoes, an immense canyon system, a thin atmosphere chiefly composed of carbon dioxide (CO_2), a frigid average surface temperature of -63 degrees Celsius, and permanent frozen CO_2 polar caps which contain some water ice.
Mars is at opposition on April 24 at a distance of only .58 AU .
Mark Cray has volunteered his 6" refractor and has mounted it alongside the 24" telescope, providing a very good image for viewing and taking pictures..

This Month:

April 10 - Public Star Party at Peach Mountain Observatory –

April 16 - Meeting at 807 Dennison. Election time, Tom Ryan and Paul Walkowski will be speaking.
April 17 - Public Star Party at Peach Mountain Observatory
April 18 - ATM Group - Meeting at Kurt Hillig's place.
April 24 – Mars at opposition. Mars is only about 55 million miles away. A diametrer of about 16 arc seconds and a magnitude of -1.7 . The best convenient time to observe Mars is during the month following the opposition .

Next Month:

May 8 - Public Star Party at Peach Mountain Observatory – Mars should be very well positioned for viewing and is only a couple of weeks past its opposition. still nearly at 16 arc seconds and -1.7 mag. You must see this.

May 15 - Public Star Party at Peach Mountain Observatory –
May 21 – Meeting at 807 Dennison -
May 22 – Lowbrows at the Leslie Science Center

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Credit: From ASTRO MAN by Dave Scherping, modified (slightly) by Dave Knisely :-) in the October 1996 issue of THE PRAIRIE ASTRONOMER

Credit #2: Discovered by Chris S.

#3 Some editorial liberties were taken. — BF

This is the end of the humorous section.

See Tom Stoner for a selection of eyepieces.

Concerning Clusters

By P. Walkowski

Second only to the planets as crowd pleasers at star parties, clusters have caught the eye of amateur and professional astronomers for centuries. While Open and Globular Clusters have stars and the word cluster in common, they are quite distinct. For my own edification, I started reading about these wonders of the heavens, and am recording the findings here to share with you. In general a cluster of stars has enough bright stars grouped together to be visible over the background of the sky. But to be a true cluster rather than as asterism, the stars must all be traveling together.

Open Clusters have been known since prebiblical times, the most common names being bestowed by the ancients. Haydes and the Pleiades are examples of these loose, irregular clumps of stars that are noted in the "Almagest" of Ptolemy (140 AD). What makes them a cluster at all is that they are traveling together across the heavens. In the 1930s Robert Trumpler's system of classifying open clusters according to their size, magnitude, and richness came in to common use, such as I 3 r for the Pleiades. His categories are:

- I through IV represent the amount which the stars are clumped in the center or central concentration with I being the strongest, and IV having no central tendency.
- 1-6 represent. the luminosity of the brightest stars.
- p, m, r represents the richness of stars inn the cluster ranging from <50 (**p**oor), 50-100 stars (**m**oderate), >100 stars (rich).

Open Clusters were and are continuing to be born in the spiral arms and the central bulge of the Milky Way Galaxy. It is as though these relatively new stars were being wrung out of the folds of the blanket of the heavens. In fact radio telescope and infrared observation of intrastellar nurseries can detect these new stars millennia before they can be seen visually. The spectacular Hubbell Telescope stellar nursery photos of the pillars of gas birthing stars in the Eagle Nebula are examples of this phenomenon. It is generally believed that all the stars of an open cluster are born of the same gas cloud, and velocity vector maps of the Hyades have been used as evidence of this common point of origin. Their future as a cluster is less certain because few open clusters have sufficient mass to gravitationally bind the stars together, hence they continue to drift apart. It is estimated that if a cluster is to remain together it should have a density of 10 stars/pc, while open clusters typically range from 0.1 to 10 stars/pc. The stars of an open cluster can be thought of as the fragments of a bombshell, the center of mass is still

following the same trajectory through space, but the fragments them selves are spreading apart with different velocities.

