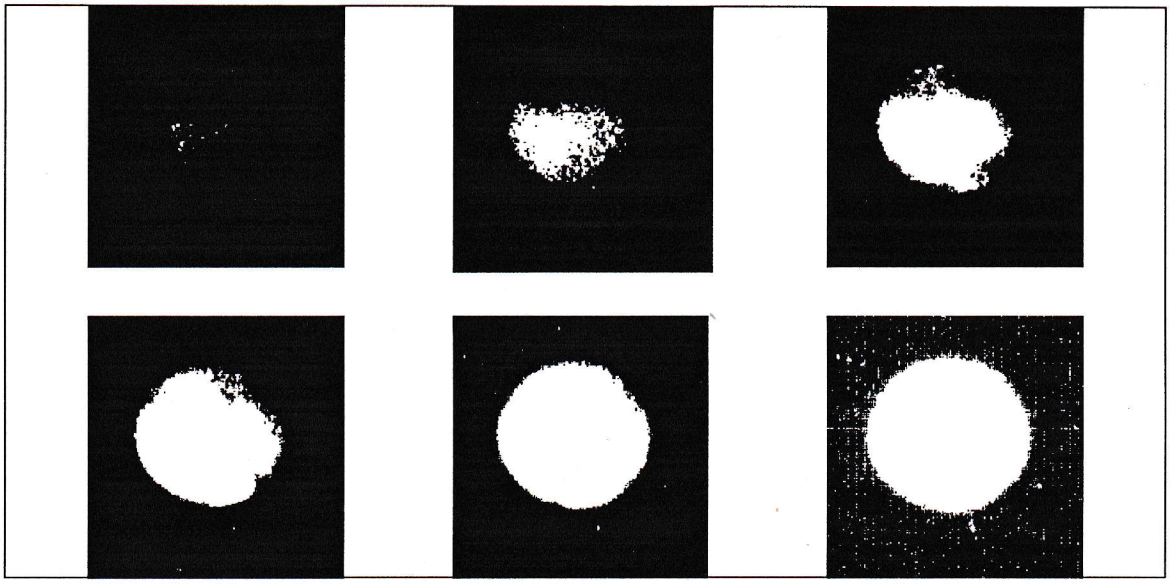
REFLECTIONS



REFLECTIONS

February 1993

Six scanned images of Mars, each made with a different black/white threshold level, and which were composited to produce the final picture printed on the back cover of this issue of *Reflections*.

Kurt Hillig
Editor

Of the University Lowbrow Astronomers

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 Detroit Observatory at the corner of Observatory and Ann Streets in Ann Arbor. Meetings begin at 7:30 PM and are open to the public. Public star parties are also held twice monthly, at the Peach Mountain Observatory on North Territorial Road (1.1 miles west of Dexter-Pinkney Road; map on page 7) on the Saturdays before and after the new moon (cancelled if it's cloudy at sunset). For further information, call Stuart Cohen at 665-0131.

This Month:

February 19 - Meeting at the **Detroit Observatory**. Come help us celebrate Copernicus' 519th birthday, as VP Paul Etzler gives a presentation on the Dark Sky Association. Also on display: some recent pix through the 24" scope!

February 20 - Public Open House at the **Peach Mountain Observatory**. Mercury is near it's greatest elongation – maybe the skies will be clear enough for us to spot it!

February 27 - Public Open House at **Peach Mountain**. It's been a pretty cloudy year so far, but Mars is only a few weeks past opposition (only 94 million km away!) and won't be higher in the sky for several years. Wear long johns!

Stranger than Truth? Cheaper than Truth!

We introduce a new feature in *Reflections*, mandated by our illustrious leader (Stu Cohen). This column is for YOU to write – all we need is the wierdest, most fraudulent, outrageous, or just plain dumb thing you've run across lately. Yes, folks, this is your chance to send in those stories National Enquirer turned down!

This month our roving reporter has investigated a case of consumer fraud in the pages of *Sky and Telescope*! It seems our president – er, I mean reporter – saw a new product announcement for Fingermits™ – all-wool mittens with a fold-back flap to let your fingers out so you can tweak the focus, for only $26.95 . A quick trip to K-Mart® revealed an almost identical product – shooter's mitts – for only $6.95! Which pair would you buy?

Next Month and Beyond:

March 1 - Computer Subgroup Meeting at **Tom Ryan's** house (a Monday). Steve Musko will update us on the project to computerize the 24" scope, plus more on Stu Cohen's programming challenges and our usual collection of assorted astronomy-related codes.

March 19 - Meeting at the **Detroit Observatory**. Dr. Richard Teske of the UM Astronomy Department will talk on "Mysterious Geminga: the Rise and Fall of a Naked Neutron Star".

