Reflections

of the University Lowbrow Astronomers

May 1996

Farewell Hyakutake, Hello Hale-Bopp!

Observer: Hal Weaver Location: Hubble Space Telescope

Hubble Space Telescope (HST) image of comet Hale-Bopp taken at approximately 06:30 UTC on 23 October 1995 with the PC1 CCD chip of the Wide-Field Planetary Camera 2 (WFPC2), with a 60 sec exposure. The image is 36.4 arcsec on a side, corresponding to 177,000 km at the comet. Celestial North is at 130.7 deg CW from the straight up direction and East is at 90 deg CCW from North.

The image has not been "cleaned", which means that it is littered with background stars (the comet is still near the galactic plane), cosmic ray events, and hot pixels.

The nucleus is near the center of the frame in the highly saturated region. This particular intensity stretch was chosen in order to bring out the faint feature that's about 3.5 arcsec due north the nucleus (i.e., at 131 deg CW from straight up). This feature is almost certainly the remnant of the outburst that took place on 10/13 and which was first reported during observations on 10/14 from the Teide Observatory in the Canary Islands. The average projected speed of this clump of material is about 20 meters/sec.

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-Pinckney Road; further directions on page 9) on Saturdays before and after the new Moon. The party may be cancelled if it's cloudy at sunset. For further information, call 480-4514.

Important Dates

This Month:

May 11 - Public Star Party at Peach Mountain Observatory Comet Hyakutake is in the southern sky so now we can get back to our observing

May 17 - New Moon at 7:46 am EDT and **Meeting** at 807 Dennison - speaker Dr. Richard Teske, on "Distance Scale of the Universe"

May 18 - Public Star Party at Peach Mountain Observatory

May 25 - Leslie Science Center - General observing, open to the public, beginning at sunset. Please bring your telescopes!

Next Month:

June 8 - Public Star Party at Peach Mountain Observatory

June 15 - New Moon at 9:36 pm EDT and **Public Star Party** at Peach Mountain Observatory

June 20 - Summer solstice 10:24 pm EDT

June 21 - Meeting at 807 Dennison - Topic and subject to be determined

June 30 - Blue Moon 11:58 pm EDT This is June's second full moon, the first is June 1 4:47 pm EDT

Astronomy's Problem with Light Pollution

Printed with permission from
the International Dark-Sky Association

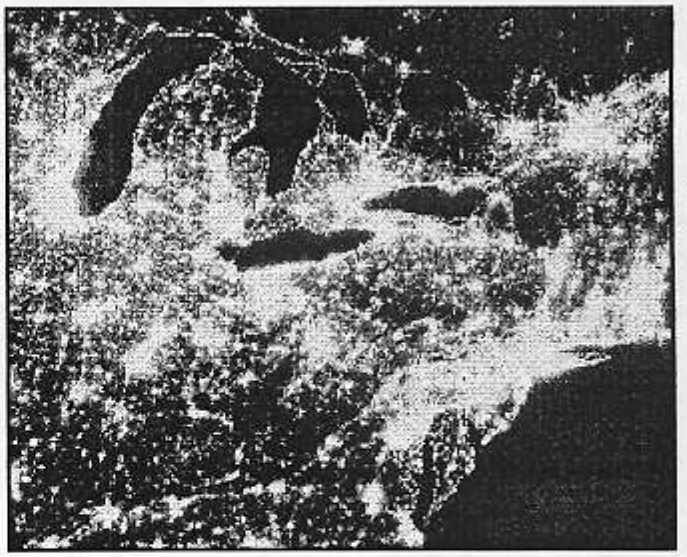
Today, people who live in or near large cities have lost much of their view of the universe. The spectacular view of the night sky that our ancestors had above them on clear dark nights no longer exists. The great increase in urban population has caused an ensuing rapid increase in urban sky glow due to outdoor lighting, which has brightened the heavens to such an extent that the only view most people have of the Milky Way or most stars is when they are well away from cities. This excess light in the sky has an adverse impact on the environment and seriously threatens to remove forever one of mankind's natural wonders -- our view of the universe.

While this increased urban sky glow brightens the night sky for the general public and for amateur astronomers, it is a special threat to professional astronomy. Advances in frontier astronomy require observations of very faint objects that can be studied only with large telescopes located on prime observing sites, well away from sources of air pollution and from urban nighttime skyglow. For example, most observations of cosmological interest deal with extremely remote sources: galaxies or quasars at such distances that the light has traveled several billion years, sometimes twice the age of our solar system, before reaching us. This light is then often lost in the glare of man-made sky glow.

The increased sky glow which adversely affects the environment and compromises astronomical research is called "Light Pollution", for it is wasted light that does nothing to increase nighttime safety, utility, or security. It only serves to produce glare, clutter, light trespass, light pollution, to waste energy and money.

