
Reflections *of the University Lowbrow Astronomers*

April 1997



Comet Hale-Bopp with Andromeda, Cassiopeia, and Perseus on March 25, 1997. Photo by Kurt Hillig.

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 each month, weather permitting, at the University's Peach Mountain Observatory on North Territorial Road (1.1 miles west of Dexter-Pinckney Road; see inside for directions) on the Saturday evenings before and after the new Moon. For more information call (313) 480-4514.

Important Dates

This Month:

- Apr 5 - Public Open House** at Peach Mountain Observatory
- Apr 12 - Public Open House** at Peach Mountain Observatory
- Apr 18 - Meeting** at 807 Dennison: Mark Vincent will talk on "Hale Bopping from Kitt Peak", followed by Elections. Show up, or risk being voted into office!
- Apr 20 - ATM group meeting** at Doug's house - call 996-8784
- Apr 25 & 26 - Comet Party** at Kensington Metropark. Info inside.

Next Month and Beyond:

- May 1-3 - Huron County Star Party** near Port Austin, MI.
- May 3 - Public Open House** at Peach Mountain Observatory
- May 10- Public Open House** at Peach Mountain Observatory
- May 16- Meeting** at 807 Dennison
- May 18- ATM group meeting**
- May 31- Public Open House** at Peach Mountain Observatory
- June 7 - Public Open House** at Peach Mountain Observatory

Why is a Comet when it Spins?

Kurt Hillig

The printing process used in producing *Reflections* isn't well suited for reproducing high dynamic range images (see the cover pictures in this issue, for example). But everyone who's looked at the head of Hale-Bopp recently at high power has commented on the concentric half-rings surrounding the nucleus; Peter Alway's recent photos through the 24" scope at Peach Mountain clearly show six or seven rings, and hints of as many as nine!

Rings around cometary nuclei aren't really all that rare – I've got a photo of Hyakutake that shows a ring, and many other comets have exhibited these as well. These features all seem to share some common characteristics: they generally cover an arc of less than 180 degrees, and they are most distinct on the sunward side of the comet.

Some have attributed these to shock waves as the gases escaping from the comets surface slam into the solar wind at relative speeds of a few hundred miles per second. But the bow shock is actually quite a bit further from the nucleus than the rings, and it's hard to come up with a mechanism that propagates such extreme density waves "upstream" against the ejected gas, with such remarkable uniformity.

What's really going on here is that we're seeing the fortuitously obvious results of two phenomena: the nucleus is rotating, and gas and dust emission doesn't occur uniformly across its surface.

The "evaporation" of the surface of a comet is driven by sunlight; solar intensity at Earth's orbital distance is about a kilowatt per square meter. Unlike the Earth, where it takes weeks for the surface to warm up in the sun, it takes only a few seconds for the comet's surface to start evaporating when it rotates into the light (and only a few seconds to cool off again at "night"). But the comet's nucleus isn't a simple sphere, it's an irregular mass of ices, dust and rock – and not just water ice, the frozen gases include ammonia, carbon monoxide and carbon dioxide, carbonyl sulfide and carbon disulfide, hydrogen cyanide and cyanogen, sulfur dioxide and hydrogen sulfide, and many others.

Observations over the past year have clearly shown that these materials are not uniformly distributed, and research has shown that the dust, water, and carbon disulfide (among others) come off the surface at different rates, suggesting that the comet may be segregated into clumps of different materials. Could this be the result of several generations of accretion during its formation? We'll have to wait until we can visit it to know for sure. But the result of this segregation is that some parts of the surface are more active than others; and the "hot spots" are the sites where the multiple jets that have been seen in recent months arise.

What appears to be happening is that over the past several weeks, one of these hot spots has come to dominate the dust emission from the comet. And, like water zooming out from a spinning lawn sprinkler, this one jet has given rise to a series of concentric, expanding shells around the nucleus.

