



REFLECTIONS AND

REFRACTIONS

OF THE UNIVERSITY LOWBROW ASTRONOMERS

June 2005

Upcoming Events June 2005

- **Saturday, June 11, 2005.**
Open House at Peach Mountain. May be cancelled if it's cloudy or too cold.
- **Friday, June 17, 2005.**
Monthly Club Meeting 7:30 PM. Bob Gruszczynski. "A New Star Party with a New Scope"
- **Saturday, July 2, 2005.**
Open House at Peach Mountain. May be cancelled if it's cloudy or too cold.
- **Saturday, July 9, 2005.**
Open House at Peach Mountain. May be cancelled if it's cloudy or too cold.
- **Friday, July 15, 2005.**
Monthly Club Meeting 7:30 PM. Special Guest Speaker John Kirchoff of Rider's Hobby Shop in Livonia.
- **Saturday, August 6, 2005.**
Open House at Peach Mountain. May be cancelled if it's cloudy or too cold. (Starting at Sunset).
- **Friday, July 15, 2005.**
Monthly Club Meeting 7:30 PM. Nathan Murphy. "A Survey of Telescope Designs, or How to Tell a Nagler-Petzval from a Dall-Kirkham".

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Observe the Outer Planets!

by Doug Scobel

Now that summer is here, planetary observing is on the downswing. Saturn is now lost in the sun's glare, and Jupiter, long past opposition, is quickly heading for the same fate. Mars won't be well placed for evening observing until fall. Yes, Venus is in the evening sky now, but it sets early. So what's a planetary observer to do? Why, observe the outer planets, of course! Frequently neglected, Uranus, Neptune, and Pluto are well placed in the night sky this summer, and can provide a nice diversion from deep sky observing.

Now you're probably thinking to yourself, "Been there, done that. They're small, featureless, and unimpressive. And Pluto – forget it!" But the outer planets reveal their own brand of uniquely challenging yet rewarding visual delights to those who make the effort to seek them out.

