REFLECTIONS

of the University Lowbrow Astronomers

March 2002

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 130 or 807). Meetings begin at 7:30 PM and are open to the public. Public star parties are held twice a month at the University's Peach Mountain Observatory on North Territorial Road (1.1 miles west of Dexter-Pinkney Road; further directions at the end of the newsletter) on Saturdays before and after the new Moon. The party may be canceled if it's cloudy or very cold at sunset. For further information call (313) 480-4514.

Photo of Comet Ikeya-Zhang by Gerald Rhemann and reprinted with permission.

Current magnitude estimates place this comet at 4.8 mag. Have you seen it yet?
Well, you won't want to miss this one as it makes its way through the Inner Solar System, the last time it came through was 341 years ago in 1661.
Comet C/2002 C1 is moving rapidly through Pisces and will soon disappear into the Sun's glare, so look for it soon.

This Month: **March 15th** is the Lowbrow Meeting at 7:30pm in Room 130 of the Dennison Bldg. Speaker: Joe Bernstein - Windblown Bubbles: The Hydrodynamic Dance of Pulsar Wind Nebulae and Supernova Remnants
March 16th Public Open House and Star Party at the Peach Mt. Observatory - Comet Ikeya-Zhang (C/2002 C1) is listed as 4.8 magnitude and moving rapidly thru Pisces, Have you seen it yet? Also Messier Marathon at Lake Hudson State Recreation Area starting at dusk. Contact Mark Deprest for more info.

Also note that our web site has a new URL: **www.umich.edu/~lowbrows/** Thanx Dave!!

Next Month: **April 6th** Public Open House and Star Party at the Peach Mt. Observatory
April 13th Public Open House and Star Party at the Peach Mt. Observatory. Also, an alternate date for a Messier Marathon at Lake Hudson State Recreation Area.
April 19th is the Lowbrow Meeting at 7:30pm in Room 130 of the Dennison Bldg. Election Night - cast your vote for the Club's Officers.

PART 2: EYEPIECES… THE OTHER HALF OF YOUR SCOPE

By Charles Nielsen February 3, 2002

In part one of this article many characteristics of a good quality eyepiece were described.

These were resolution, contrast, eye relief and field of view. It was also pointed out that it is difficult to produce an ideal eyepiece that is good in all of these aspects. Compromises are therefore involved. These are the considerations. As eyepiece focal length decreases (more magnification), our image scale increases but becomes dimmer, and eye relief usually becomes shorter. Also, as field of view increases, eye relief decreases, unless more optical elements or lenses are used. This increases weight, size and cost. It also means more light loss and reduction of contrast. This light loss can be reduced significantly when low dispersion glass and excellent optical coatings are employed. That of course also increases cost. It was also stated that most aberrations in the eyepiece and the human eye as well, tend be worse around the edges of the field of view. That is why acuity (or sharpness and detail) actually improve as exit pupil decreases. This reaches its maximum at around 2 mm. Reducing the exit pupil further may be of benefit to most eye glass wearers because the smaller cone of light will "avoid" many imperfections of the human lens, allowing that person to observe a well defined image without using their glasses. Without those glasses, the inherent short eye relief is not as much of a problem. As we approach the 1 to 0.5-mm exit pupil range, reduction in image brightness starts taking a heavy toll. At the lower end you will also start to see "floaters". Debris in the eye (floaters) tend be become worse with age. Age reduces the maximum size that the pupil in our eye can expand as well. Exit pupil also has a great bearing on what light pollution filter is the most effective.

Since the center area of most eyepieces is the best corrected, and longer focal length telescopes will concentrate more light through this center area, longer focal length will let you use cheaper eyepieces more satisfactorily. Longer focal length will also produce higher magnification and smaller exit pupils than shorter focal length, given the same eyepiece. One side bar to magnification is this: As higher magnification reduces image brightness, it also reduces the brightness of the background sky. In a sense this has an effect similar to a light pollution filter in that the darker background may help you see a dim object easier, even if the object's small size was not the reason for using more power.

So what types of eyepieces are good for your scope? First let's go over the types of eyepieces commonly available and then we can really answer this question. The first type worthy of even mentioning is the Kellner. Kellners employ three optical elements and so produce bright images, even with lesser coatings. In longer focal lengths (20-25 mm and up) field of view and eye relief are not bad. Contrast is average at best. Kellners are often referred to as "modified achromats". Stepping up in quality, we encounter the Orthoscopic. Orthos are usually not expensive and are in many respects the best eyepiece ever designed. They are almost unbeatable when it comes to resolution and contrast, due to sound design and use of only four lenses. This design is probably also the best at accurate color transmission. Orthos also have very flat fields with excellent edge correction. Where is the down side? Eye relief can become an issue in shorter focal lengths, and field of view is typically only in the 42-45 degree range. If you have a clock drive and are observing the moon and planets, this smaller field may not bother you, making this probably the best planetary eyepiece of any design. The desire for wider fields is the main reason for the popularity of the Plossl eyepiece. Plossls also employ four optical elements, but in a different arrangement then the Ortho. I believe there is a wide range in quality with Plossls. A good Plossl demonstrates good resolution, contrast, and have fields of view around 50 degrees. I believe a good Ortho still beats a good Plossl in all areas except field of view. There also exists a modified version of the Plossl, which uses five elements. The most common of these would be the Orion Ultrascopic and Celestron Ultima family. The same factory in Japan produces both of these brands, as well as a Canadian version called Antares Ultimas, so I am quite sure they are optically the same. I suspect the Takahashi LE and some of Park's eyepieces are also these. They produce very good resolution and contrast, rivaling the Orthoscopic. Field of view is typically 50-52 degrees. These eyepieces also use top-notch coatings, probably the best available. Eye relief does get sacrificed somewhat. A 20 mm in this category will probably have less eye relief then a 20 mm "pure" Plossl or Orthoscopic.