March 20 - Public Open House at the **Peach Mountain Observatory**. Come take a look at the Orion nebula through the 24" with the new 120 mm Erfle eyepiece - you'll be impressed, we guarantee!

March 27 - Public Open House at **Peach Mountain**. Do you think any daffodils will be up yet?

April 1 - Computer Group Meeting at **Kurt Hillig's** house.

From the Editor's Pen (well, keyboard)

You're in luck this month – I'm not going to rant about needing articles, missed deadlines, software failures etc. Just a newsletter full of passion, history, sparkling wit and biting satire (guess who wrote this piece), technical insight – even some sexy pictures to liven things up (by my standards anyway). Enjoy, and Clear Skies!

Discovery at Adelphi!

by J. Fitzpatrick, K. Hillig and D. Mathis

A tremendous discovery was made last month by a student, Jamie Fitzpatrick, at Adelphi College in upstate New York. While cleaning out their observatory, he dusted off an old telescope. His posting to the sci.astro UseNet news group read in part:

".... It wasn't until I was ready to tackle the cleaning job on it that I realized it was something special. It had all brass fittings. On the front was inscribed 'Alvin Clark & Sons – 1877 – Cambridgeport Mass.' Does anyone know who this was? I've removed all the brass and found a second lens (7 inches) packed in a brass container...."

Yes, he'd found an Alvan Clark refractor! I was tempted to send him an e-mail message that it was a piece of junk but I'd take it off his hands for fifty bucks, but my conscience got the better of me, and instead I (along with about 30 other sci.astro readers) let him know how valuable a piece of history he'd uncovered.

One of the other news group readers (Donl Mathis, at Silicon Graphics Computer Systems, Mountain View, CA) posted an article on the history of Alvan Clark, which I reproduce in part below.

[For those interested in Alvan Clark] I might recommend "The History of the Telescope", by Henry C. King. A very interesting book, if you like telescopes. The famous names and instruments we have heard about take on new life when you know some of the stories behind them. I shall bodily lift a summary of various passages on Alvan Clark & Sons; I hope a few people find it all as interesting as I did.

Alvan Clark was a portrait painter who was interested in telescope objectives, and spent enough time grinding lenses and mirrors to discover that it was a difficult thing. He had heard of the quality of the 15 inch European objective in the telescope at Harvard, and was one day granted the opportunity to look through it.

> "I was far enough advanced in knowledge of the matter to perceive and locate the errors of figure in their 15-inch glass at first sight. Yet these errors were very small, just enough to leave me in full possession of all the hope and courage needed to give me a start, especially when informed that this object-glass alone cost $12,000."

He closed his studio, started out by figuring existing lenses, and then started grinding his own. He made a 5 1/4 inch achromat, and then an 8 inch, and knew by his tests that they were at least as good as, if not better than, what the Europeans were producing. This was in about 1844, and for the next seven years he worked without getting much business. He started corresponding with Dawes about the double stars he was resolving with his objectives, and Dawes became quite enthused about them, buying several, including an 8 inch that was later passed to William Huggins, who used it for most of his pioneering work in spectroscopy. Dawes invited Clark to London to meet Lord Rosse and Sir John Hirschel, which provided significant publicity for Clark. The news of the wonderful telescopes and the things being done with them spread, so that when he got home to America, he was swamped with orders, and his business was off and running. The shop moved and grew, and became "Alvan Clark & Sons".

In 1860, Dr. Barnard ordered an 18.5 inch achromat for the University of Mississippi, which at the time was (I believe) the largest refracting telescope ever made, and Clark accepted the job. He sold his house, bought some land, and built the first American telescope factory. His sons designed and built the grinding and polishing machines. There was a 230 foot long tunnel under the factory to be used for testing, where vibration, dust, and humidity could be controlled. The bought the two pieces of glass from Europe (because getting good glass that big was a problem in itself), and spent a year or so grinding and polishing. During rough testing, with the glass mounted in a temporary tube, they pointed the glass at Sirius, and noticed not one star, but two, the second being a faint companion! Because of the Civil War, the glass never reached Mississippi, and ended up at the University of Chicago, to be used by Hough and S. W. Burnham, and then on to the Dearborn Observatory at Northwestern University in Illinois.

In 1870, the government wanted the Clarks to build an objective for a telescope for the U. S. Naval Observatory, the biggest telescope they could get for $50,000 (in 1870 dollars!). The size ended up being 26 inches, and the Europeans had real trouble producing good pieces of glass that large. Grinding started in 1871 and took a year and half. The focal length was over 32 feet, and the cost $6000. This lens nearly reached Dawes' limit of 0".16 on close doubles, and was used in the discovery of Deimos and Phobos. The lens, remounted in another telescope, was apparently still in use in 1955.