There are two sites on the World-Wide Web where you can see this. Terry Platt of Starlight Xpress (a color CCD camera manufacturer) took a series of 12 color images between 1900 UT on March 28 and 0415 UT on the 29th, using a 12.5" tri-schiefspiegler at f/20. Point your browser at <http://www.demon.co.uk/astronomer/> to see an MPEG movie made from these images. Also, you can go to <http://voltaire.csun.edu/comet.html> to see a similar movie made by Brad Wallis. Terry Platt describes his images like this:

"The process seen is the formation of an intense 'C' shaped arc of dust which rotates and expands over about 5 hours on the sunlit

side of the nucleus. As the jet moves into darkness, its activity rapidly subsides and so very little is seen on the 'dark' side. The 'C' arc continues to expand and becomes a new 'hood' after about 10 hours, after which the process repeats as the jet comes back into sunlight. Most of the activity is on the 'afternoon side' of the nucleus and this leads to the asymmetric appearance of the coma."

Peter Alway measured the separation between the shells to be ca. 1.1 mm on the negatives taken with the 24" scope; this corresponds to a separation of about 7300 miles, and given HB's observed rotation period of 11.47 hours, they are found to be expanding at about 650 MPH. Interestingly, this is fairly close to the average speed of a gas molecule at a temperature of 200K, and a very reasonable number if the dust is being driven by evaporating gas from the comets surface. I haven't tried to calculate the effective pressure at the surface; if you care to try, you can assume the comet is 25 miles across, and it's observed to be evaporating at a rate of ca. 100 tons of gas per second...

Incidentally, researchers have now seen spectral signatures of silicate minerals and of sodium atoms (presumably boiled off from the dust grains by sunlight) in Hale-Bopp, along with dozens of small molecules and ions – many never seen before in comets.

From the Observatory

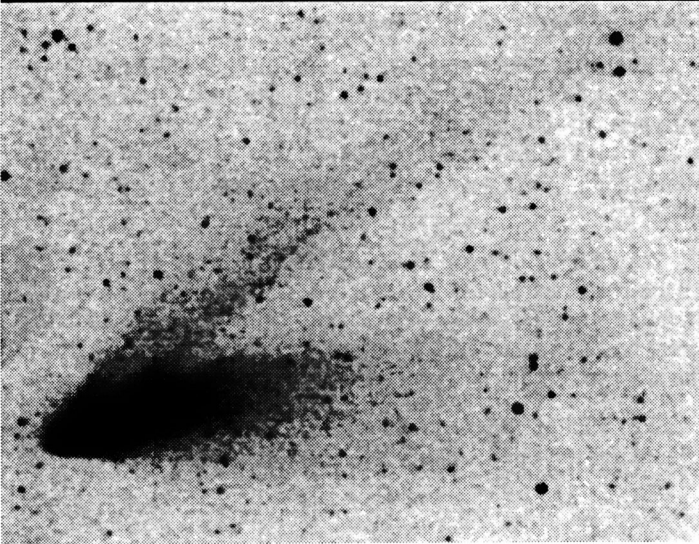
Bernard Friberg

Hale-Bopp has been the star attraction at the observatory in recent weeks, and continues to be so. The activity around the 24 inch is considerable, with cameras mounted here, cameras mounted there, cameras at prime focus, cameras on tripods – lots of pictures of Hale-Bopp are being taken.

Chris Sarnecki is frequently seen working on another drawing, and Mark Deprest also spends his spare time on drawing the comet. This is the time to observe and take lots of pictures, it's at its best right now (the first week in April). Its expected to very good up to April 12, the date of the second open house in April, and then the Moon will reduce the contrast. The comet is expected to be observable into early May. The comet's closest approach to the Earth was on March 22 and the closest approach to the Sun in the latter part of the evening on March 31. Doug Nelle holds the record for the first to spot the comet after sunset without the aid of binoculars.

I have heard many different estimates of tail length by the club members – 5°, 7°, 10°, and one third-hand report of more than 20° at a very dark site. The above translates into a tail length from 5 million miles to maybe 40 to 50 million miles or more. [With binoculars at Peach Mountain on March 25, I could follow the ion tail for about 15° and the dust tail for about 8° - Ed.] I made a quick calculation of the comet's orbital speed at aphelion and came up with a speed in the neighborhood of 300 mph more or less. This may be way off, the number needs to be checked using other methods. [Sorry Bernard, but at aphelion it's moving at only slightly less than solar escape velocity, something around 20 miles per second! - Ed.]