Now we get to the big boys on the block, the wide fields. The first wide fields were the Erfle and the Konig. The Erfle contains five or six elements. They produce bright images across fields from 60-70 degrees. Edge of field sharpness falls off rapidly in medium to shorter focal lengths. A better quality Erfle in focal lengths of 25-30 mm and up will provide a pleasing view with good eye relief. Konigs are usually a four element design with field widths in the 60-65 degree area. They are a strange eyepiece in my opinion; more about this in my review section. Beyond this is the land of the giants. Combining very wide fields with very good optical correction (especially at the edges) requires large glass elements and plenty of them. One of the earliest, and still in production, is the Televue Nagler. Naglers all have 82 degree apparent fields of view. They are very well corrected and very well coated. Resolution is in the Ortho league, but not contrast. Since they typically employ eight glass elements, they are large and heavy. Eye relief sadly, is quite short, even in some of the medium focal lengths. This and their high cost are the only real downsides of this design in my opinion. Otherwise they are one of the finest types of eyepieces money can buy. Meade has a line of eyepieces named Ultrawides. They have field widths almost identical to Naglers, and I have heard somewhat better eye relief. In the 65 degree field area we have several players. The Televue Panoptic series sports 68 degree fields with very good optical correction and good coatings. They are smaller and less expensive than Naglers. Eye relief is generally on the short side. Meade also has a 68 degree entry called the Superwide. I have not tested this one, but reviews generally indicate they are somewhat below Panoptic quality. Our next two entries are real winners. Each has a 65 degree field, and 20 mm of eye relief! The Pentax XL series feature retractable eye guards, excellent coatings and

quality glass. They produce excellent, comfortable views that are hard to beat at any price. They are unfortunately pretty expensive themselves. For slightly less money there are Vixen Lanthanum Superwides, which also have that magic 65 degree field with 20 mm eye relief. They are fully multicoated, and use eight elements of high quality glass. Excellent correction, contrast, and edge sharpness complete the resume. More comments about this one later. Recently Televue introduced their Radian line up. These eyepieces show 60 degree fields with 20 mm eye relief. Contrast and resolution are top-notch, right up there with the Orthoscopic. Coatings are excellent, and so is edge of field resolution.

Although I have missed a few, this was a brief on most of the popular eyepieces available today. What should you have in your scope? First of all consider that faster focal ratios (about f/6 and faster) benefit more by very well corrected eyepieces. An eyepiece that has average edge correction in a f/4.5 scope may show marked improvement in a f/10 scope. Better coatings translate to better contrast, and contrast is always important. Good coatings also help reduce light lost by passage through many glass elements. Avid planetary and lunar observers need resolution and contrast most of all. Spend your money on those qualities, and sacrifice field of view if you must. A good planetary eyepiece with a wide field of view (50+) will be expensive. Not to pick on Dobsonian owners again, but that wide field is very handy when you must hand slew and track. Also if deep sky is more your thing then wide fields are desirable. If the 65 degree class is good enough for your tastes, then you can get good eye relief, and very nice images for less money then stepping up to anything wider. Also consider size and weight. Be extra careful with heavy eyepieces in a diagonal that could rotate and drop it on the ground. Will that hand grenade eyepiece cause you to re-balance your scope every time you use it? I believe if given two eyepieces of exactly the same qualities, but much different size and weight, most people will feel more comfortable reaching for the smaller one. I have found that eyepieces are like many other things; you pretty much get what you pay for. So would you be happier with that one hundred dollar Plossl versus the fifty dollar one? You would see enough difference in image quality that I believe the answer would be yes. Spend what you can, but wisely.

In the remainder of this writing I would like to comment on some eyepieces that I own, have used enough to form an opinion, or actually compared to others. Many of these experiences are the primary foundation for many of the opinions I have expressed. My first really good eyepiece was actually the first one I ever bought! It is an Orion 9 mm Ortho in the .965 barrel size. I thought it might improve the view in my 60 mm department store refractor that so many of us started out with. Of course the scope did not do it justice, but it certainly did improve the image, big time. I retired that scope, but kept the eyepiece and later adapted it to my 8 inch reflector. This eyepiece has about a 45 degree apparent field that is very flat and sharp to the edge. Resolution and contrast are excellent. Eye relief is pretty short. I also own a 12.5 mm University Optics Ortho, and have tested vintage Edmund Scientific 18 and 6 mm Orthos. All had flat but small fields, sharp right to the edge, and excellent resolution. The University showed better contrast, I suspect due to significantly better coatings. I compared the Edmund 18 to my Celestron Ultima 18 and found that resolution was almost too close to call. The Ultima has a much wider field and maybe slightly better contrast, but edge definition was a bit better in the Ortho. In another Ortho comparison I put my University 12.5 against a Celestron Ultima 12.5, in a 10 inch DOB with an excellent mirror. Several other observers and myself agreed that the Ultima had a much wider field of view, and resolution was very comparable. I think the Ortho may have had a slight edge. Contrast was considerably better in the Ortho, and the Ortho seemed to have an edge on eye relief.