The Clarks made many other notable refractors and/or lenses: a 15.6 inch for the University of Wisconsin, a 23 inch for Halstead Observatory (now of Princeton University), a 16 inch for a private party, another 26 inch for the University of Virginia, a 30 inch for Pulkowa Observatory, the 11 inch achromat with a photographic corrector used to take the first photograph of the Orion nebula, a 20 inch for Wesleyan University in Connecticut, a 20 inch for Chamberlin University in Colorado, and the 24 inch for Percival Lowell, a wealthy amateur who studied Mars. Also, the 36 inch Lick refractor and the 40 inch Yerkes refractor, of essentially the same design with the mounting produced by the same person. The glass for the 40 inch cost $20,000, and was originally intended for the University of Southern California, which couldn't get the money to finish the job, and the glass ended up, through the efforts of George Ellery Hale, in Chicago, with help from Yerkes.

And others. Producing large pieces of raw glass was a genuine problem in those days (and still is, but the rules and dimensions have changed!). Grinding and figuring *any* telescope objective was a bit more difficult without all the technical support we now have, and making large ones was an even more significant task. These are special lenses.

IT'S REAL!

by John Raz

My memory of a particular 1992 summer open house has remained very vivid to me! It was an exciting night. I am an electrical engineer and have had a lively interest in astronomy even though my experience has been forced to be very limited. In any event, even though my experience of this particular open house is approximately five months old, it still burns bright in my imagination.

I remember watching the hard work that was going on with the McMath telescope. The efforts to get it going would have succeeded that night if the level of earnest effort could have been magically transformed into a well focussed image from some distant astronomical source. However, two things stood out. One was the devotion of the workers. The other was the brightness of the lights needed for their work.

When I stepped out of the building which houses the McMath telescope, I immediately commented to myself how dark it was. I figured it was just because my eyes hadn't adjusted to the change in light. However, after a while, I heard others also commenting on how dark it was. My normal experience of absence of light was what could be found inside Ann Arbor city limits. I had no idea what a treat I was in for.

That night I saw Neptune and Uranus. I viewed star clusters. I saw the Ring Nebula. The Veil Nebula seemed to hang in outer space like an immense piece of Saran® Wrap. What beauty!

However, the most memorable experience of that evening was that it was the first time I had ever viewed the Milky Way. What a vast expanse of impressive beauty! Even more than that, was the inner pronouncement that echoed within me. Our home is part of a galaxy! This had same impact on me as if I were witnessing the final verdict given by a judge. The evidence was in and I could see it for myself.

As I looked up at the sky, I could simultaneously perceive two things. I could see why our ancient predecessors would not be able to make any sense of what they saw. The other was that I was viewing a galaxy from the inside. I had all I could do to keep from going from person to person saying "Its true! We live in a galaxy! Just look!" The excitement within me was barely controlled by my desire to not look like a fool. However, let me say: "ITS REALLY TRUE! WE LIVE IN A GALAXY! COME TO THE NEXT OPEN HOUSE AND HAVE A LOOK FOR YOURSELF!"

HELP WANTED –

To restore the World's Largest Visual Telescope!

Ireland, once home of the world's largest telescope, and proud possessor of the world's oldest 'astronomical observatory' at Newgrange, is currently trying to restore the Third Earl of Rosse's 72-inch reflector, the remains of which still lie in the grounds of Birr Castle in the centre of Ireland. We here in Astronomy Ireland are doing our best to see the project through to its completion.

The story of the great telescope is too lengthy to go into in detail here. It was built in 1845 and not superceded in size until the Mt. Wilson 100-inch in 1917.

As part of a proposal to restore the telescope to full operational status we need some technical advice. The main 72-inch mirror is made of a metal alloy, speculum. It tarnishes rapidly and has low reflectivity. Does anyone have figures for the reflectivity of speculum (2/3 copper 1/3 tin)? I think it's 68% (including the flat mirror = 46% system efficiency).

Can such metal mirrors be coated with aluminium or even higher reflectivity films? (Al at 88% = 77% system efficiency and the possibility of even higher reflectivity materials could give up to double the real light grasp that even the Third Earl had over 100 years ago – what a sight that would be!).

Can quartz or SiO_2 overcoats be applied to such speculum and/or Al-on-speculum and how are these likely to affect the life of the coatings in a damp sea-level site? (The mirror's figure is unlikely to be very accurate. Even if perfect, sea level conditions would never allow diffraction limited operation so many many coats could be applied without too much concern for affecting the optical figure).