The internet link to additional home pages is now in place. Many thanks to Dave Snyder for his efforts on these pages, and for providing disk space to store the text and pictures. The Lowbrow address is: <http://www.astro.lsa.umich.edu/lowbrows.html>, and click on 'to additional pages' for the new link. The original Lowbrow homepage has been operational for several months.



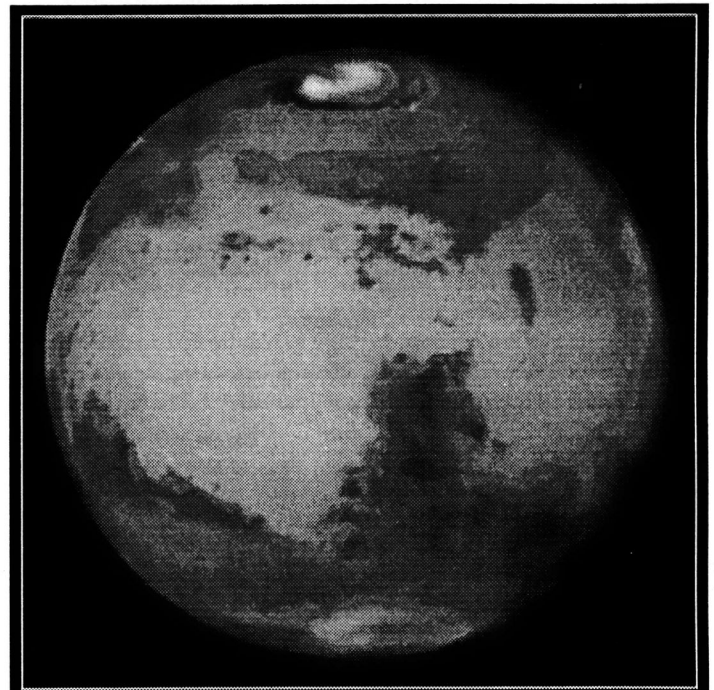
For your viewing pleasure, we present a selection of images to tickle your retinas and whet your astronomical appetites. While Kinko's does a generally excellent job on our newsletter, pictures like this always do manage to lose something in the reproduction. The cure, of course, is to get out and look for yourself! There's almost always something interesting, unusual, and just plain pretty up in the sky - heck, even clouds can be fun to watch!

Left, top: Another view of the head of Hale-Bopp, taken by Peter Alway through the McMath 24" telescope at Peach Mountain. Although only four or five rings are visible by eye to most observers, Peter has managed to capture as many as nine rings in his photographs.

Left, center: The Moon at the height of the lunar eclipse on March 23, 1997. This photo was taken by Bernard Friberg at prime focus through the 6" refractor at Peach Mountain. The faint haze around the bright limb is probably due to chromatic aberration; it appears purple in the original color image.

Left, bottom: Another view of Hale-Bopp, this one by Kurt Hillig. A five-minute tracked but unguided exposure on ASA 1000 film with a 400mm f/5.6 telephoto, this has been digitally enhanced to show the faint blue ion tail. (As this caption is being typed, Kathy Hillig is braving the elements to try for still longer exposures, to really pin this tail on the comet! Results should be visible at the next meeting.)

Below: Mars, as seen by the Hubble Space Telescope. It appears that the recent mission to replace some of its instruments hasn't hurt the optics any. With Mars just past opposition, the next month or two are the best chance you'll have to take a close look until 1998.



Mars • Syrtis Major • March 10, 1997
Hubble Space Telescope • WFPC2

PRC97-08 • BT 50 (PFO) • March 20, 1997 • E. Crisp (LPL), the WFPC2 Science Team and NASA

The Kensington Comet Party is Coming, April 25 and 26 to Kensington MetroPark The public is invited to attend!

The viewing place selected will be at Kensington Metro Park at the Martindale Beach location. We have permission from the metro park authority at Kensington to host this event on the nights of April 25 and 26 1997 from 5:00pm to 12:00am. This event will be in conjunction with the Kensington Spring Festival occurring that same weekend. The Kensington authority are very excited about our event and would like to have us as their evening event for their Spring Festival. The Detroit Astronomy Club, the Lowbrows and EMU will be joining the Warren Astronomical Society in hosting this event.