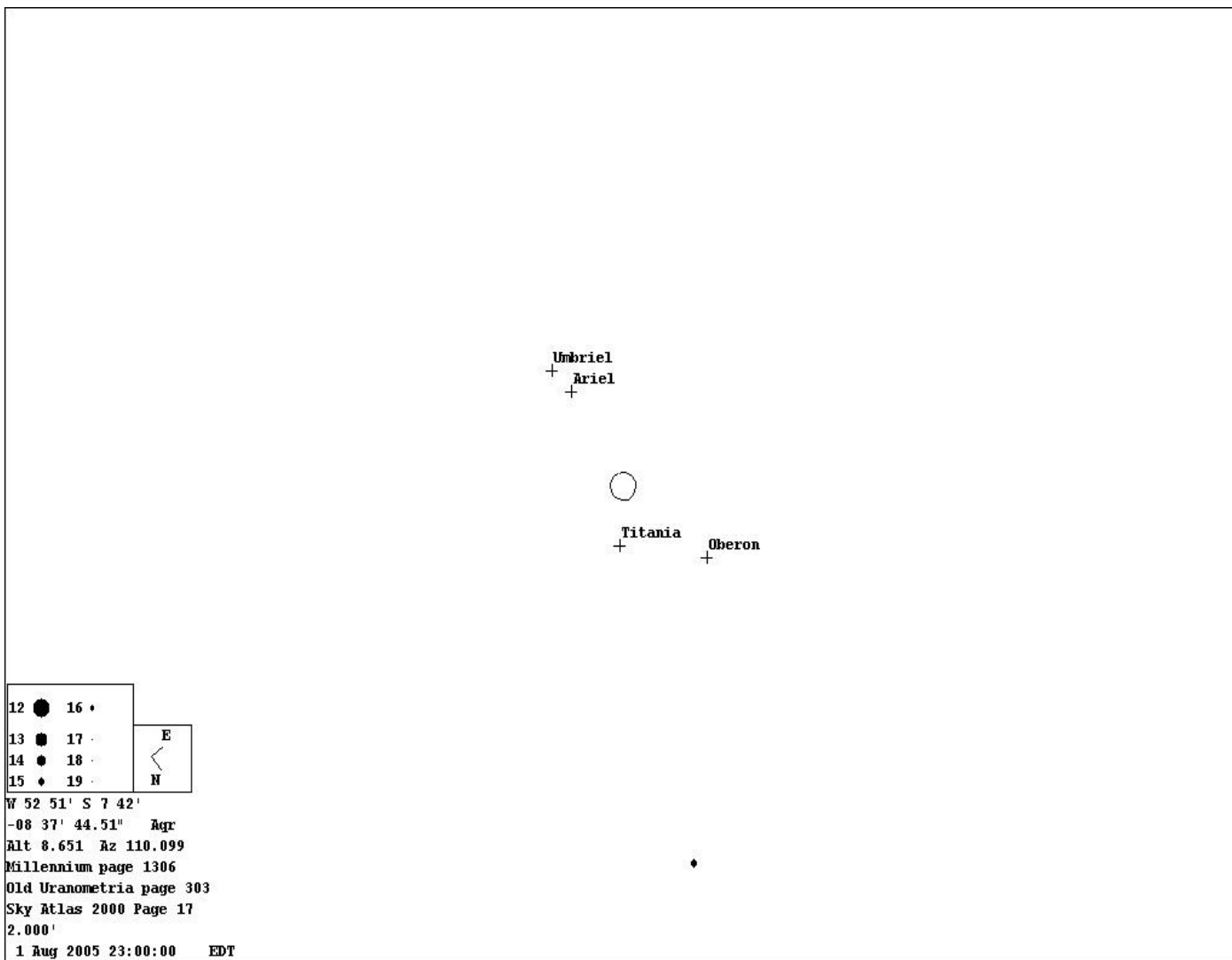
Uranus is the next most distant planet after Saturn. Like its big brothers Jupiter and Saturn, it also is a so-called gas giant, with an equatorial diameter just under half that of Saturn. But because it lies about twice as far away as the ringed world, it presents a disk not even four seconds of arc across at its best. Despite its small angular size and great distance, it still gets up to naked eye (under dark skies) brightness; about magnitude 5.7 around opposition.

Virtually any good backyard telescope under reasonably steady skies will let you discern its small greenish-blue disk, revealing it as a planet, not a star. But don't expect to see any detail, although some claim to see some minor albedo variations in very large telescopes under ideal viewing conditions. What is of greater interest to the visual observer is its moons. Uranus has five medium-sized moons and more than 20 smaller ones. Its two brightest moons, Oberon and Titania, at magnitudes 14.2 and 14.0, respectively, are within the grasp of many amateur-sized telescopes. Two more of its large moons, Ariel and Umbriel, at magnitudes 14.4 and 15.1, respectively, are a little more difficult to spot, partly because they are fainter, and partly because they orbit closer to Uranus than Oberon and Titania. Miranda is a distant fifth brightness-wise, at visual magnitude 16.6, so you will need a *lot* of aperture to glimpse it. The rest of the moons are extremely small and faint, and virtually unreachable visually.

To identify them, you'll need a diagram showing their positions for the date and time at which you will be making your observation. I've not found any web links to let you do this, so you may have to resort to a good sky charting computer program such as *Guide* (see accompanying chart below). You can use *Guide* to generate a time-specific chart showing the positions and magnitudes of the moons to help you positively identify them in the eyepiece. I was able to spot both Oberon and Titania at the 2004 Black Forest Star Party in my 13" reflector using charts made in *Guide 8.0* by Doug Nelle. Some of us spotted them at Lake Hudson a few weeks ago as well. How many can *you* see?

Uranus spends all of 2005 in Aquarius (the Water Bearer). There is a good finder chart for it on page 72 of the June 2005 issue of *Sky & Telescope* magazine. Or you can use the following web link: <http://www.rasnz.org.nz/SolarSys/UranNept.htm>

The following chart of Uranus and its four brightest moons was created in *Guide 8.0*, for August 1, 2005 at 11:00 PM, EDT. Note that the chart is inverted with south near the top, as it would appear in an inverting telescope. Also note that the field shown is only two arc minutes across, so you can see that you'll need plenty of magnification to pick up the moons. Of course, this chart is accurate for that date and time only. As time goes on, the moons travel in their orbits and will appear at different locations relative to the planet. (The dot near the bottom of the chart is a 15th magnitude star.)