The argument that all astronomy can be done from space is not correct; the largest telescopes will continue to be ground-based for a long time, because of cost factors. It doesn't make sense to do in space, at much higher cost, what can be done from the ground. There are many things that can only be done from space, and the demand for that type of research is and will be severe. The experience of more than two decades of space astronomy is that space research has greatly increased the demand for ground-based facilities. Planning for several ground-based telescopes much larger than anything now in existence is already underway, one such project is nearly completed. There are exciting times ahead for astronomy, using present and future ground-based telescopes, which *complement* the telescopes in space.

Solutions exist to the problem of light pollution, and control programs are underway now in a number of communities. Programs like these are critical to the long term success of astronomical research and to preserve mankind's view of the



Satellite image of the East Coast at night

universe. There is much more to be done, however, even in these communities, and most places are not yet even aware of the issue.

At present, the lack of awareness rather than resistance is generally the biggest problem in controlling light pollution. Educating the public, government officials and staff, and lighting professionals is a major thrust of the current programs. These efforts have helped. The increase of light pollution near major observing sites is moderating. More can and must be done, locally, nationally, and internationally. Astronomers, amateurs and professionals, and many others are urging such cooperation.

Astronomers are **not** against night lighting. They have the same needs for quality lighting as everyone else. They advocate the best possible lighting for the task, with lighting designs that allow for all the relevant factors such as glare control, efficiency, and the need for dark skies. An important added advantage is that everything that is done to minimize light pollution also saves energy by improving efficiency and utility of the nighttime lighting. Everyone wins.

Here are some solutions that minimize light pollution without compromising in any way nighttime safety, security, or utility:

1. Use night lighting only when necessary. Turn off lights when they are not needed. Timers can be very effective. Use the correct amount of light for the need, not overkill.

2. Direct the light downward, where it is needed. The use and effective placement of well-designed fixtures will achieve excellent lighting control. When possible, retrofit present poor fixtures. In all cases, the goal is to use fixtures which control the light well, minimize glare, light trespass, light pollution, and energy usage.

3. Use low pressure sodium (LPS) light sources whenever possible. This is the best possible light source to minimize adverse sky glow effects on professional astronomy. LPS

lamps are the most energy efficient light sources that exist. Areas where LPS are especially good: street lighting, parking lot lighting, security lighting, and any application where color rendering is not critical.

4. Avoid growth nearest the observatories, and apply rigid controls on nighttime lighting when such growth is unavoidable. Such controls do not compromise safety and utility. Lighting ordinances have been enacted by many communities to enforce quality, effective nighttime lighting.

All of these solutions to the problem say, really: "Do the best possible professional lighting design for the task. Include all relevant factors, such as glare, light trespass, and light pollution." All the solutions needed for protecting astronomy have positive side benefits of maximizing the quality of the lighting and of saving energy.

We must do what we can, now, to protect the nighttime environment. It is another of the key environmental issues confronting mankind, one that most people are unaware of, however.

The International Dark-Sky Association, a tax-exempt non-profit membership based organization, has been founded to help overcome this awareness problem and to help preserve dark skies while at the same time maximizing the quality and efficiency of nighttime outdoor lighting.

The IDA can be contacted at:
http://www.darksky.org/~ida/index.html
or 3545 N. Stewart Ave., Tucson, AZ 85716

New Light Pollution Bill Introduced in Legislature

by Wes Boyd

It's been a while coming, but the follow-up legislation to the act that created [the Dark Sky Perserve at] Lake Hudson [State Recreation Area] has been introduced in the Michigan Legislature. Though it's late in the term, Rep. Tim Walberg, (R-Tipton) thinks that it has a chance to get through the legislative mill yet this term. However, it may involve some letter writing, and perhaps even going to a committee hearing or two -- but that can be fun, as well. Hopefully this can lead to more communication and cooperation among Michigan astronomy enthusiasts. Here's the text of Rep. Walberg's bill:

House Bill No. 5526 January 25, 1996, Introduced and referred to the Committee on Conservation, Environment and Great Lakes

A bill to amend Act No. 451 of the Public Acts of 1994, entitled, "Natural Resources and Environmental Protection Act," as amended, being sections 324.104 to 324.90106 of the Michigan Compiled Laws, by adding part 752 to read as follows:

The people of the State of Michigan enact:

Section 1: Act No. 451 of the Public Acts of 1994, as amended, being sections 324.101 to 324. 90106 of the Michigan Compiled Laws, is amended by adding part 752 to read as follows:

PART 752: Outdoor Lighting Study

Sec. 75201. As used in this part, "Board" means the Outdoor Lighting Study Board created in Section 75203.