Site location: Kensington Metro Park; Martindale Beach, public viewing time is 5:00 pm to 12:00 am. Viewing time for Astronomy club members is 5:00pm to 2:00am.

Viewing area: Martindale Beach provides clear horizons down to between 5 and 10 degrees from the horizon facing West, North, and South. In those directions you are looking across the lake. The East is very good except there are a few scattered trees. This site contains plenty of wide sidewalks and grassy areas to set up telescopes and binoculars.

Power: This site has A.C. power and additional power will be brought in if necessary. Bring your own extension cords!

Facilities: There are facilities for restrooms as well as a medium size outdoor shelter at the site. This site can handle up to a couple thousand people.

Lighting: We have control over the lighting at this site. There will be portable lighting in the parking lots which can be both aimed and controlled. We also can control the lighting at the outdoor shelter and restrooms.

Transportation: The Metro Parks people will provide a vehicle to transport your telescopes from your car in the parking lot to the site should you need help. (about 200 feet)

Food & Drinks: Elias Brothers will be selling food and drinks for the public.

Parking: There is sufficient parking to handle up to a couple thousand people. Astronomy Club members bringing equipment will be allowed to park near their observing site.

Shelter: Although the shelter is not very big, It will provide cover if it rains and also provide a dark area to have slide shows.

Metro Parks will advertise including the papers and cable TV. They are expecting between 2000 and 3000 people.

Directions

From Ann Arbor, take US-23 north to I-96 east (from the Detroit area, take I-96 west). Get off at the Kent Lake Rd. exit and follow the signs to the MetroPark, which is just north of I-96. Martindale Beach is about 1/2 mile beyond the park entrance, on the left. **Club members who are bringing telescopes should pick up their park passes at the meeting on April 18, or call Doug Scobel to arrange to pick them up.**

Astro-Ads SEDS/University of Arizona

The Astro-Ads Electronic Mailing List and WWW Service is provided through the generosity of SEDS (Students for the Exploration and Development of Space) and the University of Arizona. Astro-Ads is a free service for use by the world-wide community of amateur astronomy enthusiasts. There are no costs of any type for non-commercial use of this system. **This system is not for the placing of commercial advertisements.**

The Astro-Ads service is comprised of a majordomo mailing list and the program Hypermail. The mailing list can be subscribed to by anyone, it is an open list. But, one need not subscribe to the mailing list to post an advertisement or to see other ads. Here's the scoop on how it works:

To subscribe to the mailing list: Send an e-mail message to *astro-ads-request@seds.org* and place the word *subscribe* in the body of the message. You will then begin receiving Astro-Ads postings in your personal mailbox.

To remove yourself from the list: Send an e-mail message to *astro-ads-request@seds.org* and place the word *unsubscribe* in the body of the message.

To place an ad: You need not be subscribed to the mailing list. Send an e-mail message to *astro-ads@seds.org* and put in the subject line one of the abbreviations:

[FS] for "for sale" items

[WTB] for "want to buy" items

[TRADE] for "want to trade" items

then, still in the subject line, put a brief description of the item.

For example:

[FS] Tele Vue 35mm Panoptic

[WTB] 10" or 12" Newtonian

[TRADE] Lamborgini for 12" Clark Refractor

Finish by describing the item in the body of the message, going into as much detail as necessary. If you're selling, it helps to give your asking price – if you're willing to dicker, you can add "OBO" for "or best offer". If you're looking to buy but on a limited budget, state the price you're willing to pay.

When you send the message, everyone subscribed to Astro-Ads will receive it in their mailbox. Also, your ad will be processed by Hypermail and placed in an archive for four weeks, where people on the World Wide Web will be able to view it. To look at the last month of ads, point your browser at <<http://www.seds.org/Astro-Ads>>.

Why did we develop Astro-Ads with SEDS? To assure that private-party astronomy classified ads on the internet have a permanent, FREE home. The reason for siting this service at SEDS was to find a location that would incur no costs for any individuals. The labor to run this service is donated anonymously.

We acknowledge and thank SEDS and the University of Arizona for their participation and support of this project.