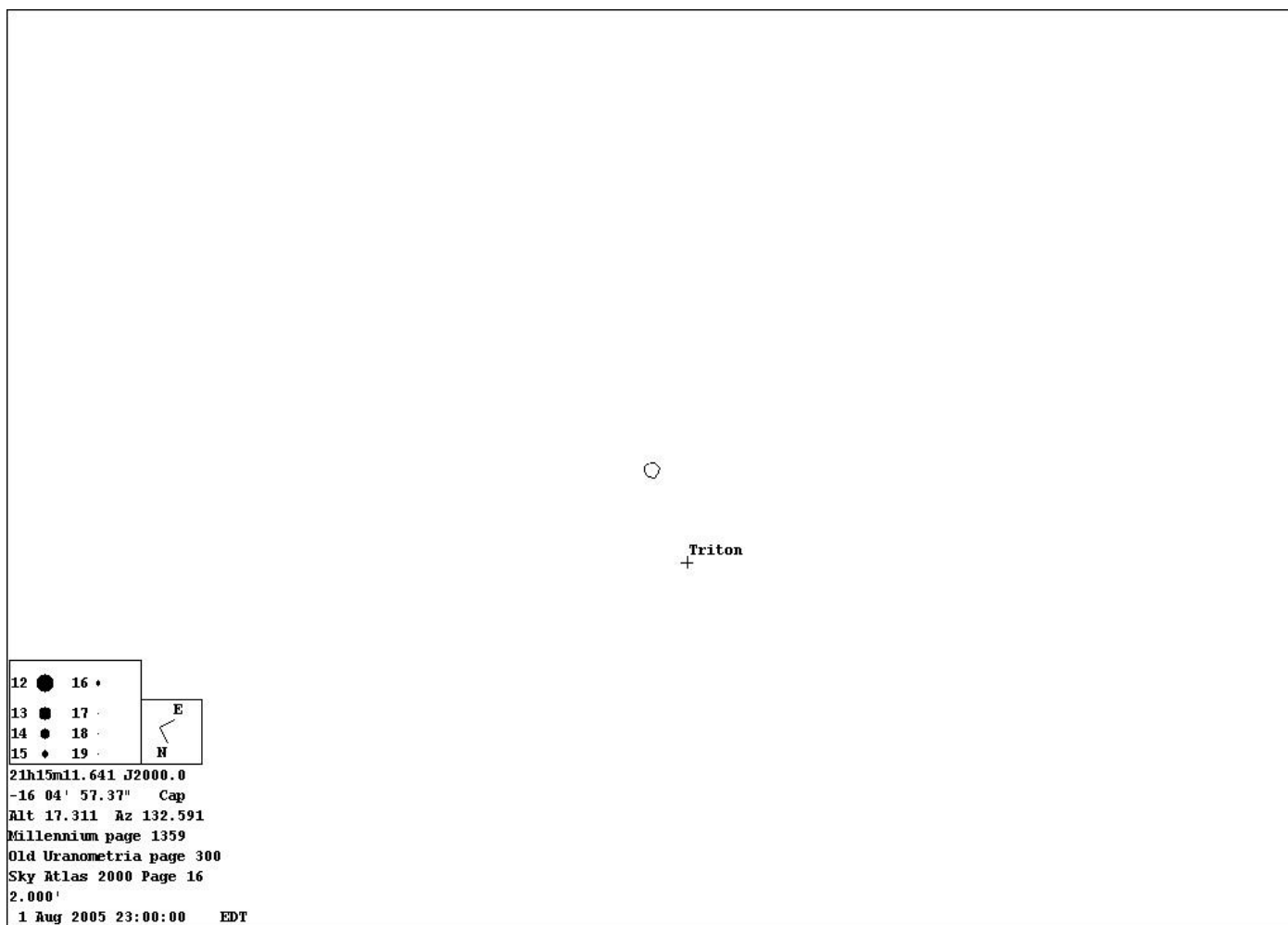


Neptune, the next stop on our outer planetary tour, is also a gas giant. It has an equatorial diameter that is slightly less than that of Uranus, but it lies half again farther away. As a result, its angular size measures barely more than 2 arc seconds across. Its greater distance also makes it appear less bright, about magnitude 7.8 around opposition, making it strictly a binocular or telescopic object.