I ask these questions on behalf of our Chairman, David Moore, who liases with the project on our behalf. I will direct answers to him so allow a few days for any replies. Probably many people will find the project interesting so public rather than email replies are suggested.

Tony Ryan, Trinity College Dublin
Hon. Sec., Astronomy Ireland, P.O.Box 2888, Dublin 1.

[Astronomy Ireland: the world's largest astronomical society PER CAPITA? Now 1 in 3,000 and improving. Do you know of any better statistics?]

Anyone with answers to these questions can contact Kurt Hillig, who can relay them via e-mail – faster and cheaper than air mail, and (hopefully) more reliable.

Notes from the Internet: a discussion on the origins of the Julian day system

Taken from the sci.astro news group and edited by Kurt Hillig

weber@zdfzs.una.ac.at (Erich Weber, from somewhere in Austria) writes: I have two questions about the Julian day system: Why has this system the name "Julian days"? And why does it use the January 1, 4713 B.C. as day 0?

In the sixteenth century, Joseph Justus Scaliger tried to resolve the patchwork of historical eras by placing everything on a single system. Instead of introducing negative year counts, he sought an initial epoch in advance of any historical record. His numerological approach utilized three calendrical cycles: the 28-year Solar cycle, the 19-year cycle of Golden numbers, and the 15-year indiction cycle. The solar cycle is the period after which weekdays and calendar dates repeat in the Julian calendar. The cycle of golden numbers is the period after which the moon phases repeat (approximately) on the same calendar dates. The indiction cycle was a Roman tax cycle.

Scaliger could therefore characterize a year by the combination of numbers (S,G,I), where S runs from 1-28, G from 1-19, and I from 1-15.

Scaliger noted that a given combination would recur after 7980 years. He called this a Julian period, because it was based on the Julian calendar year. For his initial epoch Scaliger chose the year in which S,G, and I were all equal to 1. He knew that the year 1 BC was characterized by S=9, G=1, and I=3. He found that the combination (1,1,1) occurred in 4713 BC, or as astronomers now say: -4712. This serves as year 1 of Scaliger's Julian Period.

— from "Historical Eras and Chronology, Explanatory Supplement to the Astronomical Almanac", by Seidelmann

Arlin B Collins, University of Texas at Dallas

The Julian Day system is an extension of the original Julian Calendar, devised by Julius Caesar. The zero date of that calendar was the alledged date of the founding of the city of Rome by Romulus and Remus; such dates are often given as AUD (Ab Urbe Deundum; from the founding of the City). For astronomical purposes it is sometimes more convenient to just number the days sequentially (rather than breaking them up into months and years).

Richard J. Edgar, University of Wisconsin-Madison

This is not true at all! Julian day numbers have nothing whatsoever to do with the Roman calendar. The Roman calendar was, as you correctly say, started with the legendary founding of the city. But that was in 753 BC, *not* 4713 BC! Dates in the Roman calendar are usually followed by "AUC" (not AUD, as stated) - "anno urbis conditae" - "years from the building of the city".

Chris Marriott, Warrington, UK

Also common in larger scale reference (more common than AUC) was the Olympiad system from the Hellenic world. Hellenistic astronomers like Ptolemy *would* use "eras" of a sort that would be congenial to modern thought — e.g. in eclipse observations, Ptolemy used an Assyrian era (i.e. regnal years of someone-or-other) continued long after the bloke was dead (when everybody BUT astronomers rapidly switched to some other dating :-))

Michael L. Siemon

It seems that it is *not* the same name as the Julian Calendar - which is definitely named after Julius Caesar. According to "The Explanatory Supplement to the Ephemeris", (1961 Edn, Section 14F) the name was "introduced in the sixteenth century by Josephus Justus Scaliger, under the name Julian period in honour of his father". Unfortunately there are no Refs in this section, I would be obliged if anyone else has seen this in an independent source...

Philip Taylor, Royal Greenwich Observatory, Cambridge, CB3 0EZ UK

Seems I recall Guy Otewell saying in the Astronomical Companion that as obvious an answer as this seems, it is incorrect. Seems the originator of the system in fact named his system for his father, who was also a Julius. Apparently holy mother church (and it's protestant offshoots) weren't fond of anything which memorialized pagans such as Gaius Julius Caesar had been.

-Bill Gawne, Space Telescope Science Institute

He may have had a pun in mind, but he *named* the system after his father, Julius Caesar Scaliger, a major if slightly disreputable humanist.

Michael L. Siemon

One note here; the start time 0.0 is noon GMT, Jan. 1 -4712, only if the date is given as from the Julian calendar. The start date 0 for the Gregorian calendar is noon GMT, Nov 24, -4713 (4714 B.C.). Pedantically yours,

Dave Suess, Aerospace Inc.