Reflections on *Reflections*

Kurt Hillig

As the end of my second stint as editor of *Reflections* draws to a close (and, while I deeply appreciate all the nice things you've said about my work, I must step down once again) I'm afraid I must give in to the urge to wax philosophical just once more.

There are many facets to joy that can be found in the art and science of Astronomy. For some, it's the power of supernovae and quasars; for some it's the tranquility of silent nights alone under the stars; for some it's the subtle beauty of nebulae; for some it's the challenge of recording on film, or paper, or disk, what the eye can barely, rarely, make out; for some it's the mathematical elegance of general relativity; for some it's the mystery of the missing mass; for some it's the wonder in a child's face when she first sees Saturn through a telescope; for some it's the satisfaction of making by hand something whose precision is measured in millionths of an inch; for some it's the conviction that we are not alone in the universe.

I expect that all of us appreciate all of these facets to some extent. As a scientist and engineer by training, I'm fascinated by all of the technical side of astronomy – the glass and aluminum that gather the data, the silicon that turns it into useful information, and the physics that is so different from ordinary experience. As a human by birth, I'm awed by the size and scale of what's around us, and drawn by an undefinable beauty in the images we obtain. And as an academician, I feel it a duty, and a satisfying one, to help others understand better the universe in which they live.

How does one edit a newsletter like *Reflections*? I can tell you how I do it: I try to find a little bit of everything – pictures and poetry, science and science fiction, humor and dry dull fact – and I try to stuff it all into five and a half pages; and I gripe because there's too much good stuff, and I gripe because nobody writes articles for it, and I try to scoop *Sky and Telescope* when I can, and I worry about making the deadline, and who's talking at the next meeting anyway? But mostly, I try to put together a newsletter that I'd like to read myself (and I do, when my own copy comes in the mail – when I'm putting it together I'm too deep in the process to read what's in front of me). And, once in a while, I even manage to put in some news.

But I'm just another guy, too, and just as subject to "the thousand natural shocks that flesh is heir to" as the next. And, sadly, those shocks are what are forcing me to give up something I've come to love despite the pain it gives me. In other words, my hands hurt too much, and I've got to get away from the keyboard for a while.

Is it overweening pride to think that I've done a good job? Perhaps – certainly there are things I could have done better, and (I keep telling myself) should have done better. But much of what I take pride in is really just a matter of style, of form rather than function; and when you get down to it, it's the content that's important, the message and not the medium.

What am I trying to say? I don't really know, to tell the truth. In part, to whomever the next editor will be: Don't worry about style or form or format. You're a Lowbrow, you've got a little bit of everything in you – create something that *you* know is good, and you may well be surprised to discover that it *is* good.

And I guess that's not bad advice to the rest of us, either.

ATM News

The ATM group met at Kurt Hillig's house on March 23. Attendance was light, but the hard-core corps of telescope makers proved their mettle by defining a number of projects to be undertaken. Not all of these are telescope-making in the strictest sense, but these will serve to teach some of us the basics of the mechanical side of telescope making and other structural engineering projects. Assuming we remain undaunted by the crude, physical nature of these more mundane tasks, we will then proceed to the real fun – glass-pushing, and all that that entails! But before we get down to the nitty-gritty, we did have some fun.

Several interesting bits of hardware made it to the meeting, and we spent a good half hour or so studying the domestic life of the red-tailed hawk – and at the same time, comparing the optical qualities of a 4" Russian Maksutov and a 1950's vintage 60mm spotting scope. The Mak was determined to be better baffled, but a comparison of optical quality was rendered impossible due to the less-than-perfect window through which we were spying on the nest. (A later comparison of the Mak against a Meade 2045 – a 4" SCT – showed a bit of an edge in favor of the American optics.)

Mark Vincent also brought a lovely all-walnut sector-drive camera mount he'd made, and we spent some time discussing the relative merits of sector vs. barn-door (and double-arm barn door) mounts. The sector certainly wins the prize for best long-term tracking, but doing it right does require just a tad more expertise (and investment in) the proper tooling.

We spent some time in the basement shop talking about specific details of various scopes, for example: a focuser should be mounted such that the focal plane is 1/2" outside the end of the draw tube in its innermost position; Sonotube interiors can be blackened effectively by peeling off the inner waxed layer and painting the inside with ebony stain; Edmund's black flocked paper can't be beat.