Sec 75202: The Legislature finds that excessive and misdirected outdoor lighting is a consequence of using outdoor lighting where and when it is not needed, and of not using the types of outdoor lighting most efficient, effective and cost effective for the task intended; that controlling outdoor lighting will result in significant cost savings due to the decrease in energy requirements; that light from improperly shielded street lights and security lights is a serious safety hazard to motorists and others; that the unchecked growth of ineffective and inefficient outdoor lighting fixtures in modern times has unnecessarily deprived most residents of the beauty of the starry night sky and of nighttime cloud patterns, while also potentially having serious ill effects on nocturnal fauna and flora; that while the lighting of streets, businesses and residences may be desirable and necessary for security, it is not desirable or necessary to have lights shining directly and often dangerously into the eyes of motorists, or uselessly and wastefully into the sky and off into space; that in several other states, and in large cities certain legislation has been adopted to control outdoor lighting, and that the State of Michigan has adopted Part 751 to create a Dark Sky Preserve, and several Michigan Local Governmental units have adopted various light control measures; that such measures are saving those jurisdictions considerable amounts of money in energy costs;

Sec 75203 (1) The Outdoor Lighting Study Board is created within the department.

(2) The board shall consist of the following members appointed by the governor:

(a) The director or his or her designee.
(b) The director of commerce or his or her designee.
(c) Two representatives from the electric power industry,
(d) One representative of the business community,
(e) One representative of an environmental organizations;
(f) One representative of an amateur astronomy association
(g) One representative of local law enforcement,
(h) One representative of local government planning
(i) One representative of the state legislature
(j) One architect/ or lighting design engineer
(k) One representative of Abrams Planetarium, Michigan State University.

(3) The members first appointed to the board shall be appointed within 60 days after the effective date of this part.

Legislation, con't

(4) Members of the board shall serve for terms of 3 years, or until a successor is appointed, whichever is later, except that of the members first appointed, 4 shall serve for 1 year, 4 shall serve for 2 years, and 4 shall serve for 3 years.

(5) If a vacancy occurs on the board, the governor shall make an appointment for the unexpired term in the same manner as the original appointment.

(6) The governor may remove a member of the board for incompetency, dereliction of duty, malfeasance, misfeasance or nonfeasance in office, or any other good cause.

(7) The first meeting of the board shall be called by the director of the Department of Natural Resources within 30 days of its complete formation. At the first meeting, the board shall elect from among its members a chairperson, who is not a department director or his or her designee, and other officers as it considers necessary or appropriate. The board may appoint a secretary who is not a member of the board as the board determines appropriate. After the first meeting, the board shall meet at least quarterly, or more frequently at the call of the chairperson or if requested by 7 or more members.

(8) A majority of the members of the board constitutes a quorum for the transaction of business at a meeting of the board.

(9) Members of the board shall serve without compensation, however members of the commission may be reimbursed for their actual and necessary expenses incurred in the performance of their official duties as members of the board to the extent funds are appropriated or otherwise lawfully available for this purpose.

(10) The board shall do all of the following:

(a) Study the nature and extent of problem associated with outdoor lighting.

(b) Study available regulatory and administrative solutions to problems associated with outdoor lighting and make recommendations to the legislature regarding the desirability of adopting these solutions.

(c) Study the potential for positive economic impacts that could result if more efficient and effective outdoor lighting alternatives are selected, including but not limited to ecological benefits, enhanced tourism, improved public safety and security, and any other benefits.

(d) Study solutions as taken by other jurisdictions to regulate outdoor lighting.

(e) Submit to the legislature within 9 months of the board's first organizational meeting a report detailing the result of the board's study as required in this part.

(f) Following submittal of the report required under this section, meet at least annually for the 5 years following submittal of the original report and report to the legislature regarding further recommendations related to the board's responsibilities.

(11) The board may do all of the following:

(a) Seek assistance from any person as the board determines necessary or appropriate to fulfill the responsibilities of the board under this part.

(b) Incur expenses that are necessary and proper and within the limits of funds appropriated or otherwise lawfully available to the board to fulfill the responsibilities of the board under this part.

[Wes is the Editor of The StarQuest Newsletter for the Amateur Astronomy in Lenawee, Jackson, and Hillsdale Counties, MI, and Steuben County, Indiana. The support of Michigan's Amateur Astronomy clubs will be instrumental in making legislation such as this a reality. Wes can be contacted at WESBOYD@delphi.com for additional information on very important issue. - Chris Sarnecki]

Upcoming Events

by Christopher Sarnecki

The following is a listing of some upcoming amateur astronomy events and information for your consideration. Flyers containing additional information for much of the events listed below will be available at next month's meeting.

Public Viewing Night

Hosted by:	The U of Michigan - Student Astronomical Society
Where:	Angell Hall Observatory
When:	9:00 - 11:00 pm every Friday night
Info:	Call 764-6829 for a recorded message
	SAS Home Page: http://www.astro.lsa.umich.edu/sas

Public Skywatching Nights

Hosted by:	Abrams Planetarium
Where:	MSU Observatory, East Lansing, Michigan
When:	9:00 - 11:00 pm on May 17 & 18, June 21 & 22, July 19 & 20
Info:	View the night sky through MSU's 24 inch scope
	Abrams Home Page:
	http://www.pa.msu.edu/abrams/home.html

Huron County/Bad Axe Star Party (the 1st !)