Scaliger devised his system in 1582, the same year Gregory promulgated his calendar. I don't believe the terms "Gregorian calendar" and "Julian calendar" were in use yet. At least, they weren't in English (Webster's Ninth New Collegiate gives c. 1771 as the dates for both). However, Scaliger was French (and his father Italian according to the same dictionary), but I don't think these were in use in French at that time either.

So while Scaliger may have been indirectly honoring Julius Caesar (who didn't actually devise his calendar any more than Gregory devised the one named after him*), the name he gave his system was probably not a pun on "Julian calendar".

* In case anyone is interested, Julius got a Greek from Alexandria named Sosigenes to do his calendar and the Gregorian calendar was devised by Clavius. Clavius was honored in the book/movie "2001" by having a moon base named after him.

Dan Tilque, dant@techbook.com

A Night on Fuzz Mountain

(Observing Notes and other Reflections)

by Kurdest Hillorgski

It was a dark and stormy night. So, naturally, I didn't bother going to the observatory. But, a couple days later....

Wednesday, January 6. Just home from visiting the family at Christmas. Had almost a full hour of clear skies in the past two weeks; wasn't worth dragging the scope 1200 miles. But it's clear tonight, and as I come home from work I see Mars and Venus along with the quarter Moon. Well, Mars is a day or two from opposition, so I figure let's head up to the hills and see what it really looks like.

Got in touch with Fred - nobody else's asked for the key, so the scope is free. About 8 PM Kathy and I put on about seventeen layers each and head up north. It's my first time soloing on the scope – for that matter my first time trying to find Fred's house in the dark. But we found the house, got the key, got to the gate....

Problem 1: the lock's full of ice. Poke around for a few minutes before remembering the Thermos of hot tea – which works like a charm. I don't trust the road to the shack so we park up by the radio dish and walk the last few hundred yards. A good idea, as the path is mighty icy. Down the last hill there's good crusty snow, though, so we make it without bruises.

Problem 2: the lock's full of ice. This time we're ready with the tea, so we get inside in short order. Roll back the roof (not so easy with the ice on the rails), flip switches, root around in the desk to see if we can figure out which pieces go where... [Hmm – someone should label the eyepieces: FINDER, GUIDE, etc.] Manage to get everything in more or less the right place, so it's time to start observing!

First stop: Venus. She's getting pretty low in the west by now, so we figure if we don't try now we won't get another chance. But, as I half expected, she doesn't look so pretty this late in the day – hair flying all over the place, she'd obviously had a rough day.

So, we crank around a few degrees and take a look at old Luna. Man, what an eyeball burner! Rummage around looking for a filter, then find that the best eyepiece isn't threaded. What the hay, we're looking near the zenith, it can't fall out can it? And what do you know? When you don't have to squint, that old Moon's a right pretty sight! In fact, lets pop in the ol' camera and see what we can do....

Now, you've got to realize that I'm not an astrophotographer, at least not yet. So I haven't learned all the tricks yet – like if I half disassemble my eyepiece projection tube (geez, don't dumb amateurs buy the wierdest stuff?) I can use it as a 2" prime-focus camera mount. But then (I tell myself) this is just for calibration, I don't have to get perfect pictures the first time.

And it ain't as easy as it looks, nosiree Bob! First, you dam' near break your neck trying to look through the viewfinder two feet off the floor, and it's a real art to get it to focus just right, and I haven't got a particularly good idea of the exposure to use. But, film's cheap (until you develop it), so I pop off a dozen shots in the hope that one or two will come out. (FYI, 1/60" with ASA 200 – and a 1-1/4" camera mount clips off almost 1/3 of the image!)

Well, my back and neck were in pretty bad shape at this point, so we swung the scope on east to pick up Mars. And son of a gun if that sucker isn't still just a teensy fuzzy orange spot! I thought sure that with a big scope like this that we'd be seeing the gondoliers on the canals. But, every ten or twenty seconds or so there'd be a flash of clear seeing, and I could half-convince myself that I could make out some general details – Kathy thought I was making them up, but you know how spouses are – so in pops the camera again, and I fire off another half dozen frames.

Come to think of it, I paid 35 bucks for this eyepiece projection gizmo! I'm gonna get my money's worth tonight! Drop in my favorite (i.e. only) 10 mm eyepiece, screw it all together, and hot dog! Mars is now a BIG fuzzy orange spot! But heck, I fire off the last six shots anyway.

By this time our ears are numb and our toes are in pain – I mean, this is almost as much fun as long-distance running – so we pack it up and pack it in. And, as we're packing, I see a box in the desk labeled "120 mm Erfle". Looks promising, but it's too late tonight....