Anyway, here are the projects and goals we have set:

1) Making a Dobsonian mount for the 8" Cave scope. It was generally agreed that the equatorial mount on the Cave is too wobbly for a scope of this size. A Dobsonian mount which takes advantage of the rotating rings would make the scope far more usable at star parties.

2) Turning the Cave equatorial mount into a multi-camera platform. This would have been especially useful in the past few weeks, but we just couldn't get to it in time....

3) Rebuilding the club's 8" Cassegrain. Rather than reuse the original tube (sorry, Mark – nice Bondo job, but...) we will buy a new tube for this. Just what it will be mounted on hasn't yet been decided, but give us a chance, we'll come up with something!

4) Build a platform over the 24" scope's pier to allow visitors a more stable access to viewing objects in the northern sky.

5) Install some leveled 2' square concrete pads for setting up Dobs on the hill in front of the observatory.

6) Clear the brush and hawthorn trees from around the steel piers that are set along the lane to the observatory. This would provide several more places where scopes can be rigidly mounted, especially useful when we have crowded star parties.

Project 1 will be started at the April 20 meeting: Designing the Dob Mount (construction is scheduled for May). We'll meet at Doug Nelle's house – unless his impending second parenthood strikes! Call 996-8784 before you come. See you there!

Neptune May be Bubbling up Ethane, Not Making Diamonds

Lori Stiles <lstyles@u.arizona.edu >
University of Arizona News Services

Neptune may be bubbling ethane gas into its atmosphere rather than producing layers of diamonds at its core, a group of Italian physicists now suggest.

But we won't really know what's going on until we send a probe to the giant blue planet, possibly in the first decade of the coming millennium, according to planetary sciences Professor William B. Hubbard of The University of Arizona in Tucson. Hubbard, who chairs one of the "campaign strategy working groups" that advise NASA on the formation of the space agency's future science mission strategy, wrote a perspective on "Neptune's Deep Chemistry," published Feb. 4 in *Science*.

Hubbard's group is named the "Astrophysical Analogues in the Solar System" group – a name which reflects the fact that what scientists can learn about our own giant planets will help them better understand giant planets being found in other solar systems.

One of the big questions in planetary science about Neptune is, what happens to all the methane in the planet's atmosphere? Neptune has much more methane in its atmosphere than do the two, much larger planets, Jupiter and Saturn. Methane is what gives Neptune its striking blue color.

Below Neptune's atmosphere is a vast, dense-liquid ocean of water, ammonia and methane – a region called "ices" ironically, because the ocean is at least half the temperature of the Sun. Primordial heat left over from planetary formation is why a planet about 2.8 billion miles from the sun has an ocean that is so hot.

Until Italian physicists published results of their computer simulations (*Science*, Feb. 4), a leading theory had been that when methane reaches this "ices" region, high temperatures and pressures produce a chemical reaction that releases hydrogen to the atmosphere and crystals of pure carbon – diamonds – that sink as sediment toward the center of the planet.

The Italians' results suggest what more plausibly happens is that methane is converted into the colorless, odorless, flammable hydrocarbon gas called ethane, which bubbles up from the ocean and into Neptune's atmosphere. Observers do see ethane in Neptune's atmosphere. It previously was interpreted as a result of the action of ultraviolet sunlight on the planet's atmospheric methane.

Neptune still may be forming diamonds according to the scenario earlier described, Hubbard said. But if it's happening, it's happening at much deeper layers within the planet.

Can De Beers rest easy? Only a probe will tell.

Comet Güdt-Swift-Kiq C/1997 G3.14

Douglas Warshaw and Mark Vincent

On April 1 of this year, another visitor from the Oort cloud was discovered heading towards the inner Solar system. Doug Swift of Seattle, WA and Mark Kiq of Buffalo, NY sent in their estimated coordinates of the new comet to the Harvard-Smithsonian Center for Astrophysics (CFA). Confirmation was made on the following day. Thomas Güdt is also credited with discovery status after re-examining his pre-discovery deep sky photographs which he took over several nights in March while in Times Square in downtown Manhattan.