All of the open clusters about which we have knowledge (approximately 10,000 visible, 100,000 estimated) are in our near stellar neighborhood of the Milky Way and are sometimes referred to as galactic clusters (that is "within our galaxy"). No observations of open clusters have been made outside of the Milky Way. More distant clusters undoubtedly exist, but are obscured by interstellar dust. From our vantage point on the inside edge of the Orion Arm of the Milky Way, we can observe open clusters not only all around us in the Orion arm, but inward to the Saggittarius and Centaurus arm, and Outward to the Presius arm.
This local proximity is convenient for taking spectra and photometric measurements of the individual stars, from which we are told the clusters are millions to nearly 12 billion years old, while the Milky Way and the entire Universe itself are said to be 10-14 billion years old. From these near neighbors we continue to learn how stars are born, progress along the Hertzsprung-Russel diagram and die. We have learned that open cluster stars generally follow the H-R main sequence, have a significant number of bright supergiants, and type I Cephiads. While many different types of stars are present in open clusters, they are "common" types of galactic stars from the spiral arms they are called population type I stars. Typical stars have 1-4% of their mass as heavy elements, like our sun. It is noteworthy that extensive spectra studies of open clusters have found the H-R Horizontal branch missing, while all globular clusters have a strong horizontal branch.

Globular clusters are highly symmetric clusters of stars that form a globe shape which gradually brightens towards the center. Many globulars have so many stars (say 10 to 100 thousand) that it is impossible to count them or even see through the central portion of the cluster. Their densities range from 10 to 1000stars/pc. They have a high orbital velocity around their own center of mass, and also around the Milky Way itself. Since they have highly inclined orbits, a few globular clusters may be momentarily within the spiral arms, but most are above and below the plane of the galaxy. There are estimates of 150-200 globulars in the Milky Way and numerous examples of globulars surrounding other galaxies as well. The globular clusters orbit the nuclear bulge of the galaxy in what is called a "galactic halo" from 10,000 to about 50,000 light years from the center. The Milky Way is generally a flattened disk 100,000 light years in diameter by 3,000 light years thick. The globulars also do not participate the rotation about the galactic center that encompasses the spiral arms. The Sun is 30 light years from the galactic center (located in Sagittarius) and almost all of the 150 known globulars are orbiting the Milky Way closer in than we are.

The orbits of Globulars around the Milky Way was part of the cutting edge astronomy by Harlow Shapley in 1917, and led to thinking less about the sun centered universe and more on the galactic centered universe. Today this landmark research can be duplicated in minutes using computerized planetarium programs.

The earliest recorded galactic cluster was omega centauri, which could be seen with the naked eye in pre biblical times. Herschel expanded the list of globulars to a dozen using telescopes when he wrote the star catalogue "Uranometria" in 1603, and the list was expanded further in Charles Messier's 1781 list of 103 nebulous appearing objects, William Herschel's "Catalogue of the Nebula" in 1864 and Dreyer's "New General Catalogue" in 1888.

Stars in globular clusters are tightly bound to each other by their own gravity, and can withstand the tidal forces of the Milky Way without pulling apart. There are high concentrations of binary stars in globular clusters, which help maintain the stability of the cluster, although occasional individual stars escape from the globulars into the galactic halo.
Scientists are fairly certain that the stars within globular clusters all have a common origin, albeit that origin is outside of the galaxy itself. Globular Clusters are some of the most ancient objects observable, having ages from 12-20 billion years. I have wrestled with this age dilemma, the globulars older than the Universe or the Milky Way and can only offer hypotheses, not answers. Perhaps the globualrs condensed out of the primordial soup earlier than the galaxies being smaller and of a simpler structure, and were gathered round the late forming galaxies by their gravity, much the way comets and asteroids are gathered in by the solar system from the Oort cloud.

Globular clusters have main sequence and have large populations of red and yellow giants as well as type II Cepheids, R.V. Tauri stars, and planetary nebulae as well. Their stars are described as population type II stars and are noteworthy for the absence of heavy elements in the stars (0.001 to 0.1%).
The demise of stars in Globular clusters appears to be as a white dwarf star or as a planetary nebula, of which there is already ample evidence in the literature. Since there are a considerable number of binary stars

available, the exchange of stellar matter may result in novae and cataclysmic variables as well.