You'll need good optics, steady skies, and plenty of magnification to discern its tiny blue-gray disk. You can also forget about seeing any planetary detail - at less than 2.5 arc seconds across, you'll do well just to tell it apart from a star. Fortunately, Neptune's largest and brightest moon, Triton, is visible in moderate-sized amateur instruments, as it shines at magnitude 13.5. I also observed Triton at last year's Black Forest Star Party.

Neptune spends all this year in Capricornus (the Sea Goat). You can use the same resources and methods described above for Uranus to locate and observe Neptune and its moon Triton.

The following chart of Neptune and its brightest moon Triton was created in *Guide 8.0*, also for August 1. Again, south is near the top.

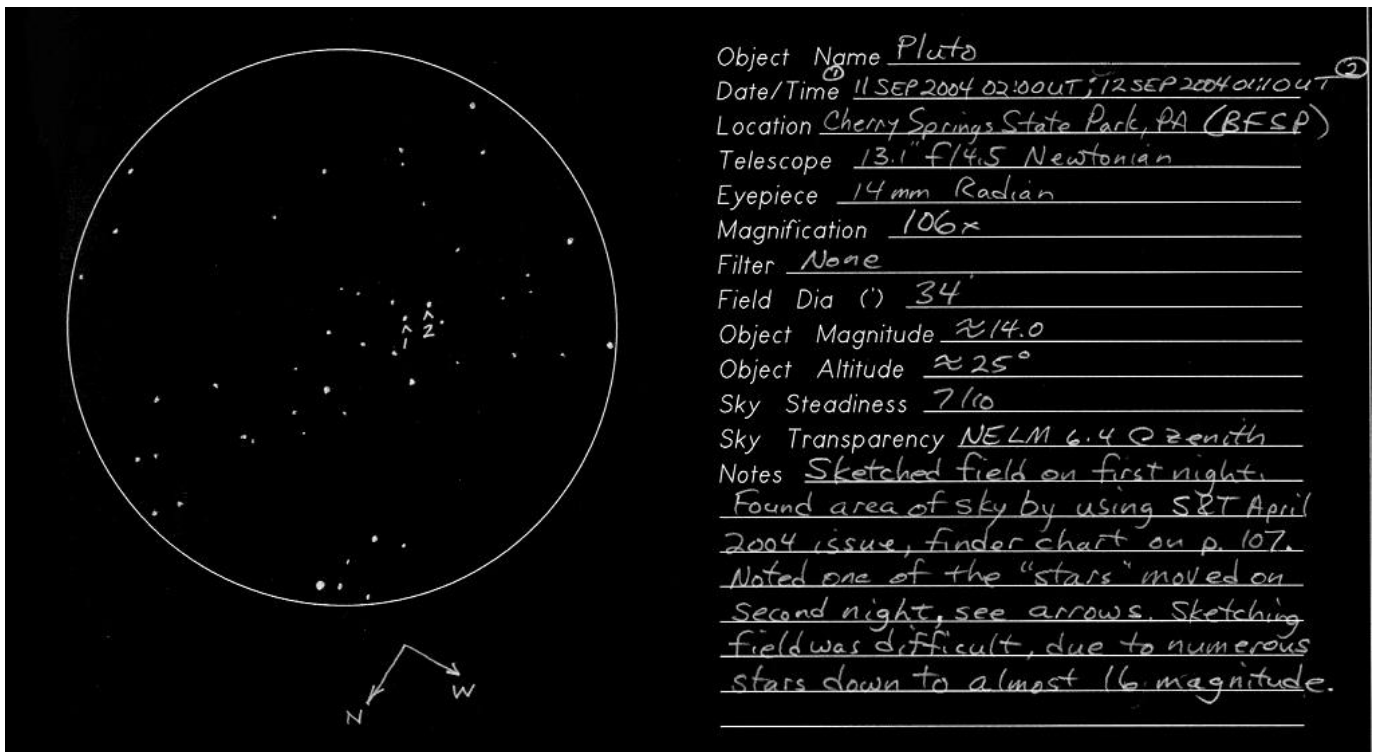


Pluto, our final destination, is by far the most challenging target of our trio. Its distance and extremely small size (it's smaller than the Earth's moon) combine to give it a very small apparent diameter, only a fraction of an arc second across. It has a highly elliptical orbit that takes it inside that of Neptune for twenty of the nearly 250 years it takes Pluto to make one trip around the sun. This was the case as recently as 1999, but it has now moved just outside Neptune's orbit and will stay outside until well into the 23rd century. Even at that "close" distance, though, it still shines only at around magnitude 13.8, if you call that shining. It's even outshone by Neptune's moon Triton!

You can forget about seeing its disk, or its moon Charon. In fact, simply finding it is quite a challenge. In my experience, you don't really observe it - you can't casually put it in the eyepiece and say "There it is!" It takes a little more work than that.

First, you need enough aperture and fairly dark skies. Some say Pluto can be spotted with eight inches of aperture, but I recommend at least ten. Also, you'll need a highly detailed finder chart. As is the case for Uranus and Neptune, the June 2005 issue of *Sky & Telescope* magazine has a good one. You could also use a good, accurate sky charting computer program, or use the following link: <http://www.rasnz.org.nz/>

Now that you know where to find it, you'll have to match up the field in your telescope with the finder chart. But which one is Pluto? There are likely to be so many faint stars in the field that it could make identifying the diminutive planet nearly impossible. I faced the same predicament at the 2004 Black Forest Star Party. There were so many faint stars in the eyepiece, many more than the number that were shown on the finder chart. There was no way to pick out one and say "That's Pluto!" What I did was to sketch the field on two successive nights. Sure enough, on the second night I noticed that one of them moved, and in the predicted direction, so my identification was complete. You may need to do the same thing.