Got the pictures back a few days later – and you know what? I was right, I'm not an astrophotographer, at least not yet. In fact I think I proved otherwise two weeks later! But that's a story for another newsletter.

Computer Subgroup Report:

Simulations of the Universe

by Kurt Hillig

The Computer subgroup met on February 1 at the home of Kurt Hillig. While attendees straggled in over a period of several hours, we had an average of six people on hand.

Our guest star (well, he's a member now, so he's not really a guest any more) was Mark Vincent – a grad student in the Space Physics Research Lab, who gave a nice impromptu talk at the club meeting a few months ago (filling in for a sick Prof.) on making metallic thin-film filters for UV astronomy with one of Hubble's new instruments.

Anyway, Mark's been a computer hacker (in all the good senses of the term) for many years, and he brought along several programs he'd written over the years to demonstrate a number of cosmic phenomena. [Warning – some of these come mighty close to winning some of Stu Cohen's computing challenge awards; you other programmers better get cracking!]

The first one he demoed was a 3D planetary system (or open cluster, if you prefer) simulator. It begins by picking a number of bodies – stars, planets, whatever, and with either user-defined or randomly chosen masses – and placing them in initially stable orbits – again either user-specified or randomly selected. Then you turn on time, and sit back and watch them interact. Since they all start out in stable orbits, rather than just random positions and velocities, you can get a nice feel for gravitational interactions in a bound system without having to worry a lot about it either collapsing or falling apart.

What about the 3D? This was the fun part of the program! (And the one that gave some people real headaches.)

Imagine yourself looking at an object – say an orange – a couple feet in front of your face. In fact, go get an orange (or a beer can, or whatever) and hold it up so you can look at it. The view you see with your right eye is displaced a few degrees from that your lefy eye sees – if you rotate the orange (beer can, whatever - you can figure this out) clockwise (looking from above) you can transform the right-eye view to the left-eye view. This angular displacement between the two eyes is called parallax – which when applied across Earth's orbit instead of your eyes is how we measure distance to the nearer stars.

Mark's program calculates the view that each eye would see if they were separated by about five degrees from the center of the planetary system being simulated (i.e. like it was a couple feet in front of you) and displays them side by side on the monitor. The hard part (for most people – which is what gives them headaches) is that to get the 3D effect you have to cross your eyes while looking at the screen until the two images merge. It takes practice, but once you get it the effect is pretty amazing.

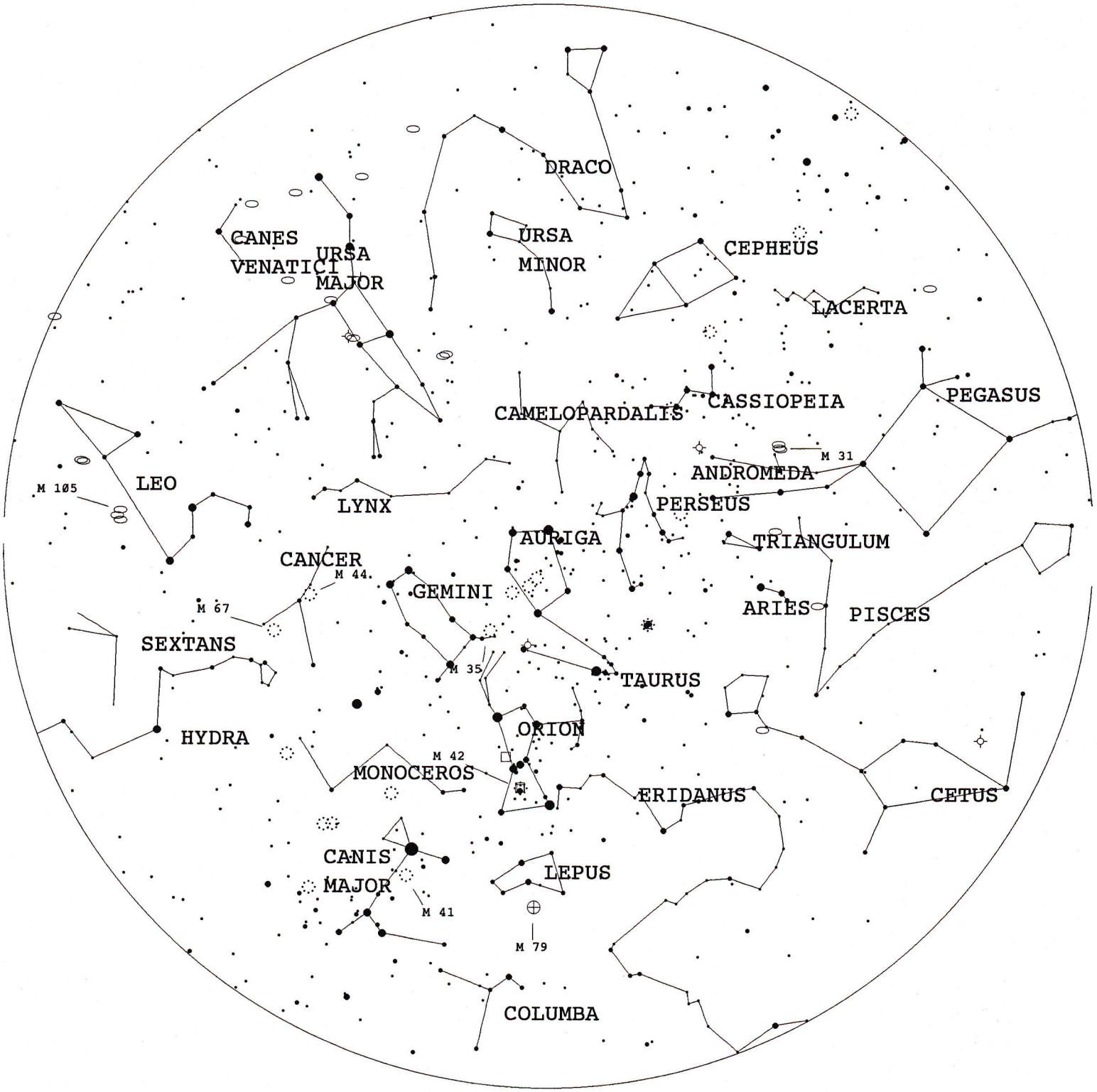
Program number two was (at least to me) even more fascinating – a simulation of colliding galaxies! Of course it wasn't a supercomputer-scale simulation – each galaxy only contained about a hundred stars instead of a hundred billion – but it was nevertheless very effective at showing how long streamers of stars can form in collisions, as has been seen in many cases.