My least expensive eyepieces are Rini's. These are named after the optician that builds them from surplus lenses. They are built inexpensively, but then they are very inexpensive eyepieces. I have an 11.4 mm that I do not like and will not mention further, as well as a 21 mm (RKE design I think), and a 35 mm Erfle. The 21 is quite sharp in the middle of the field but falls off rapidly near the edge. The edge is hard to see because it is so mushy, but it is wide. Was it worth $17.50? Sure. The Erfle was a real bargain. It has a bright wide field of around 60 degrees, and pretty good edge definition. It does suffer from stray light reflecting off the very large eye lens. I believe this eyepiece was around $25, and it is worth at least twice this in my humble opinion. I have the Orion Sirius Plossls in 40, 26, and 10 mm sizes. All are pretty good concerning resolution, and have decent contrast. They show a fair amount of edge of field aberations, however the 40 mm is much better here, but is restricted to a 43 degree field of view. The 40 mm is actually my favorite. The 10 mm has very short eye relief, but a good image if you can get close enough.

Moving up the scale, I own two Celestron Ultimas, the 18 mm and the 30 mm. Both are very nice, having resolution and contrast very close to Ortho standards. The 18 mm has a 51 degree field that actually looks a little wider. Eye relief is slightly short with glasses, but just barely. This eyepiece seems very sensitive to sky conditions and some nights seems to perform better than others. This seems especially true at the edge of field. Sometimes I think this eyepiece is playing games with me. The 30 mm was purchased fairly recently and has already become one of my favorites. It throws up a beautiful 50 degree field that you would swear is wider than that. This may be because of the perfect eye relief and good edge of field resolution. This is an excellent deep sky eyepiece and also works incredibly well with my Ultima Barlow lens.

I recently borrowed several Vixen Lanthanum eyepieces from a club member for testing. These eyepieces feature 20 mm eye relief in all focal lengths, and are fully multi-coated. The field lens is made from lanthanum crown glass to reduce optical aberations. They are six to eight element designs. I compared a 25 mm to my 26 mm Plossl, and a 10 mm to my 10 mm Plossl. Both Lanthanums showed better resolution and contrast, but were a little dimmer. Edge of field resolution was much better in the Lanthanums. Due mostly to the Lanthanum's generous eye relief, these are perhaps the most comfortable eyepieces I

have experienced. I also put the 7 mm Lanthanum against my 7 mm Nagler. This was a little disturbing. The much less expensive Lanthanum was right there in resolution and even better in the contrast department. The Lanthanum has only a 45 degree field compared to the Nagler 82, but you could see all of that 45 degrees with comfort. Would I have bought the Lanthanum instead? Probably not, but I don't want to think about this one too much! I also compared the 15 mm Lanthanum to my 30 mm Ultima with an Ultima Barlow lens. This was a very close call, but I finally decided I liked the Ultima combo slightly more.

There is also a series of Lanthanum eyepieces called "Superwides". They are much larger and heavier, but achieve a 65 degree field with eight fully multi coated elements, and still retain that 20 mm eye relief. I own the 22 mm model and it has become probably my favorite eyepiece overall. It has very good resolution, excellent contrast, and is sharp right to the edge of its beautiful field of view. I had a chance last summer to compare this eyepiece to a 22 mm Televue Panoptic in a 14 inch reflector under very dark skies. I had to spend quite some time deciding this one, and enjoyed every minute of it. The Panoptic showed a very slightly wider field, but the Lanthanum may have been slightly sharper at the edge. I finally preferred the Lanthanum mostly because it had the more comfortable eye relief. Also consider these are both expensive eyepieces, but the Lanthanum is at least 80 dollars less. Obviously I would have to very highly recommend these Superwides.

At that same dark sky sight last summer I also had the pleasure of using the Televue 35 mm Panaoptic, as well as the 12 and 16 mm Naglers. All are big, heavy, and expensive, but oh wow! They all have the typical Televue sharpness and very wide fields. The 35 Panoptic is larger than most finder scopes, but if you have a 2 inch focuser and can handle the weight this eyepiece will impress you, garanteed. The two Naglers were also optically excellent, but I found the eye relief to be rather short, so it was hard to really take advantage of their 82 degree fields with glasses on. I also compared the 16 mm to my 16 mm Konig. This seemed strange switching between equal focal lengths, but the Nagler is about five times bigger. The Konig was just as sharp right near the middle of the field, and has comparable or better contrast. But wander even slightly from the middle of the field and the Nagler destroyed it. This would have been a closer comparison in a longer focal length scope, since the Konig definitely prefers that. The Konig also has very short eye relief, so you have to almost jump inside it to see it's 65 degrees. I have also tried the 32 mm Konig is several scopes and am quite impressed with it. I once viewed a star cluster with a 2 inch 32 mm Konig in a f/9 refractor and was very impressed. I sometimes wonder if the 16 and 32 Konigs are really from the same family.