Fig 1 Shows 2 equal area diagrams of the sky with the gallactic plane as the horizontal line and the plus sign indicating the gallactic center.The top diagram is the distribution of open clusters, which lie in the spiral arms and completely surround the sun's position in the Milky Way.

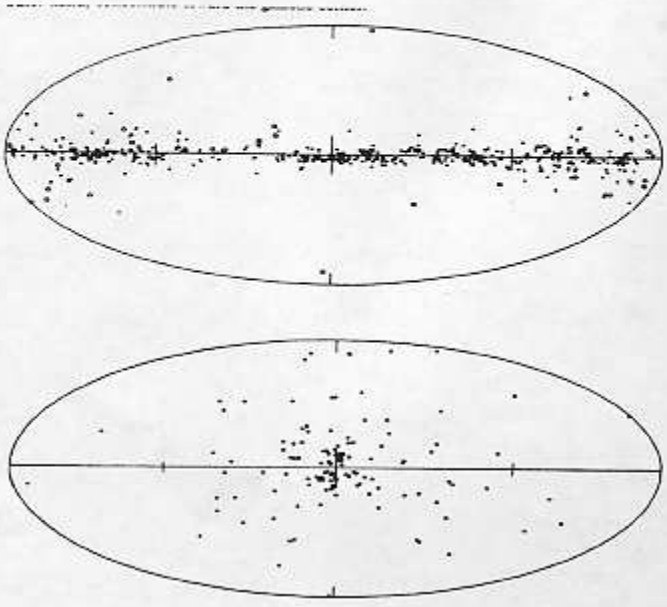


Fig 1

The bottom diagram indicates that globular clusters are predominantly above and below the plane of the Milkey Way clustered about the gallactic center in the halo region. Note that only a few globular clusters are out as far as the sun (30,000 l-yr) from the gallactic center.

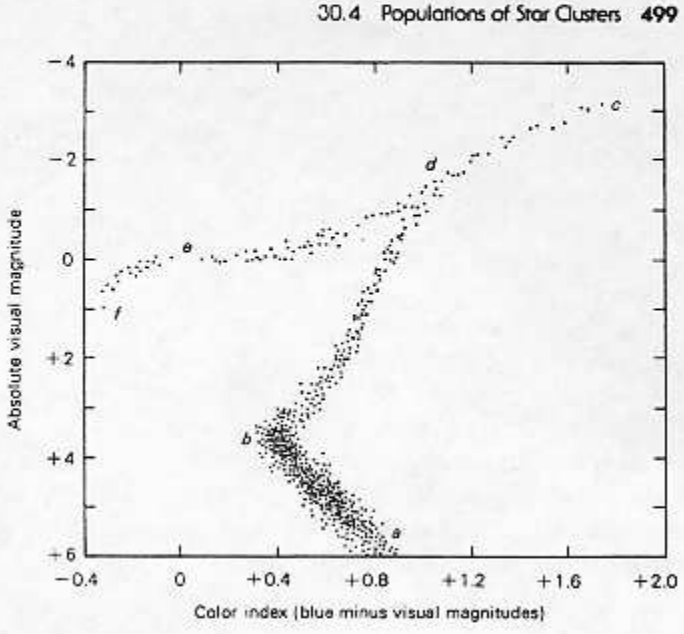


Fig 2 is a H-R (color magnitude) diagram for Open Clusters. While the open cluster H-R diagrams vary widely from each other, most stars are situated along or to the immediate right of the main sequence which streaches from lower right to upper left. The dotted diagonal line from the center to the upper right represents the place where yellow and red giant stars should be, if present on Open Clusters, which they rarely are.