Hosted by:	Ford, DAS, Warren, EMU, Lowbrows, Genesee, Oakland Astronomy Clubs and City Camera/Precision Optics
Where:	Justin's Family Campground, Bad Axe, Michigan
When:	May 16 - 17
Info:	(517)269-9773

26th Annual Apollo Rendezvous and Telescope Fair

Hosted by:	The Miami Valley Astronomical Society and The Dayton Museum of Natural History
Where:	Dayton, Ohio
When:	June 14 - 15
Info:	Call John Schroer (513)275-7431, ext 36 or jschroer@usa.pipeline.com

New Camera Brings Asteroids and a Comet into Focus

by Douglas Isbell, Nasa Headquarters and Diane Ainsworth, Jet Propulsion Laboratory

Operating a newly installed electronic camera pointed at the night sky from atop Maui's Haleakala volcano, NASA astronomers have discovered four new Earth-crossing asteroids and a fast-moving comet, just months after initiating a new near-Earth asteroid and comet discovery program.

The camera -- called NEAT, for Near-Earth Asteroid Tracking system -- enabled astronomers at NASA's Jet Propulsion Laboratory (JPL), Pasadena, CA, to make their first discovery of a new long-period comet on March 15, the first night of the monthly observing program. The comet was officially designated 1996 E1, after confirmation was received from observers in Maui, Australia, Japan, the Czech Republic and Camarillo, CA.

"This relatively bright, magnitude 16 comet was discovered in the constellation of Cancer," said Dr. Eleanor Helin, principal investigator of the NEAT camera team at JPL. "It was diffuse, with strong central condensation, sporting a 15-arcsecond tail. Its closest approach to Earth, at about 30 million miles, occurred at the end of March."

The comet, which has a parabolic orbit highly inclined to the ecliptic plane, is on a long journey through the Solar System. Named NEAT 1, the long-period comet was discovered automatically by NEAT's software and was sighted, coincidentally, on the Ides of March, "a most auspicious beginning for a discovery program," Helin added.

Four unusual Earth-crossing asteroids also were discovered using NEAT, which is the world's first autonomous imaging system. These near- Earth asteroids have been designated 1996 EN, 1996 EO, 1996 FR3 and 1996 FQ3.

"All are noteworthy for different reasons," Helin said. "1996 EN is a large, 1.8 mile-diameter asteroid which moves in a very elliptical orbit and displays a high inclination of 39 degrees relative to the ecliptic plane. As a result of its brightness at magnitude 15.5, and its placement with respect to Earth, it will be accessible for observations through the end of the year."

Of the other Earth-crossers, 1996 EO has a diameter of a little more than 1/2 mile. It is not on a collision course with Earth, but asteroids of this size and larger have been identified by the scientific community as sufficient to cause severe damage over a large area of Earth should one impact the planet, Helin noted.

Significant because it moves in a long elliptical orbit extending well inside the orbit of Venus, 1996 FR3 is one of only a handful of asteroids that passes so close to the Sun. Astronomers speculate that this object may be an extinct comet, having passed close to the Sun enough times to have lost its gaseous atmosphere.

About 328 feet in diameter, 1996 FQ3 is a small near-Earth asteroid with an absolute magnitude of 21. Although small, Helin believes this asteroid may prove to be a possible candidate for a future spacecraft fly-by mission, given its very low inclination of one degree relative to the ecliptic plane.

The discovery of the four new Earth-crossing asteroids represents half of all the Earth-crossing asteroids discovered worldwide during the month of March. Two of the discoveries — 1996 EN and 1996 FR3 -- are classified as "potentially hazardous asteroids," capable of coming exceedingly close to the Earth.

"These discoveries certainly suggest that we could face a surprise encounter with a large, unseen object," Helin said. "If these newly discovered Earth-crossing asteroids have not been seen before, then there is strong evidence that many others are near the vicinity of Earth and the inner planets, which NEAT and other programs are designed to discover."

March was the first "good weather" month for NEAT astronomers since the new electronic camera came on-line in December 1995, said Dr. Steven Pravdo, manager of the project at JPL. The March observing run alone produced more than 1,000 asteroid sightings, including high- inclination inner-belt asteroids and a number of potential Mars- crossers. Total detections since NEAT went on-line in December 1995 have climbed to more than 2,400 objects, of which about 45 percent are known objects and more than 200 to date are new discoveries receiving new asteroid designations.