And so ends my rather long commentary on eyepieces. For those that enjoyed it; it was a pleasure. For those that couldn't wait for the merciful end; sorry. I enjoy using and testing eyepieces and will continue to do so. So maybe I will reveal further findings and opinions in a future article. For readers in the before mentioned group A; when I get around to it. For people in the other group; I warned you…

Charlie Nielsen at the 2001 Leonid Fog Party.

Would you buy an Eyepiece from this guy?

Can you say .... Infomercial?

Just kidding Charlie, but what exactly happened to the money in the clubs' treasury?

Happy Birthday

By Tom Ryan

This March 25th marks the 330th anniversary of the announcement of the invention of the reflecting telescope. On that date in the year 1672, the contents of the *Philosophical Transactions* includes "An accompt of a new kind of Telescope, invented by Mr. Isaac Newton". In the "Accompt", Mr. Newton states that he tried various mixtures of copper, tin, and arsenic for the mirror, until finding a mixture consisting of copper 6 oz, tin 2oz, and arsenic 1 oz, which he found was able to be "polished better than he did the other". Newton polished his metal mirrors (he made several, and chose the best one) with putty powder. He was also apparently the first person to try polishing with pitch. In his account, he describes making the pitch lap, washing the polishing compound to prevent scratches, and his procedures for getting a good polish, all methods which are familiar to optical workers of today.

He also states: "But because metal is more difficult to polish than Glass and is afterwards very apt to be spoiled by tarnishing and reflects not so much Light as Glass quick-silvered over does ; I propose to use instead of the Metal, a Glass ground concave on the foreside and as much convex on the back-side, and quick-silvered over on the convex side. (Thus also inventing the Mangin mirror - ed.) By such a Glass I tried about five or six Years ago to make a reflecting telescope of four Feet in length to magnify about 150 times, and I satisfied myself that there wants nothing but a good Artist to bring the design to perfection."

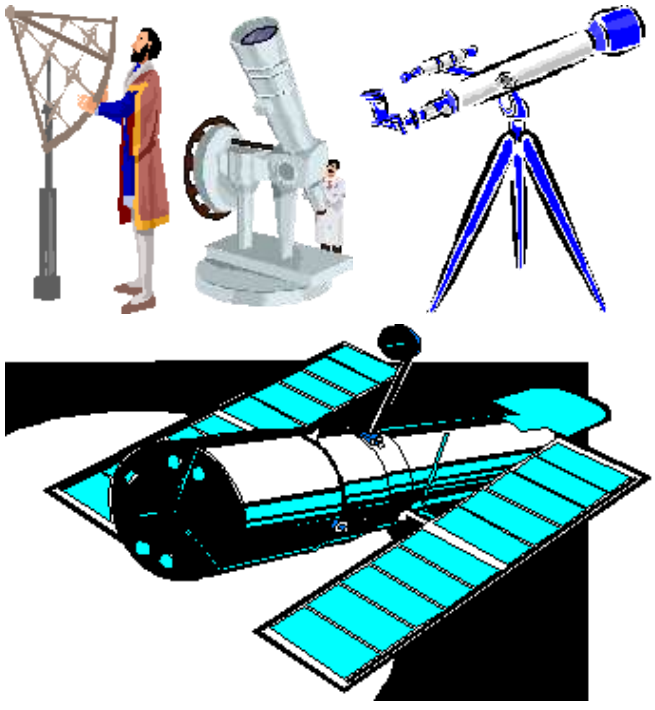
Newton made the first successful reflecting telescope, but he was not the first one to try making a reflecting telescope. In 1663 James Gregory proposed his Gregorian design, and commissioned it to be built the next

year by a famous London optician by the name of Reive. The instrument was not successful, and Gregory felt that the reason for that was that the optician had polished the mirrors with cloth. Product success can be a very elusive thing.

So too can be wealth and honor. Just 43 years later, we find that the revolution pioneered by Newton had settled down to it's present state. The great Dutch microscopist Leeuwenhoek wrote to his friend Leibnitz, on September 28th, 1715:

"As to your idea of encouraging young men to polish glass - as it were to start a school of glass polishing - I do not myself see that it would be of much use. Quite a number, who had time on their hands at Leyden, became keen on polishing glasses, owing to my discoveries; indeed there were three masters of that art in that town, who instructed students who were interested in such things. But what was the result of their labor? Nothing at all, so far as I have learnt.

"Now to every study the proposed object is this: to acquire wealth by knowledge, or celebrity by reputation for learning. But that is not to be gained either by polishing glasses or by discovering abstruse things. And then I am convinced hardly one in a thousand is properly fitted to take up this study for much time is consumed in it and money is wasted, and if one is to make any progress in it one's mind must be forever on the stretch, thinking and speculating. The majority of men are not sufficiently inflamed with the love of knowledge for that. Indeed, many whom it by no means becomes, do not hesitate to ask, What does it matter whether we know these things or not?"



BOOKING ON THE INTERNET

By Harry L. Juday

I am certain that most of you who may have an interest in buying Astronomy related or other types of books on the Internet already know how to do it and where to look. But, as I have done a bit of it, hopefully I can offer a few new ideas and places to look, especially for Astronomy related book items.

First off, I must state that most of my online book searches and purchases are for USED astronomy books. Books that I have read or heard about that seem very interesting and that I am unlikely to find in any local used book store.