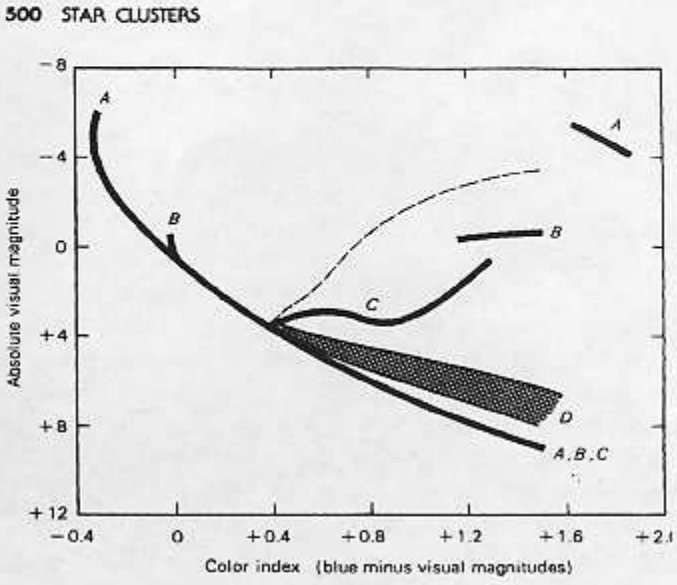


Fig 3 is a H-R diagram for globular clusters, which are extremely old objects. Note the strong presence of the yellow and red giants and the horizontal branch which is always present in globular clusters but almost entirely absent from Open clusters.

Quips have been forgotten, misquoted, and massacred, so the following is a reprint from an earlier newsletter to refresh our memories.

Quotes

Submitted by Ken Friberg

"Computers in the future may weigh no more than 1.5 ons." --Popular Mechanics, forecasting the relentless march of science, 1949

"I think there is a world market for maybe five computers." --Thomas Watson, chairman of IBM, 1943

"I have traveled the length and breadth of this country and talked with the best people, and I can assure you that data processing is a fad that won't last out the year." --The editor in charge of business books for Prentice Hall, 1957

"But what ... is it good for?" --Engineer at the Advanced Computing Systems Division of IBM, 1968, commenting on the microchip.

"There is no reason anyone would want a computer in their home." --Ken Olson, president, chairman and founder of Digital Equipment Corp., 1977

** "640K ought to be enough for anybody." -- Bill Gates, 1981 **

"This 'telephone' has too many shortcomings to be seriously considered as a means of communication. The device is inherently of no value to us." --Western Union internal memo, 1876.

"The wireless music box has no imaginable commercial value. Who would pay for a message sent to nobody in particular?"
--David Sarnoff's associates in response to his urgings for investment in the radio in the 1920s.

"The concept is interesting and well-formed, but in order to earn better than a 'C,' the idea must be feasible." --A Yale University management professor in response to Fred Smith's paper proposing reliable overnight delivery service. (Smith went on to found Federal Express Corp.)

"Who the hell wants to hear actors talk?" --H.M. Warner, Warner Brothers, 1927, commenting on the idea of sound in movies.

"I'm just glad it'll be Clark Gable who's falling on his face and not Gary Cooper." --Gary Cooper on his decision not to take the leading role in "Gone With The Wind."

"A cookie store is a bad idea. Besides, the market research reports say America likes crispy cookies, not soft and chewy cookies like you make." --Response to Debbi Fields' idea of starting Mrs. Fields' Cookies.

"We don't like their sound, and guitar music is on the way out."
--Decca Recording Co. rejecting the Beatles, 1962.

"Everything that can be invented has been invented."
--Charles H. Duell, Commissioner, U.S. Office of Patents, 1899.

"Louis Pasteur's theory of germs is ridiculous fiction". --Pierre
Pachet, Professor of Physiology at Toulouse, 1872

"Heavier-than-air flying machines are impossible." --Lord Kelvin, president, Royal Society, 1895.

"If I had thought about it, I wouldn't have done the experiment. The literature was full of examples that said you can't do this."
--Spencer Silver on the work that led to the unique adhesives for 3-M "Post-It" Notepads.

"So we went to Atari and said, 'Hey, we've got this amazing thing, even built with some of your parts,
and what do you think about funding us? Or we' ll give it to you. We just want to do it. Pay our salary, we'll come work for you.' And they said, 'No.' So then we went to Hewlett-Packard, and they said, 'Hey, we don't need you. You haven't got through college yet.'" --Apple Computer Inc. founder Steve Jobs on attempts to get Atari and HP interested in his and Steve Wozniak's personal computer.