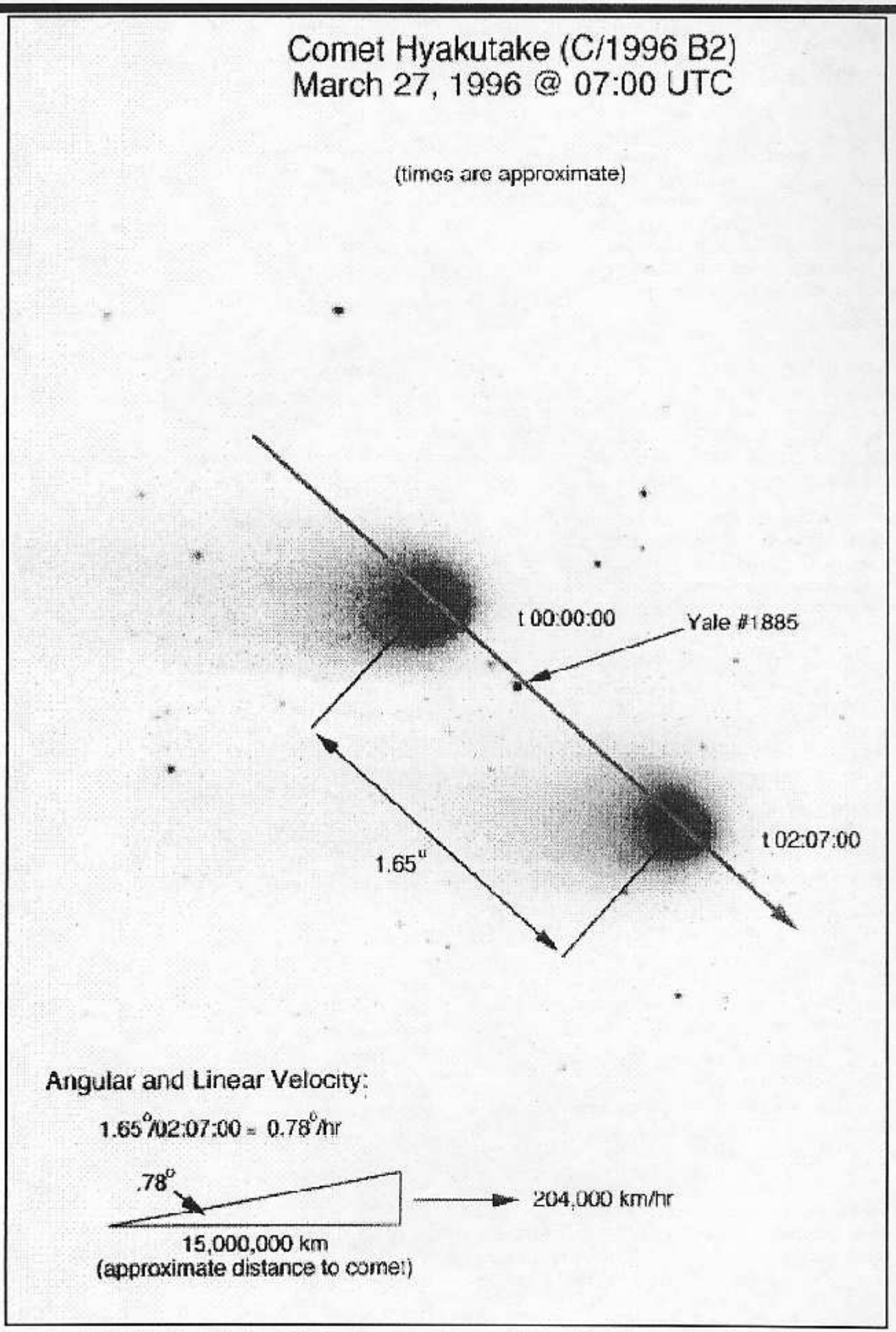
When the camera is upgraded later this month to use a very large 4,096 by 4,096-pixel charge-coupled device (CCD), astronomers expect to detect four times the number of comets and asteroids currently being observed.

Developed at the JPL, the NEAT system and its operation mark the beginning of a new era in observing programs focused on discovering and tracking asteroids and comets -- fleeting chunks of rock and ice -- as they enter the inner solar system from deep space. The autonomous imaging system contains a sophisticated computer controller and a highly sensitive CCD camera sensor.

The NEAT camera is installed on a 39-inch telescope operated at the summit of Mt. Haleakala by the U.S. Air Force. With its short exposure time and fast electronics, NEAT is able to achieve wide-sky coverage and detect objects much fainter than was possible using the photographic Schmidt telescope at Palomar Observatory in Southern California.

Systematic searches for asteroids and comets destined to cross Earth's orbit have been the topic of renewed interest in recent years, especially in the aftermath of Comet Shoemaker Levy-9 and the recent arrival of Comet Hyakutake. Today charge-coupled devices -- light detectors made of silicon -- are emerging as a favored approach to asteroid detection because CCD sensors can record light 100 times more efficiently than the most sensitive photographic film.

NEAT will be managed jointly by JPL and the U.S. Air Force. JPL manages its portion of the program for NASA's Office of Space Science, Washington, DC.



This photo was submitted by Fred Schebor. It is a double exposure image of Comet Hyakutake used to calculate the comet's velocity.

Beyond Messier

by Doug Scobel

After all these years I've finally done it! As of March's Messier Marathon, I can now truthfully say that I have "officially" observed and logged all 110 Messier objects! That night the last one on my list, M83, a mostly face-on spiral galaxy in Hydra, met its fate. Through the hazy clouds, not more than ten degrees over the horizon, there it was - a small, faint nucleus, surrounded by a VERY faint halo. Hooray!