Dr. Brian Marsden of CFA has attempted to plot the orbit of the comet, but is quite puzzled at its path. It seems that gravitational influence is not solely responsible for the odd twists and turns that GSK is taking. The best explanation to date is that the comet encountered (i. e. collided with) the lost Mars Observer spacecraft and perhaps several of the failed Russian Mars probes. "This is the damndest thing I ever saw," said Marsden. The ephemeris is given below:

Date	R.A.	Dec.
4-10-97	8h 50m	19.5
4-20-97	9h 27m	9.0
5-1-97	9h 50m	1.0
5-10-97	9h 8m	-5.5
5-20-97	9h 1m	-3.5
6-1-97	8h 39m	-7.5
6-10-97	8h 29m	-11.0
6-20-27	8h 13m	-13.2
7-1-97	7h 18m	-16.4
7-10-97	7h 12m	-5.5
7-20-97	7h 14m	-9.0
8-1-97	7h 38m	-6.2
8-10-97	7h 53m	-0.8
8-20-97	8h 2m	7.7
8-23-97	7h 52m	16.5

The reason for the irregular ending date of the ephemeris is the strong possibility that the comet will strike the Earth then. The projected impact zone seems to be Elephant Butte Reservation in New Mexico. "If this turns out to be correct," said Marsden, "The American southwest is going to get a Güdt-Swift-Kiq in the butte near the end of August."

He further commented that this would be an excellent opportunity to get close up, detailed photographs of a comet, even with Brownie cameras. Said renowned comet hunters Gene and Carolyn Shoemaker, "We are delighted at the profound impact this event will have on society."

E-mail Update

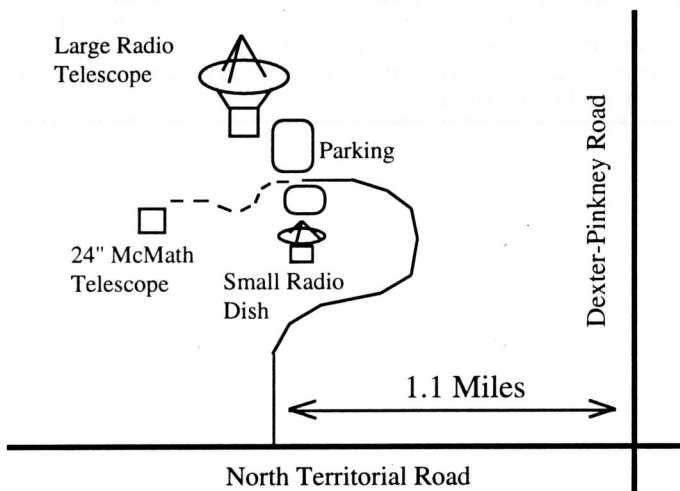
For those who don't already know, there is now a Lowbrows "X.500" mail group at UM; messages sent to "lowbrows@umich.edu" will be redistributed to every member whose address is registered. As more members hop onto the internet, e-mail is turning into a great way to keep in touch. For example, the observatory has been opened several times in the past few weeks for comet viewing; one message from Bernard in the afternoon, and more than half of the club members can read it a few minutes later.

Join the 21st century! If you've got an e-mail address and we don't know about it, please send a message to the Lowbrows' number one membership weenie Doug Scobel <djscobel@ann-arbor.applicon.com>, our soon-to-be-ex-editor Kurt Hillig <khillig@umich.edu>, or master of e-mail Tom Stoner <tgstoner@umich.edu> so we can add you to the list. And if you don't have an e-mail address, well, you'd just better run right out and get one, hadn't you?

Places:

Dennison Hall, also known as the University of Michigan's Physics and Astronomy building, is located on Church Street in Ann Arbor, one block north of South University Ave. The University parking structure on Church Street is very close by, and is open to the public after 6 PM.

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-Pinkney 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. Peach Mountain is home to millions of mosquitos in the summer, so bring insect repellent!



Times:

The monthly meetings of the Lowbrows are held on the third 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.

An amateur telescope making group meets monthly, with the location rotating among members' houses. See the calendar on the front cover for more information on the time and location of the next meeting.