"Professor Goddard does not know the relation between action and reaction and the need to have something better than a vacuum against which to react. He seems to lack the basic knowledge ladled out daily in high schools." --1921 New York Times editorial about Robert Goddard's revolutionary rocket work.

"Drill for oil? You mean drill into the ground to try and find oil? You're crazy." --Drillers who Edwin L. Drake tried to enlist to his project to drill for oil in 1859.

"Stocks have reached what looks like a permanently high plateau." --Irving Fisher, Professor of Economics, Yale University, 1929.

"Everything that can be invented has been invented."
--Charles H. Duell, Commissioner, U.S. Office of Patents, 1899.

"Louis Pasteur's theory of germs is ridiculous fiction". --Pierre
Pachet, Professor of Physiology at Toulouse, 1872

Henry Fitz lens at the Detroit Observatory

An E-mail to many
From: Patricia S. Whitesell

I had the 1857 Henry Fitz lens at the Detroit Observatory cleaned and reinstalled over this past weekend by John Briggs of Yerkes Observatory. The lens had been in storage for the past two years during the historic restoration of the Detroit Observatory. When John removed the brass cell, we observed that the last people to clean the lens had signed and dated its edge in pencil. To our surprise, it was last cleaned on July 22, 1962 by LeRoy E. Doggett and F. Michael Church.

I thought this news would be of particular interest to you and others who honor the late LeRoy Doggett's life's work through the establishment in 1996 of the annual LeRoy Doggett Prize for Historical Astronomy. I took photographs of Doggett's signature on the Fitz lens and will send copies to you, if you are interested.

For those of you interested in the details of this special lens, which is thought to be the only remaining large lens made by Henry Fitz that has not been refigured, I have transcribed below the comments dictated to me by John Briggs upon completion of the lens cleaning:

Measurements:
12 3/8 clear aperture
12 5/8 disk diameter

Notes:
Original Fitz cell and counter cell. Because the cell is original, it is very likely to be the original Fitz lens. If a new lens had been made, a new cell would have been made for it. Retaining ring goes in only one way.
Original index mark set.
Neither of the elements is strikingly thin.
No knife edge on the crown edge.
Two 2-inch scratches on front surface inclined at 90 degrees to one another.
Two fainter scratches of similar length elsewhere on front surface.
Potato-sized subtle dark stain on one of the inner element surfaces, noticeable in reflected light.
Overall cosmetics of the objective seem very, very good.
Edge marks scribed into the edges of the lens elements unambiguously orient the relative position of the elements, but these marks may not be original to Fitz.

Feel free to share this information with anyone you think will be interested who I did not include in the address list. Thanks.

Best regards,
Sandy Whitesell

Comets That Will Be Visible in the Near Future

Credit: NASA

Last Updated: 23 February 1999

This page provides a quick summary of comets that are expected to be visually observed in the near future. These are typically short period comets. Current information and observations of these comets (when they become visible) are given on the Recent News and Observations Page.

Short-Period Comets

10P/Tempel 2

37P/Forbes

P/1994 P1 (Machholz 2)

10P/Tempel 2

This comet should become 14th magnitude in April 1999 and continue brightening to 8th or 9th magnitude in August. Although visible from both hemispheres, the Southern Hemisphere will be favored when the comet is brightest. The comet should be followed through the rest of 1999.

37P/Forbes

This comet should brighten to 13.0 - 14.0 between April and July of this year. The comet will be a morning object, visible from both hemispheres.

P/1994 P1 (Machholz 2)

This comet should be recovered by visual observers by early-November. The comet is expected brighten very rapidly to perhaps 7th magnitude by mid-December. The comet's motion in the early evening sky will be primarily eastward. Although the comet will remain between -10 and -16 degrees declination during November - January 2000, the Northern Hemisphere will be favored because the comet will be north of the Sun.

Credit: 1. Chris Sarnecki for the 'new' Reflections design.
2. Mark Deprest for the logo designs

Star chart primer: —

The large circle on the star chart is the horizon line. Orient the star chart to the desired direction and face that direction. The map and sky are now aligned. Of course the time and date has to be the same as indicated on the map, or the proper correction made otherwise the sky and map will not match. Fifteen days corresponds to a one hour correction.