M83, copyright Anglo-Australian Observatory, photograph by David Malin

But what's a deep sky observer to do, now that the Messier catalog has been conquered? Plenty! Charles Messier only scratched the surface, and there are plenty more faint fuzzies waiting for someone to aim their telescope towards them. The New General Catalog of Non-Stellar Objects (or NGC) contains more than 7000 objects, and some of these are more spectacular than many of those he cataloged. There is also the Index Catalog (IC), which is basically an addendum to the NGC, and others as well.

So, if you're like me and enjoy the challenge and satisfaction of observing the formerly unobserved, then here's a few objects you may want to try to track down in the next month or two. This is spring, so most of them are galaxies. I have observed all of these personally, either at Peach Mountain or Lake Hudson State Park, and all have a fairly high surface brightness and should be relatively easy to find. I'm sure there are many I've missed, but like I said, these are objects I've actually observed so far - but I'm not done yet!

NGC 2403 Galaxy in Camelopardalis (say THAT three times real fast!) This galaxy shines at magnitude 9.5, but is nearly 20 arc minutes across, and so does not have a high surface brightness. But it does reveal a fairly bright nucleus and a hint of spiral structure. It reminds me of a smaller, but brighter version of M33.

NGC 3185, 3187, 3190, and 3193 Galaxy cluster in Leo For larger apertures, these galaxies form a nice little cluster in Leo's "sickle", halfway between Zeta and Gamma Leonis. They all fit in the same medium-power field. NGC 3190 is the largest and brightest at magnitude 11.9. The faintest, NGC 3187, shines at only magnitude 13.8, so you'll need to have a sharp eye and good optics to see it. NGC 3185 and 3193 shine at magnitudes 12.9 and 12.4, respectively.

NGC 4244 Galaxy in Canes Venatici This 10.8 magnitude galaxy is nearly edge-on to our line of sight, giving it a relatively high surface brightness, and a long, narrow outline, similar to NGC 4565. I could not see any signs of a dust lane, though.

NGC 4490 and 4485 Galaxies in Canes Venatici NGC 4490 is another almost edge-on galaxy. It has quite an elongated appearance, slightly bulged at the center. It shines at magnitude 10.1. With larger apertures, you should be able to see NGC 4485, a magnitude 12.4 glow in the same high-power field.

NGC 4565 Galaxy in Coma Berenices This is one of the finest edge-on spiral galaxies available to amateurs. Shining at magnitude 10.5, it nonetheless has a high surface brightness because it is nearly perfectly edge on to our line of sight. With a dark dust lane bisecting almost its entire length, it's a beautiful sight.

NGC 4631 and 4656 Galaxies in Canes Venatici Another edge-on spiral, NGC 4631, shines at magnitude 10.0. It shows some detail at medium to high power. Larger apertures should also reveal 10.6 magnitude NGC 4656 in the same field. Besides being fainter, it is also larger, and so has a much lower surface brightness. It, too, is a nearly edge-on spiral.

CCD Image of NGC 4565 by William McLaughlin

NGC 5005 and 5033 Galaxies in Canes Venatici This pair of nearly edge-on galaxies are magnitude 10.6 and 10.9, and are remarkably similar in appearance, with NGC 5033 being slightly smaller and fainter. They make a fine sight in the same medium to high power field.

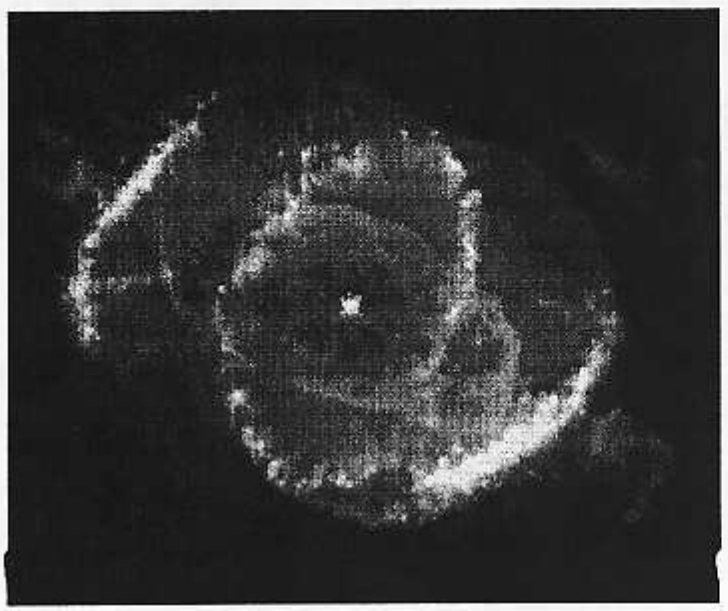
NGC 5907 Galaxy in Draco At magnitude 11.5, this little edge-on galaxy has a surprisingly high surface brightness and is easy to find. It has a very narrow, needle-like appearance.