My personal favorite place to start is with Bookfinder: < www.bookfinder.com/ >. This site searches other sites worldwide. It will not give you every book available at every site, but does give links to all sites with books. As typical to most book search sites, you can search by author, title, both type (new, used). Their somewhat limited advance search option offers more type choices, price ranges & bindings.

If I find no listings here, I know my search will be a difficult one.

Next, I usually visit The Advance Book Exchange: < www.abebooks.com/ >. This will usually give a fuller listing of what is available, should I find any sources on Bookfinder.

"Why not just go there first, your logical amateur astronomers mind asks?" Well, ABE does not search all of the sources that Bookfinder does. In fact, I have found that Bookfinder seems to search more book sources than any other book search engine.

Both of the above sites will give you the dealer & price of the book and a direct link to the bookseller selling the item. There you can find out more information about each particular book, publisher, date, condition, number of pages (usually) and sometimes a small synopsis of the book (in case you were not sure what it was really about).

Another interesting site is Powells Books of Portland Oregon: < www.powells.com/ >. This is a VERY large company with several book stores in the greater Portland area selling new, used, rare, etc. books.

And should you have the time and energy, and just

feel like browsing to see if you can find something interesting, you can always use the "keyword" option for Bookfinder & ABE and the "section" option at Powells advanced search and type in astronomy. On Feb. 13, 2002, (while I was writing this article), I checked all three sites. Powells had over 4,500 astronomy books; Bookfinder did not list the number, but from the listing sidebar they must have had hundreds to thousands and ABE listed over 44,000 astronomy books.

Now many of these are copies of the same book, however, there are enough different titles, authors and subjects in those numbers that there should be something in all of that for anyone looking for some good astronomy related reading or reference on these cloudy winter nights.

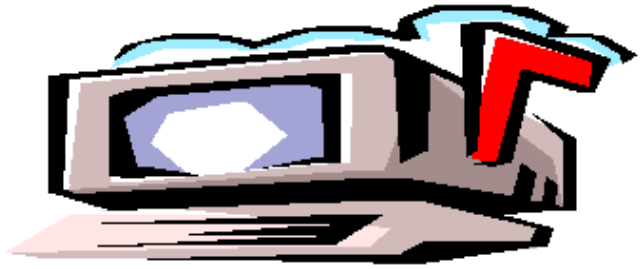
A source specializing in used, out of print and rare astronomy books is Myrna R. Bishop of Linwood, Kansas: < www.sky.net/~mrbishop/ >. Unfortunately she no longer maintains her on-line book list and inquires must be done by e-mail or telephone (links & number shown on her site).

I have gotten some great bargains in used books by being patient and searching around. Sometimes you can find identical books, one for 1/2 the price of the other, depending on the dealer (sometimes they are not aware of the value of a particular book, especially an astronomy book).

Also; personally I do not deal with Amazon if I can help it and Albiris not at all. I find Amazons prices a bit higher then private dealers and Albris quite a bit higher, for the same identical book. One reason is that they serve as a middle-man and add on their fee (Amazon often, Albris always).

"So, what kind of astronomy books do you buy (instead of more equipment) with your not bottomless funds?" you may ask, (or well may not because you couldn't care less). "And, where do you hear about books you but. are looking for, etc.?".

Perhaps that can be the subject of another article some time. hlj



March is Messier Marathon Month

By Bill Ferris

I observed all 110 Messier objects on back-to-back nights, March 23-24 and 24-25, 2001, at the All-Arizona Messier Marathon. The observations were made between 7:30pm and 5:10am both nights, including a break for a nap. adjusting for the nap, that's an average of one object every five minutes. I mention this to illustrate the fact that a well-ordered observing list is essential to a successful Messier Marathon.

A Messier Marathon is a sprint from object to object. You won't have a lot of time to enjoy them. This kind of observing is often not very fun and you're not required to participate. But marathoning does offer some benefits to those who participate. It challenges you as an observer, develops your star hopping technique and your familiarity with the night sky. When you're done, you will have observed most--possibly every--Messier object. Some amateur astronomers never get that far, even after years in the hobby. Finally, a Messier Marathon can be a great social activity. There's nothing like an all-night observing session with a hundred backyard observers to cement a lifelong interest in the hobby.

A well thought out observing list is essential to a well-run marathon. It will allow you to observe all or part of the night. If you want to break for a snack, to chat with some friends or simply to gaze at the stars with the unaided eye, you can easily rejoin the hunt at any place on your list. Additionally, your observing list can be used any clear night of the year. I keep mine always at the ready with my other charts. There's nothing better than observing a few bright Messier objects to recharge the batteries after hunting down 13th magnitude galaxies all night.

My list is a combination of one published in Don Machholz's Messier Marathon Observer's Guide and another published in the March 1994 issue of Astronomy magazine. It should be suitable for any observer located between 30 degrees and 40 degrees north latitude. The list is divided into seven sections or stages according to the time of night each group of objects is best observed. My list also includes a scheduled nap break.