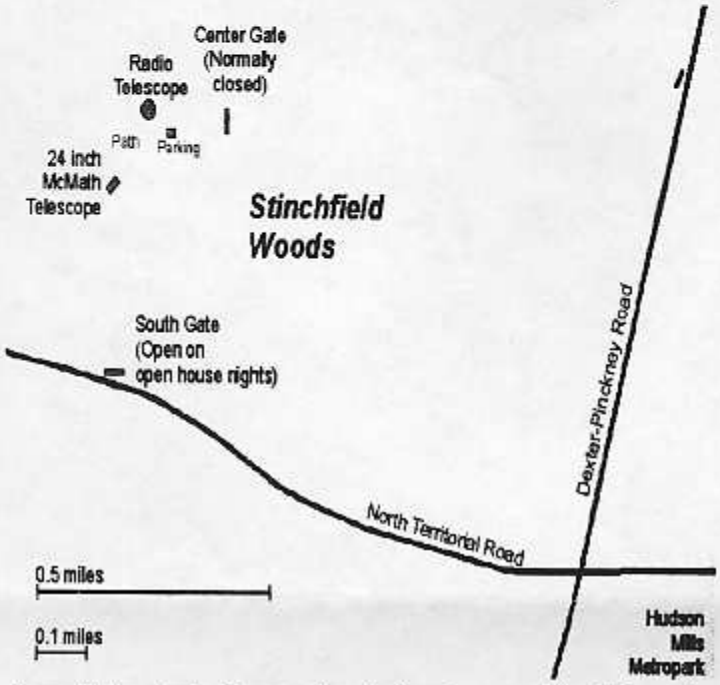
For additional charts, see BF

A Reflections from the past is included in this issue.

Ed: Bernard Friberg.

Places and Times:

Dennison Hall, also known as The University of Michigan's Physics and Astronomy building, is the site of the monthly meeting of the University Lowbrow Astronomers. It is found in Ann Arbor on Church Street about one block north of South University Avenue. The meeting is held in room 807. Monthly meetings of the Lowbrows are held on the 3rd Friday of each month at 7:30 PM. During the summer months, and when weather permits, a club observing session at Peach Mountain will follow the meeting.



Peach Mountain Observatory is the home of The University of Michigan's 25 meter radio telescope as well as the University's McMath 24 inch telescope which is maintained by the Lowbrows. The observatory is located northwest of Dexter. The entrance is on North Territorial Road, 1.1 miles west of Dexter-Pickney Road. A small maize-and-blue sign marks the gate. Follow the gravel road one mile to a parking area near the radio telescopes. Walk along the path between the two fenced in areas (about 300 feet) to reach the McMath telescope building.

Public Star Parties:

Public Open House/Star Parties are held on the Saturday before and after each new Moon at the Peach Mountain Observatory. Star Parties are canceled if the sky is cloudy at sunset or the temperature is below 10 degrees F. Call 480-4514 for a recorded message on the afternoon of a scheduled Star Party to check on the status. Many members bring their telescopes and visitors are welcome to do likewise. Peach Mountain is home to millions of hungry mosquitoes - bring insect repellent, and it does get cold at night so dress warmly !

Amateur Telescope Making Group meets monthly, with the location rotating among member's houses. See the calendar on the front cover page for the time and location of next meeting.

Membership:

Membership dues in the University Lowbrow Astronomers are $20 per year for individuals or families, and $12 per year for students and seniors (age 55/+). This entitles you to the monthly REFLECTIONS newsletter and the use of the 24" McMath telescope (after some training). Dues can be paid to the club treasurer Doug Scobel at the monthly meeting or by mail at this address:

1426 Wedgewood Drive
Saline, MI 48176

Magazines:

Members of the University Lowbrow Astronomers can get a discount on these magazine subscriptions:

Sky and Telescope: $29.95 / year
Astronomy: $27 / year
Odyssey: $16.95 / year

For more information contact the club Treasurer. Members renewing subscriptions are reminded to send your renewal notice along with your check when applying through the club Treasurer. Make the check payable to "University Lowbrow Astronomers".