Below is the sketch and observation report I made at the 2004 Black Forest Star Party, on the nights of September 11 and 12. The position of Pluto on the two nights is labeled with the numerals 1 and 2.

Pluto spends the entire year in Serpens Cauda (the Serpent's Tail), very close to the Ophiuchus – Sagittarius border.

The following table provides some additional information on the three outer planets. Saturn is included for comparison.

	Mean Diameter (km)	Mean Distance From Sun (A.U.)	2005 Opposition Date	2005 Location at Opposition	Angular Size at Opposition (arc seconds)	Brightness at Opposition (Magnitude)
Saturn	116,464	9.54	January 13	Gemini	20.5	0.4
Uranus	50,724	19.2	August 31	Aquarius	3.5	5.7
Neptune	49,248	30.1	August 7	Capricornus	2.3	7.8
Pluto	2274	39.5	June 14	Serpens	0.1	13.8

The outer planets, like so many things in life, will give you back only what you put into them. But it only

A Serendipity Photo

By Bill Stegath



During a recent trip to Florida to watch the Dexter High School Marching Band perform at Disney World during Spring Break the first week of April (in which my granddaughter is a trombonist), we extended our stay to include a week at Holmes Beach on Anna Maria Island off the coast of Bradenton, where one can view the spectacular Gulf of Mexico sunsets. As a long-time amateur photographer of the sky and water (I'm a "Yoooper" from Escanaba), I went to the beach late in the afternoon to assess the cloud formations...or if it was clear, to perhaps catch the "green flash." Some low cumulus clouds had begun to develop with variable density which obscured the sun but would make great coloring when the sun got close to the horizon. Suddenly, there was a moment when the sun became visible through a portion of the cloud with just enough haziness to act as a filter...and I was startled to see that the sun had a "bite" out of it. I had forgotten that it was April 8 and that a partial eclipse was visible that day from the mid-to-southern portion of North America, thus excluding Michigan so it wasn't on my mind....hence, the surprise. When I returned to Ann Arbor, I verified the latitude and percentage from Sky and Telescope magazine. This image appears to be very close to the maximum of 40% of the sun eclipsed judging from the magazine prediction for Miami which was about a degree and a half of latitude south of my location. (Bradenton 27.50, Miami 26 degrees)