NGC 5981, 5982, and 5985 Galaxies in Draco These faint galaxies, at magnitudes 14.2, 12.4, and 12.0 also happen to be small, and so have relatively high surface brightnesses. All three fit into the same high power field. You may have trouble spotting the faint NGC 5981.

NGC 6210 Planetary nebula in Hercules This 9.5 magnitude nebula is only about 20 arc seconds across, so it has a high surface brightness. But being small, it looks star-like at low power, so you may have difficulty finding it. Once you find it, try increasing the magnification to see if you can see the central star.

NGC 6503 Galaxy in Draco This 11.5 magnitude galaxy is also almost edge-on. It's only about 8 arc minutes long, and very narrow. I actually observed it in my old 6" f/8, and I was impressed with how good it looked in such a "small" scope. It should be more impressive in a larger instrument.

NGC 6543 Planetary nebula in Draco Also known as the "Cat's Eye Nebula", this remarkable planetary shines at magnitude 9.0. It has an irregular, oval shape, and is a very distinct bluish green. Its central star is visible, and because of its high surface brightness it withstands high magnification. With good optics and a steady atmosphere you should be able to see some details, including the central star.



Hubble Telescope image of NGC 6543 "Cat's Eye Nebula"

Here's an observing tip. Once you do find one of these, don't be afraid to use high magnification. Conventional wisdom says to use only low power with faint objects, but I have found that you actually can see much more with higher power. Here's why. Higher magnification makes the object's image dimmer, but the sky background gets dimmed also and contrast remains about the same. At low light levels your eye's resolving power goes down, so angular size becomes much more important than absolute brightness. The net result is that you can see more detail in a larger, dimmer image than in a smaller, brighter image, given constant contrast and low light levels.

Case in point. Last year I tracked down Stephan's Quintet, a compact cluster of five, 14th to 15th magnitude galaxies, in Perseus. I was at Peach Mountain with my 13 inch dob. I had been looking for it literally for years, but to no avail. I would always see a smudge, but I could never quite convince myself that I was seeing a group of five separate galaxies. I just assumed that the light pollution at Peach was just too great to see things so faint. But this time, once I found it, I boosted the magnification up to about 300x. I couldn't believe it, but there they were, all five of them! I needed averted vision to see the fainter members, but I could actually see the brightest one by looking at it directly. I made a hasty sketch, and compared it with a photograph once I got home. Sure enough, the sketch matched the photo. I guess I really DID see them all!

Here's another tip. I believe that a great many deep sky observers spend their entire observing session with eyes that are not fully dark adapted. The reason? They're continually ruining their night vision by using a red flashlight that is way too bright. There's nothing magical about red light - if it's too bright, it will spoil your night vision just as fast as any other color. If your flashlight is bright enough to comfortably read your charts, it's too bright. The ones I use are quite dim, and I have to get real close to the charts to read them. You should use as low a light level as you can get by with. And make sure it illuminates evenly. If there are any "hot spots", add diffusion to spread the light out more. Save your bright light for when you're at home in your favorite reading chair on a cloudy night.

Another factor is the charts themselves. In the field, I'm a firm believer in using charts depicting white stars on a black background. With a white background, the flashlight presents a large, bright area, presenting more opportunity for spoiling your night vision. Black charts under red light are still black, and reflect much less light into your eyes. Besides, they look more like the real sky!

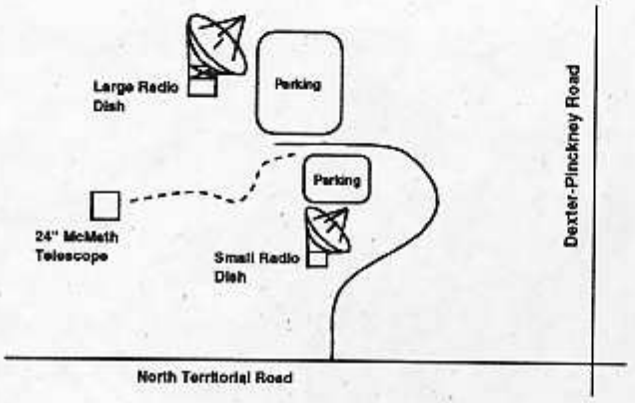
So, once you finish the Messiers, don't stop. There's plenty more where they came from!

What is inconceivable about the universe is that it should be at all conceivable.
- Albert Einstein

Places

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.

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.



Times

Monthly meetings of the Lowbrows are held on the 3rd Friday of each month at 7:30 PM in 807 Dennison Hall. During the summer months, and when weather permits, a club observing session at Peach Mountain will follow the meeting.

Computer subgroup meetings are held on the first of each month, rotating among member's houses. See the calendar on the cover page for the location of next meeting.