Newsletter Contributions:

Members and (non-members) are encouraged to write about any astronomy related topic of interest. Call or E-mail to Newsletter Editors at:

Bernard Friberg (743)761-1875 Bfriberg@aol.com
Chris Samecki (734)426-5772 chrisandi@aol.com

to discuss length and format. Announcements and articles are due by the first Friday of each month.

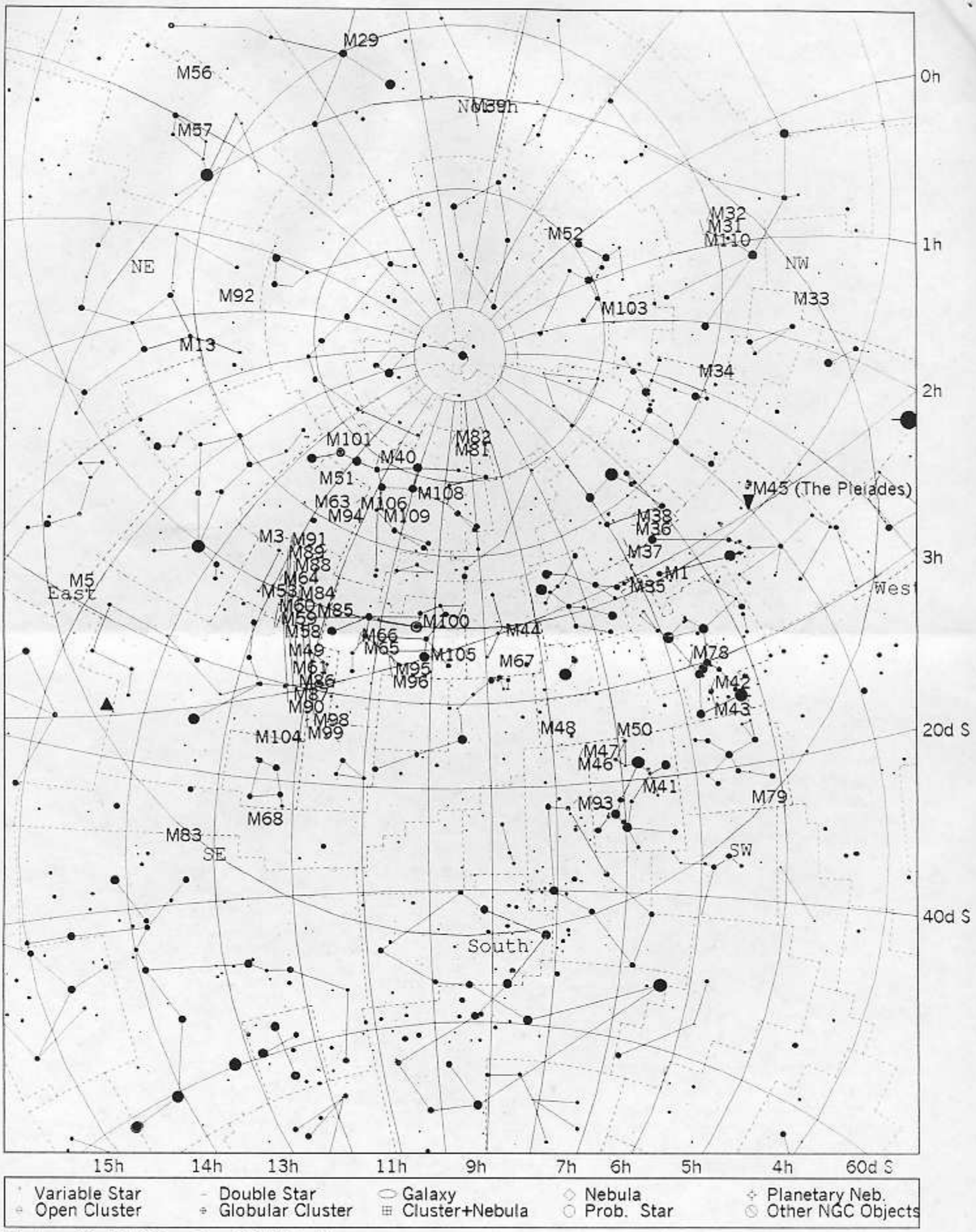
Telephone Numbers:

President:	Mark Deprest	(734)662-5719
Vice Presidents:	Lorna Simmons	(734)525-5731
	Dave Synder	(734)747-6537
	Paul Walkowski	(734)662-0145
Treasurer:	Doug Scobel	(734)429-4954
Observatory Director:	Bernard Friberg	(734)761-1875
Newsletter Editors:	Chris Samecki	(734)426-5772
	Bernard Friberg	(734)761-1875
Keyholders:	Fred Schebor	(734)426-2363
	Mark Deprest	(734)662-5719

Lowbrow's Home Page:

http://www.astro.lsa.umich.edu/lowbrows.html

Dave Snyder, webmaster
http://www-personal.umich.edu/~dgs/lowbrows/



Center RA:57h 25m Dec: 33d 26m N

UNIVERSITY LOWBROW ASTRONOMERS NEWSLETTER

Early in the morning, one can see a beautiful sight--Mars, Saturn, and Venus, shining together in the sky as a trio of celestial gemstones. This marks the beginning of the famous planetary alignment due to occur on March 10, when all nine planets will be on the same side of the sun. Already all the outer planets lie between 13 and 18 hours right ascension. If one extends this region to 19 hours, the original four asteroids--Ceres, Pallas, Juno, and Vesta--will also be included.

The term "planetary alignment" is not meant to imply that the planets will come together in a straight line. The fact is, they will not even be contained in a single quadrant, but span over 95 degrees. Nevertheless, as many people shrewdly realize, this event will mark the end of the world. In my meager attempts to present this issue objectively, I have listed three arguments for the end of the world, along with three respective refutations:

1."The tidal forces from the planets will rip the Earth to shreds." As every Astronomy 221 student knows, the tidal influence of the planets is totally insignificant compared to that of the moon.

2."Various planetary forces will increase the number of sunspots, which will influence the climate of the Earth, which will shift the winds in the atmosphere, which will alter the Earth's rotation rate and trigger major earthquakes." As I understand it, this is the basic idea behind The Jupiter Effect, although I admit I haven't read it. (I don't need to. I know everything). The line of reasoning here seems long and tenuous, and in any case no correlation has been found between sunspot numbers and earthquakes. Besides, an even closer planetary alignment occured in the early 1800's, and not only was the sunspot maximum unusually low, but there were no major earthquakes.

3."When all the planets get on the same side of the sun, the solar system will get too heavy on one side and fall over." This is the argument that convinced me. And I'm sure it will convince you.

-S.D.D.

Monthly Meeting
April 16, 1999, 7:30 pm
Room 807 Dennison Hall
Physics & Astronomy Building
The University of Michigan

Tom Ryan — The Null Testing of Mirrors

Paul Walkowski — On Clusters

GRB 990123 Host Galaxy Imaged
Credit: HST GRB Collaboration, STIS, HST, NASA
Explanation: Do the powerful explosions known as gamma-ray bursts (GRBs) originate in galaxies? This subject took on new light yesterday with the release of a Hubble Space Telescope image of the sky surrounding GRB 990123. This burst was first detected only two weeks ago and cataloged as one of the most powerful GRBs ever. The optical transient (OT) counterpart to the GRB can be seen as the bright spot just below center. Once so bright it was briefly visible with just binoculars, this OT has since become four million times dimmer and continues to fade. Now, it can be seen easily with only a large telescope. The diffuse object above is of particular interest because it appears to be the host galaxy of GRB 990123.

University Lowbrow Astronomers
Ann Arbor, Michigan

DETROIT MI
PM
APR 14
1999

USA

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3684 Middleton Drive
Ann Arbor, Michigan 48105

/1999

Lowbrow's WWW Home Page:
www.astro.lsa.umich.edu/
lowbrows.html

Check your membership expiration date on the mailing label !