STAGE 1: THE EVENING OBJECTS (7:45 - 8:30)

Order #	Messier #	Const.	RA (2000.0)	Dec.	Type	Mag.	Size
1	M45	Tau	3h47.0m	24°07'	OC	1.2	110
2	M42	Ori	5h35.4m	-5°27'	DN	---	66x60
3	M43	Ori	5h35.6m	-5°16'	DN	---	20x15
4	M103	Cas	1h33.2m	60°42'	OC	7.4	6
5	M52	Cas	23h24.2m	61°35'	OC	6.9	13
6	M76	Per	1h42.4m	51°34'	PN	12.2P	1
7	M34	Per	2h42.0m	42°47'	OC	5.2	35
8	M31	And	0h42.7m	41°16'	Gal	3.5	178x63
9	M32	And	0h42.7m	40°52'	Gal	8.2	8x6

10	M110	And	0h40.4m	41°41'	Gal	8.0	17x10
11	M33	Tri	1h33.9m	30°39'	Gal	5.7	62x39
12	M77	Cet	2h42.7m	-0°01'	Gal	8.8	7x6
13	M74	Psc	1h36.7m	15°47'	Gal	9.2	10x10

My evening sequence is unconventional and a bit risky. It is based on the order in which the Messier objects emerge through the darkening sky. This sequence has worked well for me during past marathons. However, getting hung up on any of the first ten objects could result in M74 and M77 slipping below the horizon before you get to them. First-time marathoners, observers at sites with an obstructed northwest horizon, and late-season marathoners may be better served by a more traditional sequence. The Students for the Exploration and Development of Space (SEDS) Messier Marathon section includes links to pages with more traditional search orders. Check these out and see which one works best for you.

STAGE 2: THE WINTER OBJECTS (8:30 - 9:30)

Order #	Messier #	Const.	RA (2000.0)	Dec.	Type	Mag.	Size
14	M79	Lep	5h24.5m	-24°33'	GC	8.0	9
15	M78	Ori	5h46.7m	0°03'	DN	---	8x6
16	M1	Tau	5h34.5m	22°01'	DN	---	6x4
17	M35	Gem	6h08.9m	24°20'	OC	5.1	28
18	M38	Aur	5h28.7m	35°50'	OC	6.4	21
19	M36	Aur	5h36.1m	34°08'	OC	6.0	12
20	M37	Aur	5h52.4m	32°33'	OC	5.6	24
21	M41	CMa	6h47.0m	-20°44'	OC	4.5	38
22	M93	Pup	7h44.6m	-23°52'	OC	6.2	22
23	M50	Mon	7h03.2m	-8°20'	OC	5.9	16
24	M47	Pup	7h36.6m	-14°30'	OC	4.4	30
25	M46	Pup	7h41.8m	-14°49'	OC	6.1	27
26	M48	Hya	8h13.8m	-5°48'	OC	5.8	54
27	M44	Cnc	8h40.1m	19°59'	OC	3.1	95
28	M67	Cnc	8h50.4m	11°49'	OC	6.9	30

STAGE 3: THE SPRING OBJECTS (9:30 - 11:00)

Order #	Messier #	Const.	RA (2000.0)	Dec.	Type	Mag.	Size
29	M95	Leo	10h44.0m	11°42'	Gal	9.7	7x5
30	M96	Leo	10h46.8m	11°49'	Gal	9.2	7x5
31	M105	Leo	10h47.8m	12°35'	Gal	9.3	5x4
32	M65	Leo	11h18.9m	13°05'	Gal	9.3	10x3
33	M66	Leo	11h20.2m	12°59'	Gal	9.0	9x4
34	M81	UMa	9h55.6m	69°04'	Gal	6.9	26x14
35	M82	UMa	9h55.8m	69°41'	Gal	8.4	11x5
36	M108	UMa	11h11.5m	55°40'	Gal	10.1	8x3
37	M97	UMa	11h14.8m	55°01'	PN	12.0P	3
38	M109	UMa	11h57.6m	53°23'	Gal	9.8	8x5
39	M40	UMa	12h22.4m	58°05'	DS	8.0	1
40	M106	CVn	12h19.0m	47°18'	Gal	8.3	18x8
41	M94	CVn	12h50.9m	41°07'	Gal	8.2	11x9
42	M63	CVn	13h15.8m	42°02'	Gal	8.6	12x8
43	M101	UMa	14h03.2m	54°21'	Gal	7.7	27x26
44	M51	CVn	13h29.9m	47°12'	Gal	8.4	11x8
45	M102	UMa	15h06.5m	55°46'	Gal	9.8	5x2
46	M53	Com	13h12.9m	18°10'	GC	7.7	13
47	M64	Com	12h56.7m	21°41'	Gal	8.5	9x5
48	M3	Com	12h40.0m	-11°37'	Gal	8.3	9x4

STAGE 4: THE VIRGO CLUSTER (11:00 - 12:00)

Order #	Messier #	Const.	RA (2000.0)	Dec.	Type	Mag.	Size
49	M98	Com	12h13.8m	14°54'	Gal	10.1	10x3
50	M99	Com	12h18.8m	14°25'	Gal	9.8	5x5
51	M100	Com	12h22.9m	15°49'	Gal	9.4	7x6
52	M85	Com	12h25.4m	18°11'	Gal	9.2	7x5
53	M84	Vir	12h25.1m	12°53'	Gal	9.3	5x4
54	M86	Vir	12h26.2m	12°57'	Gal	9.2	7x6
55	M87	Vir	12h30.8m	12°24'	Gal	8.6	7x7
56	M89	Vir	12h35.7m	12°33'	Gal	9.8	4x4
57	M90	Vir	12h36.8m	13°10'	Gal	9.5	10x5
58	M88	Com	12h32.0m	14°25'	Gal	9.5	7x4
59	M91	Com	12h35.4m	14°30'	Gal	10.2	5x4
60	M58	Vir	12h37.7m	11°49'	Gal	9.8	5x4
61	M59	Vir	12h42.0m	11°39'	Gal	9.8	5x3
61	M60	Vir	12h43.7m	11°33'	Gal	8.8	7x6
63	M49	Vir	12h29.8m	8°00'	Gal	8.4	9x7
64	M61	Vir	12h21.9m	4°28'	Gal	9.7	6x6
65	M104	Vir	12h40.0m	-11°37'	Gal	8.0	8x3
66	M68	Hya	12h39.5m	-26°45'	GC	8.2	12
67	M83	Hya	13h37.0m	-29°52'	Gal	8.0	11x10