The filtering effect was just right for a photo without eye damage through the camera viewfinder and this photo was the best of three I was able to get before the sun was again obscured. Here is the exposure data:

Nikon SLR Digital Camera (D 70)
Resolution: 2240x1488
Mode: Program (Auto-focus)
Exposure compensation -0.67

Date and Time: 4/08/05 6:30:21 EDT
Lens: 220 mm (Sigma Zoom Telephoto)
Exp: 1/8000 @ f.8

The image is stored on Google's Picasa software (excellent and free) which allows some adjustments in quality. This image has been enhanced with the "auto contrast" and "sharpen" tools to help compensate for lack of "tack sharpness" due to the camera being hand-held and hastily used to capture what I call my fleeting "serendipity" moment.

Recent Lowbrow Activities

Photos by Dave Benham

Our new Observatory Director, D.C. Moons, and our old(er) Observatory Director, Bernard Friberg, determined that the 24" telescope mirror's coating had gotten thin enough to need recoating, so they contacted H.L. Clausing Inc. in Skokie, IL. Mr. Clausing generously agreed to coat both the primary and the secondary mirrors for free, and both mirrors, which had been carefully transported in a special crate by Lowbrows Jim Wadsworth and D.C. Moons, came back with excellent aluminized coatings on their surfaces.

D.C. Moons then organized a mirror insertion work party, and the mirrors were carefully replaced in their cells in the steel telescope tube. Unfortunately, rain threatened the operation, so the alignment of the optics was postponed for a week. However, Bernard Friberg and Tom Ryan were able to go out to the hill the following Saturday, and they aligned the optics as well as they could be aligned. Mr. Ryan, after carefully examining the system's images, thinks that the primary and secondary mirrors are not operating at their correct design conjugates, since the images got better and better as the final focal plane was moved farther away from the primary. (The 24" originally had auxiliary optics attached to the back of the scope, and the original focal plane position is not known.) However, he agreed to look into this further at some future date, and in the meantime, the scope is fairly well aligned, has new coatings, a working drive, and is ready for use.



Mike Kurylo prepares to squash a bug.



Look, kid. Stop asking so many questions. I'm not telling you where I studied Engineering, and the hat was a gift.



Almost ready to go!



Darn it! Leftover parts! Does anybody know what these do?

Read This Now!

As agreed to at the April meeting, in order to save money and effort in mailing the newsletter, **the default means of receiving the newsletter will be by downloading it from the member web site.** You must know the (recently changed) userID and Password to access it. Our Webmaster, Dave Snyder, will continue to send notices when the latest newsletter is posted to the web site. Of course, this means members must inform the Webmaster whenever their e-mail addresses change or you will not get these notices.

If you wish to continue receiving a hard copy in the mail, you must notify Kathy Hillig by returning this form or e-mailing her with the same information.

I wish to continue receiving a hard copy of the Lowbrow Newsletter by mail.

My current mailing address is:

Name

Address

City, State, Zip

Send the form to: Kathy Hillig, 7654 W. Ellsworth Rd., Ann Arbor, MI 48103 or e-mail to hilligk@hotmail.com.



Economics 101

by Tom Ryan

Many of you are aware of the club's recent efforts to reduce its costs by publishing *Reflections* electronically. Indeed, you'd have to have been living on Mars to have missed them. However, since many Lowbrows actually do spend a lot of their time on or around Mars, it is still necessary to call attention to them. And to their unintended consequences.

Sending out newsletters electronically is one of the least painful methods of reducing the club's costs. Lowbrows have one of the highest levels of computer ownership in our society. (Whether that's due to terminal Nerddom, or because computers are required to navigate the member's transport systems to and from Mars, I'll leave to the reader's speculation.) Because of this high computer literacy, it was felt that our members would easily adapt to the change from paper to electronic media. And so we have. The number of paper newsletters has been reduced from over 140 to 78 at last count (in May), and this has been done strictly through Lowbrows who volunteered to change over.