In this program, the galaxies were modeled with all of the mass of each galaxy concentrated in its core, and with a disk of stars in orbit around it. As the galaxies collide the paths of the stars are influenced only be the masses of the cores. Even though the stars essentially ignore each other, this gives a very realistic picture of how some very peculiar observed galactic structures can come to exist.

The remainder of the computational side of the meeting evolved into some less astronomical topics; Mark's other programs for generating fractal curves, one for playing "Life" (a mathematical game – sort of) etc., and ended with a re-demo of the Zemax optical CAD program that Tom Ryan has. (Since Tom brought the computer to the meeting, and I needed to tweak a scope design I'm working on, it seemed a natural thing to do.)

The next meeting will be at Tom Ryan's house (if you need directions, his phon enumber is on page 7) on March 1 at 7:30 PM. Anyone with an interest is invited – bring a disk of your favorite software (or to get a copy of shareware). Since Steve Musko has returned from Antarctica, the main topic will be the 24" scope computerization project; Kurt Hillig has some recent information on CCDs as well.

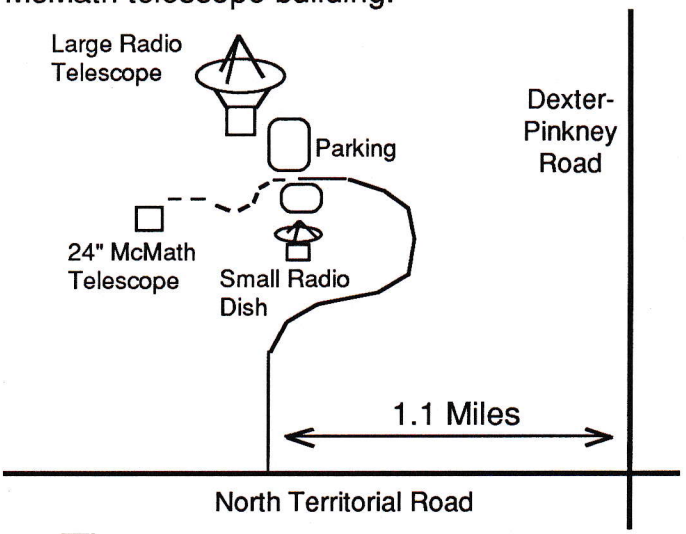
FEB. 2Ø 7:48 EST STARS TO 5TH MAG



☞ Places:

The Detroit Observatory is in Ann Arbor, at the corner of Observatory and Ann Streets, across from the old University of Michigan hospital and between the Alice Lloyd and Couzens dormitories. The Detroit Observatory is an historic building which houses a 19th century 12-inch refractor and a 6-inch transit telescope.