STAGE 5: NAP TIME (12:00 - 2:00am)
STAGE 6: THE SUMMER OBJECTS (2:00 - 4:00)

Order #	Messier #	Const.	RA (2000.0)	Dec.	Type	Mag.	Size
68	M5	Ser	15h18.6m	2°05'	GC	5.8	17
69	M13	Her	16h41.7m	36°28'	GC	5.9	17
70	M92	Her	17h17.1m	43°08'	GC	6.5	11
71	M57	Lyr	18h53.6m	33°02'	PN	9.7P	1
72	M56	Lyr	19h16.6m	30°11'	GC	8.3	7
73	M29	Cyg	20h23.9m	38°32'	OC	6.6	8
74	M39	Cyg	21h32.2m	48°26'	OC	4.6	32
75	M27	Vul	19h59.6m	22°43'	PN	7.6P	6
76	M71	Sge	19h53.8m	18°47'	GC	8.3	7
77	M107	Oph	16h32.5m	-13°03'	GC	8.1	10
78	M12	Oph	16h47.2m	-1°57'	GC	6.6	15
79	M10	Oph	16h57.1m	-4°06'	GC	6.6	15
80	M14	Oph	17h37.6m	-3°15'	GC	7.6	12
81	M4	Sco	16h23.6m	-26°32'	GC	5.9	26
82	M80	Sco	16h17.0m	-22°59'	GC	7.2	9
83	M9	Oph	17h19.2m	-18°31'	GC	7.9	9
84	M19	Oph	17h02.6m	-26°16'	GC	7.2	14
85	M62	Oph	17h01.2m	-30°07'	GC	6.6	14
86	M7	Sco	17h53.9m	-34°49'	OC	3.3	80
87	M6	Sco	17h40.1m	-32°13'	OC	4.2	15
88	M11	Sct	18h51.1m	-6°16'	OC	5.8	14
89	M26	Sct	18h45.2m	-9°24'	OC	8.0	15
90	M16	Ser	18h18.8m	-13°47'	DN	---	35x28
91	M17	Sgr	18h20.8m	-16°11'	DN	---	46x37
92	M18	Sgr	18h19.9m	-17°08'	OC	6.9	9
93	M24	Sgr	18h16.9m	-18°29'	OC	4.5	120x40
94	M25	Sgr	18h31.6m	-19°15'	OC	4.6	32
95	M23	Sgr	17h56.8m	-19°01'	OC	5.5	27
96	M21	Sgr	18h04.6m	-22°30'	OC	5.9	13
97	M20	Sgr	18h02.6m	-23°02'	DN	---	29x27
98	M8	Sgr	18h03.8m	-24°23'	DN	---	90x40
99	M28	Sgr	18h24.5m	-24°52'	GC	6.9	11
100	M22	Sgr	18h36.4m	-23°54'	GC	5.1	24
101	M69	Sgr	18h31.4m	-32°21'	GC	7.7	4

102	M70	Sgr	18h43.2m	-32°18'	GC	8.1	8
103	M54	Sgr	18h55.1m	-30°29'	GC	7.7	9
104	M55	Sgr	19h40.0m	-30°51'	GC	7.0	19
105	M75	Sgr	20h06.1m	-21°55'	GC	8.6	6

STAGE 7: THE MORNING OBJECTS (4:00 - SUN)

Order #	Messier #	Const.	RA (2000.0)	Dec.	Type	Mag.	Size
106	M15	Peg	21h30.0m	12°10'	GC	6.4	12
107	M2	Aqr	21h33.5m	-0°49'	GC	6.5	13
108	M72	Aqr	20h53.5m	-12°32'	GC	9.4	6
109	M73	Aqr	20h59.0m	-12°38'	OC	8.9P	3
110	M30	Cap	21h40.4m	-23°11'	GC	7.5	11

Tom Polakis, a regular contributor to Astronomy magazine, suggests a somewhat altered order in his Morning Sequence. Tom suggests observers at higher latitudes consider moving M15 ahead of the Sagittarius objects. M15 is at a much higher declination than the Sagittarius objects. This makes M15 attainable earlier than the southern-most Messiers in Sagittarius. Also, Tom suggests you consider moving M55 closer to the end. His order places this globular cluster next to last, right before M30. M55 is at a southerly declination and is a difficult morning object for observers at latitudes of 40 degrees north or higher.