Public Open House/Star Parties are held on the Saturdays before and after each new Moon, at the Peach Mountain Observatory. Star Parties may be cancelled if the sky is cloudy at sunset or the temperature is below 10°F – call 480-4514 to check on the status. Many members bring their telescopes; visitors are welcome to do likewise. Peach Mountain can get cold at night, so dress appropriately!

Membership:

Membership dues in the Lowbrow Astronomers are \$20 per year for individuals or families, and \$12 per year for students. This entitles you to monthly issues of *Reflections* and the use of the 24" McMath telescope (after training). Dues can be paid to the club treasurer, Doug Scobel, at any meeting or by mail at this address:

1426 Wedgewood Dr.
Saline, MI 48176

Magazines:

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

Sky and Telescope: \$27 / year
CCD Astronomy: \$20 / year
Astronomy: \$20 / year
Odyssey: \$16.95 / year

For more information, contact the treasurer.

Newsletter Contributions:

Members (and non-members) are encouraged to write about any astronomy-related topic in which they are interested. Images, whether photographs, sketches, or in electronic form (GIF, TIFF or JPEG) are also welcome. Call the editor (Kurt Hillig) at 313/663-8699(h) or 313/647-2867(o), or send e-mail to khillig@umich.edu, to discuss length, format, etc. Announcements and articles are due 14 days before each monthly meeting. Contributions can be mailed to:

Kurt Hillig
7654 W. Ellsworth Rd.
Ann Arbor, MI 48103

Telephone Numbers:

President:	D. C. Moons	810/254-9439
Vice Pres:	Mark Cray	313/283-6311
	Tom Pettit	313/878-0438
	Fred Schebor	313/426-2363
	Mark Vincent	313/663-7813
Treasurer:	Doug Scobel	313/429-4954
Observatory		
Director:	Bernard Friberg	313/761-1875
Newsletter:	Kurt Hillig	313/663-8699
Publisher:	Lorna Simmons	313/525-5731

Peach Mountain Keyholder:

Fred Schebor 313/426-2363

Visit our Home Page:

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

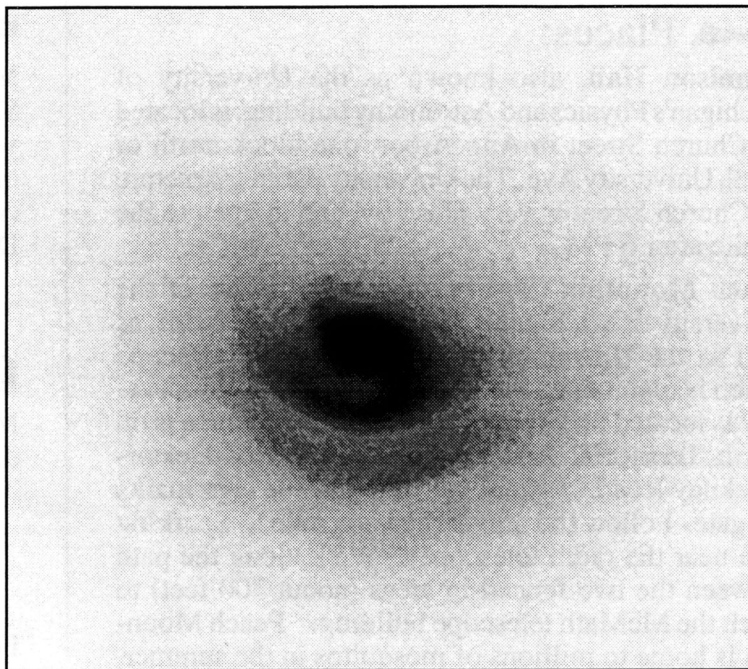
Monthly Meeting:

Mark Vincent:
Hale-Bopping
from Kitt Peak
&
Elections

Come prepared to vote!

Apr. 18, 1997 at 7:30 PM

Room 807 of the Dennison
Building on the UM Campus



The head of comet Hale-Bopp, photographed at prime focus with the 24" McMath telescope at Peach Mountain on March 26, 1997. The concentric shell structure is a spiral of ejecta from a "hot spot" on the comet as it spins with a 11.5 hour period. CCD-image movies demonstrating this can be found at <http://www.demon.co.uk/astronomer/> and <http://voltaire.csun.edu/comet.html>. Image and processing by Kurt Hillig.

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