Public Open House/Star Parties are held on the Saturday before and after each new Moon at the Peach Mountain Observatory. Star Parties may be 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 tocheck on the status. Many members bring their telescopes and visitors are welcome to do likewise. Peach Mountain is home to millions of hungry mosquitos - bring insect repellent, and it does get cold at night so dress warmly!

Dues

Membership dues in the University Lowbrow Astronomers are $20 per year for individuals or families, and $12 per year for students. 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 either at the monthly meeting or by mail at:

Doug Scobel
1426 Wedgewood Drive
Saline, MI 48176

Magazines

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

Sky and Telescope: $24 / year
Astronomy: $20 / 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.

Newsletter Contributions

Members and (non-members) are encouraged to write about any astronomy related topic of interest. Call the Newsletter Editor Laura Meluch or e-mail to meluch@alumni.engin.umich.edu to discuss length and format. Announcements and articles are due by the first Friday of each month. Articles should be mailed to:

Laura Meluch
522 Second Street
Ann Arbor, MI 48103

Telephone Numbers

President:	D. C. Moons	254-9439
Vice Pres:	Mark Cray	283-6311
	Tom Pettit	878-0438
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Newsletter:	Laura Meluch	747-6998
Publisher:	Lorna Simmons	525-5731
Keyholder:	Fred Schebor	426-2363

From the Editor . . .

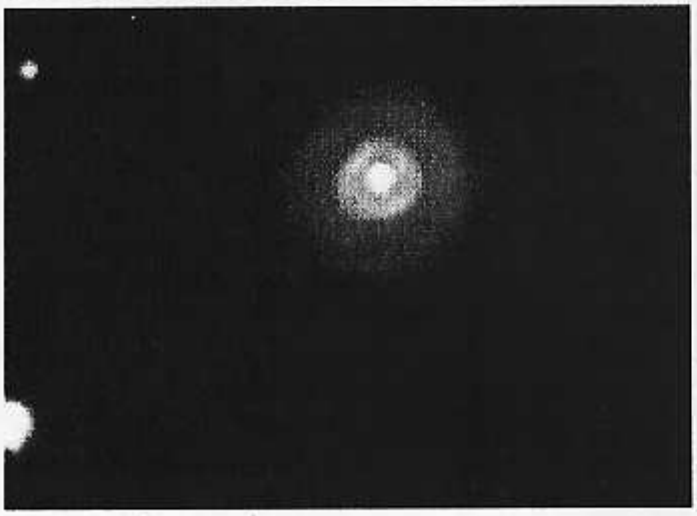
Hello! Allow me to introduce myself: my name is Laura Meluch, and my husband Norm and I (and our 9 month old son Jack), just joined the Lowbrows. I also took on the task of getting this newsletter out to you all. A hearty thanks to Chris Sarnecki and Bernard Friberg for all their patience and help while I pestered them with questions about getting this first issue out. I couldn't have done it without them.

I look forward the challenge of getting this out each month. And as I am very new to astronomy, I'm also looking forward to learning a lot along the way. Just as a reminder, this is YOUR newsletter - your submissions are what make it interesting. So keep those cards and letters coming!

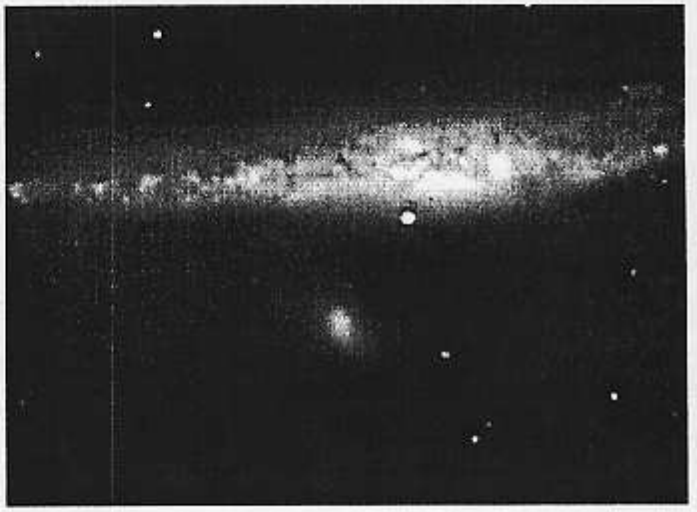
At the Last Meeting

Elections were held. Check the roster on page 9 for the new office holders.
Impending dark-sky legislation was discussed. *See related articles in this issue*
If you have books or materials to donate or lend to the club library, please come early (7:00) to the meeting May 17, and bring them along. The library is also looking for a new home. Can you help?

More Deep Sky Objects



Eskimo Nebula NGC 2392 RA 7 h 29.2 m DEC +20d 55m mag 8 planetary nebula in the constellation Gemini



NGC 4631 RA 12 h 40.9 m DEC 32d 41m mag 10 CVn This edge on galaxy is littered with knots, patches, and mottlings

University Lowbrow Astronomers
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Check your membership expiration date on the mailing label!