The Peach Mountain Observatory is the home of the University of Michigan's 20-meter radio telescope, and the McMath 24-inch telescope maintained and used 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 southwest (between the two fenced-in areas) about 300 feet to reach the McMath telescope building.



☞ Times:

The monthly meetings are held on the third Friday of each month at 7:30 PM at the Detroit Observatory. During the summer months, and when weather permits, a club observing session at Peach Mountain will follow the meeting.

Public Open House / Star Parties are held on the Saturdays before and after each new moon at the Peach Mountain Observatory. Star Parties are cancelled if the sky is cloudy at sunset – call 426-2363 to check on the status. Many members bring their telescopes; visitors are welcome to do likewise. Peach Mountain is home to millions of hungry mosquitos – bring insect repellant, and wear warm clothes, as it gets cold at night!

☞ Dues:

Membership dues in the Lowbrow Astronomers are $20 per year for individuals or families, and $12 per year for students. This entitles you to use the 24" McMath telescope (after some training). Dues can be paid to the club treasurer, Ron Avers, at a meeting or by mail at this address:

9394 Anne
Pinckney, MI 48169-8912

☞ Magazines:

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

Sky and Telescope: $20 / year
Astronomy: $16 / year
Odyssey: $16.95 / year

For more information, contact the treasurer.

❒ Sky Map:

The sky map in this issue of *REFLECTIONS* was produced by Doug Nelle using *Deep Space 3D*.

✎ Newsletter Contributions:

Members (and non-members) are encouraged to write about any astronomy-related area in which they are interested. Please call the newsletter editor (Kurt Hillig, 663-8699) to discuss length, format, etc. Announcements and articles are due 14 days before each monthly meeting. Contributions should be mailed to Kurt Hillig, 1718 Longshore Dr., Ann Arbor, MI 48105.

☎ Telephone Numbers:

President:	Stuart Cohen	665-0131
Vice Pres:	Doug Nelle	996-8784
	Paul Etzler	426-2244
	Fred Schebor	426-2363
	Tom Ryan	662-4188
Treasurer:	Ron Avers	426-0375
Observatory:	D. C. Moons	254-9439
Newsletter:	Kurt Hillig	663-8699
Membership:	Steve Musko	426-4547

Peach Mountain Keyholder:

Fred Schebor 426-2363

Monthly Meeting:

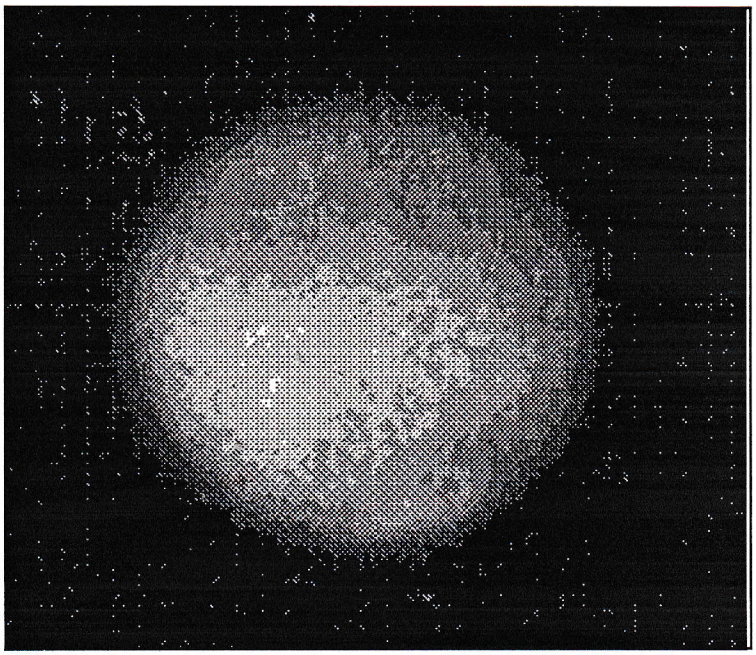
Paul Etzler

on

"Fighting Light Pollution: The International Dark Sky Association"

Feb. 19, 1993 at 7:30 PM

At the Detroit Observatory in Ann Arbor



A picture of Mars, taken by Kurt Hillig on Jan. 19, 1993 with the 24" McMath telescope at Peach Mountain. Full aperture, 25mm eyepiece projection, ASA 1600 film at 1/60 sec (equivalent to a 60m FL at f/100). Digitized by an Apple scanner and processed using Adobe Photoshop on a Macintosh IIfx.

University Lowbrow Astronomers
840 Starwick
Ann Arbor, MI 48105