This article was reprinted with the permission of Bill Ferris and edited to fit our newsletter's format by Mark Deprest. Bill maintains a wonderful web site that should be in everyones favorites, at:

"http://www.cosmic-voyage.net"

Some of the Lowbrows are planning a totally unofficial and unsanctioned Messier Marathon on Saturday, March 16th at Lake Hudson State Recreation Area. Contact Mark Deprest at (734) 223-0262 for more info. This year there are two possible weekends to attempt this feat, as Saturday, April 13th falls within the suggested parameters. Michigan weather is some what unpredictable, so a back-up date is welcomed.

Charles Messier
It almost looks like he knows just how much fun we'd have with his list.
In the mid-18th century for a period of about 15 years nearly all of the comets that were discovered , were "the Comet Ferret's." Charles Messier is credited with 15 comet discoveries.

Kids theories on Science:

Submitted by Paul Walkowski

When they broke open molecules, they found they were only stuffed with atoms. But when they broke open atoms, they found them stuffed with explosions.

While the earth seems to be knowingly keeping its distance from the sun, it is really only centrificating.

There is a tremendous weight pushing down on the center of the Earth because of so much population stomping around up there these days.

We say the cause of perfume disappearing is evaporation. Evaporation gets blamed for a lot of things people forget to put the top on.

To most people solutions mean finding the answers. But to chemists solutions are things that are still all mixed up.

Rain is often known as soft water, oppositely known as hail.

Thunder is a rich source of loudness.

Isotherms and isobars are even more important than their names sound.

Not so Deep Thoughts

Also submitted by Paul Waklowski

-- Apparently from an actual newspaper contest where entrants age 4 to 15 were asked to imitate "Deep Thoughts by Jack Handey." --

I believe you should live each day as if it is your last, which is why I don't have any clean laundry because, come on, who wants to wash clothes on the last day of their life? -- Age 15

Give me the strength to change the things I can, the grace to accept the things I cannot, and a great big bag of money. -- Age 13

Democracy is a beautiful thing, except for that part about letting just any old yokel vote. -- Age 10

For centuries, people thought the moon was made of green cheese. Then the astronauts found that the moon is really a big hard rock. That's what happens to cheese when you leave it out. -- Age 6

Think of the biggest number you can. Now add five. Then, imagine if you had that many Twinkies. Wow, that's five more than the biggest number you could come up with! -- Age 6

As you make your way through this hectic world of ours, set aside a few minutes each day. At the end of the year, you'll have a couple of days saved up. -- Age 7

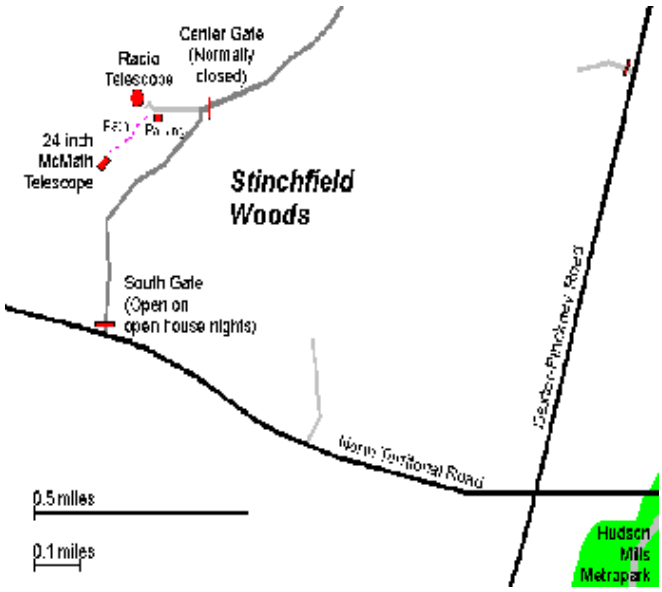
Often, when I am reading a good book, I stop and thank my teacher. That is, I used to, until she got an unlisted number. -- Age 15

It would be terrible if the Red Cross Bloodmobile got into an accident. No, wait. That would be good because if anyone needed it, the blood would be right there. -- Age 5

If we could just get everyone to close their eyes and visualize world peace for an hour, imagine how serene and quiet it would be until the looting started. -- Age 15

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 480-4514 for a recorded message on the afternoon of a scheduled Star Party to check on the status. Many members bring their telescopes and visitors are welcome to do likewise. Peach Mountain is home to millions of hungry mosquitoes - bring insect repellent, and it does get cold at night so dress warmly !

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

Membership:

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

6655 Jackson Road #415
Ann Arbor, MI 48103

Magazines:

Members of the University Lowbrow Astronomers can get a discount on these magazine subscriptions:
Sky and Telescope: $29.95 / 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 E-mail to Newsletter Editors at:
Mark Deprest (734)223-0262 msdeprest@comcast.net
Bernard Friberg (743)761-1875 Bfriberg@aol.com
to discuss length and format. Announcements and articles are due by the first Friday of each month.

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Keyholders:	Fred Schebor	(734)426-2363
	Mark Deprest	(734)662-5719

Lowbrow's Home Page:

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

This Month:

Part 2 of Eyepieces: The Other Half of Your Scope. By Charlie Neilsen

Tom Ryan Wishes Happy Birthday to the Telescope

Harry Juday's Article on Booking Via the Internet.

Bill Ferris of Flagstaff, Arizona on Messier Marathoning

Paul Walkowski Submits His Version of "Kids Say the Funniest Things"

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www.astro.lsa.umich.edu/lowbrows.html
Check your membership expiration date on the mailing label !