In the past, our cost to print the newsletter has been four cents per page, plus two cents per issue. This was discounted from the normal eight cents per page and four cents per issue because the Lowbrows enjoy a 50% volume discount from our printer, Kinko's. (I believe we have also occasionally enjoyed further discounts as a result of our club's name recognition by friendly Kinko's employees, but I frankly haven't pursued that question in detail. Certainly for us, as for some members of our present government, it pays to have friends who are in a position to help you.) So. Since there were typically ten pages per issue and 140 issues, printing a month of newsletters cost us about \$70.00 plus \$2.80, plus tax, plus \$51.80 in postage, or over \$125.00. Every month. Twelve times a year, in a good year.

You might look at your newsletter and seriously question whether it's worth it. If so, you're not the first person to wonder about that. However, as some of the more perceptive readers of *The Wall Street Journal* and *Physics Today* understand, it is actually advantageous to the prosperity and functioning of a group to have its members be on the same page on most of the day's issues, and they can best do that by getting their news from the same sources. (You might think about with which group you are commonly sourcing your news, the next time you turn on your television.)

In any case, that was then, and this is now. We had successfully reduced our printed newsletters by almost half, and it was with much anticipation (and a bit of glee, no doubt influenced by my Scottish grandfather) that I called our printer to get a price for publishing 78 copies of the May issue. And here, I ran into the Law of Unintended Consequences. Kinko's informed me that since we have reduced our volume, we have fallen below the minimum number of issues required to receive their volume discount, and our cost per issue was now being raised to the regular rate, and our total cost to print 78 newsletters would now actually be higher than it had been to print 140, and they were very sorry, but those were the rules, and I should have a nice day, but they really didn't see how that would be possible, since I was clearly shirking my duty to support the economy and their company, in particular.

(They didn't really say this. In fact, the person with whom I spoke was really very courteous, and genuinely regretted that this was the new policy. I mention this because he is obviously badly out of step with Corporate, and may soon be needing job references.)

I guess I should have seen this coming. I have vivid memories of the gas crisis of 1974. Natural gas prices shot up (along with almost everything else) and everyone scrambled to do what they could to reduce waste. Insulation was installed, better thermostats and more efficient furnaces were invented, alternate energy sources were researched, and everyone looked forward to reducing their energy costs. I, personally, was therefore very surprised when the rate per cubic foot on my natural gas bill increased as my gas consumption fell, but I came to realize that the gas company has fixed costs, and those have to be supported whether they sell any gas or not. I probably couldn't afford to buy any gas at all if I stopped using it altogether.

Waste not, have not.

The price of gas and oil, I have since been told, is not really determined by its production costs, but rather is set as high as it can be, without being so high that the next competing technology can be economically developed. After that, company expenses just rise to ensure that everything gets spent. (Geochemists, as a group, are the highest paid engineers.)

Copymart, are you listening? This volume break point provides priceless information about Kinko's' fixed costs. If you know their fixed costs, you have a handle on how low and how long you need to underbid them to break them. (For a white paper on this, please contact this office, and have your checkbook handy.)

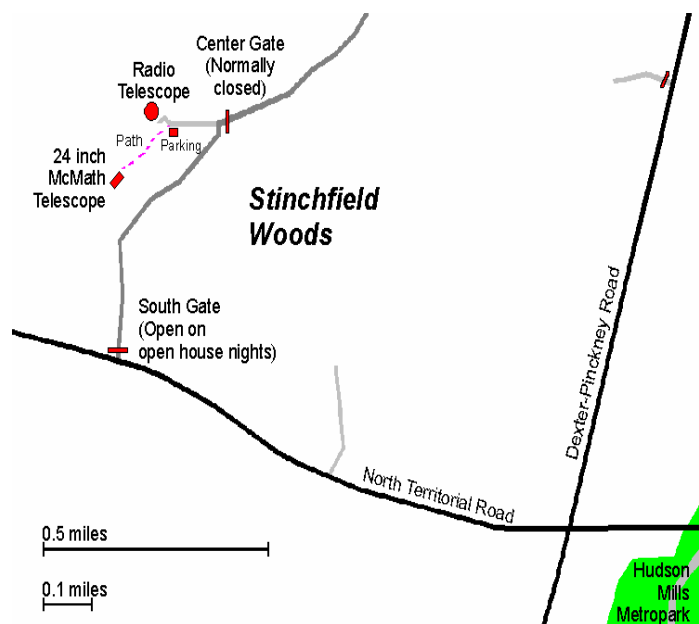
I was feeling sorry for myself after this, I am ashamed to say, thinking that all our efforts had come to naught, and even fell to reflecting that no good deed goes unpunished. However, Nathan Murphy remained strongly optimistic and pointed out that at least we would now be saving trees, and Jim Forrester, a local printer and Lowbrow, offered to print the newsletter at a rate which, while higher than Kinko's "discount" rate, is still much lower than Kinko's' regular rate. We hope that it is higher than Jim's break even point, because we like him, and hope that he stays in business. (Partners Press 734-769-0560).

Thus, with help from members of our group, the May issue was printed, and the club progressed towards its goal of further reducing its fixed costs and retaining more cash for needed investment in the things which tie us together and help us grow.

This story has a happy ending for us, but I wonder how many others find themselves falling below some invisible breaking point, after which costs rise, services become worse, help flees, and life spirals increasingly downward, as a result of a positive feedback phenomenon which is out of their control. We know that positive feedback works in both directions. I sometimes think that this mechanism is the only important difference between Zimbabwe and New York. Important, and perhaps very hard to change, once it starts. ●

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 130. 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-Pinckney 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 4332-9132 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 at the monthly meeting or by mail to this address:

Kathy Hillig
7654 W. Ellsworth Road
Ann Arbor, MI 48103

Magazines

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

Sky and Telescope: \$32.95 / year

Astronomy: \$29.00 / 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 Email to Newsletter Editor at: John Ryan (734) 662-4188 allegheny@mac.com to discuss length and format. Announcements and articles are due by the first Friday of each month.

Telephone Numbers

President:	Charlie Nielsen	(734) 747-6585
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	Bernard Friberg	(734) 761-1875
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	Doug Warshow	(734) 998-1158
Treasurer:	Kathy Hillig	(734) 663-8699
Observatory Director:	D. C. Moons	(586) 254-9439
Newsletter Editor:	John Ryan	(734) 662-4188
Keyholders:	Bernard Friberg	(734) 761-1875
	Charlie Nielsen	(734) 747-6585
	Mike Radwick	(734) 453-3066
	Fred Schebor	(734) 426-2363
Webmaster	Dave Snyder	(734) 747-6537

Lowbrow's Home Page
<http://www.umich.edu/~lowbrows/>

Camp Lowbrow



Summer is officially here, and with the warm weather comes new Star Party announcements. These are opportunities for Lowbrows to observe together at exotic places, both near and far from home. Pictured above are intrepid Lowbrows (left to right: Bob and Joan Gruszczynski, Mark Deprest, Doug Scobel, and Jim Wadsworth) who arrived early enough at the Cherry Springs Star Party on June 4 to set up Camp Lowbrow in the middle of the field. This star party is held at the same venue as the Black Forest Star Party, held later in the summer, and is a popular destination for Lowbrows looking for very dark skies.

Other star parties which are coming up:

Stellafane in Springfield, VT. August 5 & 6, 2005.

Black Forest Star Party in Potter County, PA. September 2-4, 2005.

Astrofest in Kankakee, IL. September 8-10, 2005

Prairie Skies Star Party in Kankakee, IL. September 9-10, 2005

Great Lakes Star Gaze in Gladwin, MI. September 30-October 2, 2005.

Hidden Hollow Star Party in Mansfield, OH. September 30-October 2, 2005.

Make your reservations early!



UNIVERSITY LOWBROW
ASTRONOMERS

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