UNIVERSITY LOWBROW ASTRONOMERS
Ann Arbor, Michigan

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The End is Near!?! or How Near is the End?

Predicting the End of the World

by Bishop Wembley

Rather than boring you to death with articles like "How to Design A Telescope", let's talk about something fun, like the End of the World.

You can predict it, you know. Perhaps not exactly, but pretty well. You can have a 95% confidence level in your answer. You can also predict the End of the Human Race with the same level of confidence. Or the End of Your Affair, or the End of Your Job, or, in fact, the end of anything that has existed for some time and doesn't have a well known duration. Best of all, you don't have to know very much to be right. You only need to know how long something has existed, and to use a method of calculation devised by astrophysicist J. Richard Gott in 1969, to get scientifically proven and accurate results.

In 1969, Mr. Gott was visiting the Berlin wall. At that time, the wall was eight years old, and Mr. Gott began to wonder how long it might last. Having no knowledge of politics, history, or human foibles in general (astrophysicists are like that), he reasoned that, since there was nothing special about the time of his visit, there was a 50% probability that he was visiting it in the middle two quarters of its life. If his visit was at the start of the second quarter, then the wall, which had been in existence for eight years already, would last 24 more. On the other hand, if his visit were at the tail end of the third quarter, then the wall would last only another 2.7 years. Before leaving Berlin, he made the prediction to a friend that the wall had a 50% probablility of lasting between 2.7 years and 24 years. In November of 1989, twenty years after his prediction, the wall came down.

Being an Astrophysicist, Mr. Gott decided to apply scientific rigour to his method, and raised the certainty of his calculations to the 95% confidence level. This meant assuming that one is encountering the object of calculation somewhere in the middle 95% of its total lifetime, which leads to the conclusion that it will continue to exist for more than 1/39 of its present age but less than 39 times its present age.

Mr. Gott applied his method to predict the duration of political parties in power, to the run time of off-Braodway plays, to the duration of human space exploration, and to the very lifetime of "Homo-Sapiens", all with predictably accurate results (except, of course, the last, which is still not yet settled, but is nevertheless predicted). You can apply his method, too. It works.

Mr. Gott concluded that we need to get off this planet to reduce the likelihood of the total end of the human race, and that we need to do so soon, because the end of spaceflight is closing in on us. Unfortunately, it might be vanity to assume that we can avoid our fate. After all, we are designed to die, so that we may leave room for better adapted forms of life, and Mr. Gott's method doesn't specify how things end; only that they will.

Maybe the best thing we can really hope for is to keep writing code for Skynet.

You can find out more about Mr. Gott here: http://pthbb.org/manual/services/grim/

The wisdom of the good Bishop Wembley is presented here through the offices of his outstanding acolyte, Lowbrow Tom Ryan. It is widely believed impossible to determine where the Bishop's thoughts end and his acolyte's begin.––ed.

How to make a Telescope

By Jack Brisbin

While it is possible to buy inexpensive telescopes today, it is also easy and fun to make them yourself. Making a reflecting Telescope takes on different methods of involvement and interest. You can make your own telescope mirror, requiring you to grind, polish and test the optical quality of your mirror. The rewards for doing so include a sense of accomplishment, the ability to make telescopes that aren't commercially available, and the assurance that the quality of the components is high. From a professional designer's or optics user's standpoint, there are benefits gained from hands-on experience, by learning how optical and mechanical components interact.

Resources for building telescopes are available from the many companies that supply telescope components, from a number of inexpensive books on the subject, telescope making websites and from members of the local amateur telescope making community.

Recently Tom Ryan and I both members of the University Lowbrow Astronomers Ann Arbor MI, gave a presentation to members of the Ann Arbor section and Student Chapter of the Optical Society of America (OSA) titled; “How to Make a Telescope”. The lecture included grinding and polishing demonstrations with audience participation.

Tom started by discussing his past experiences in telescope making and how it has changed over the years, taking into consideration part suppliers and the impact of low cost telescopes from overseas manufactures.

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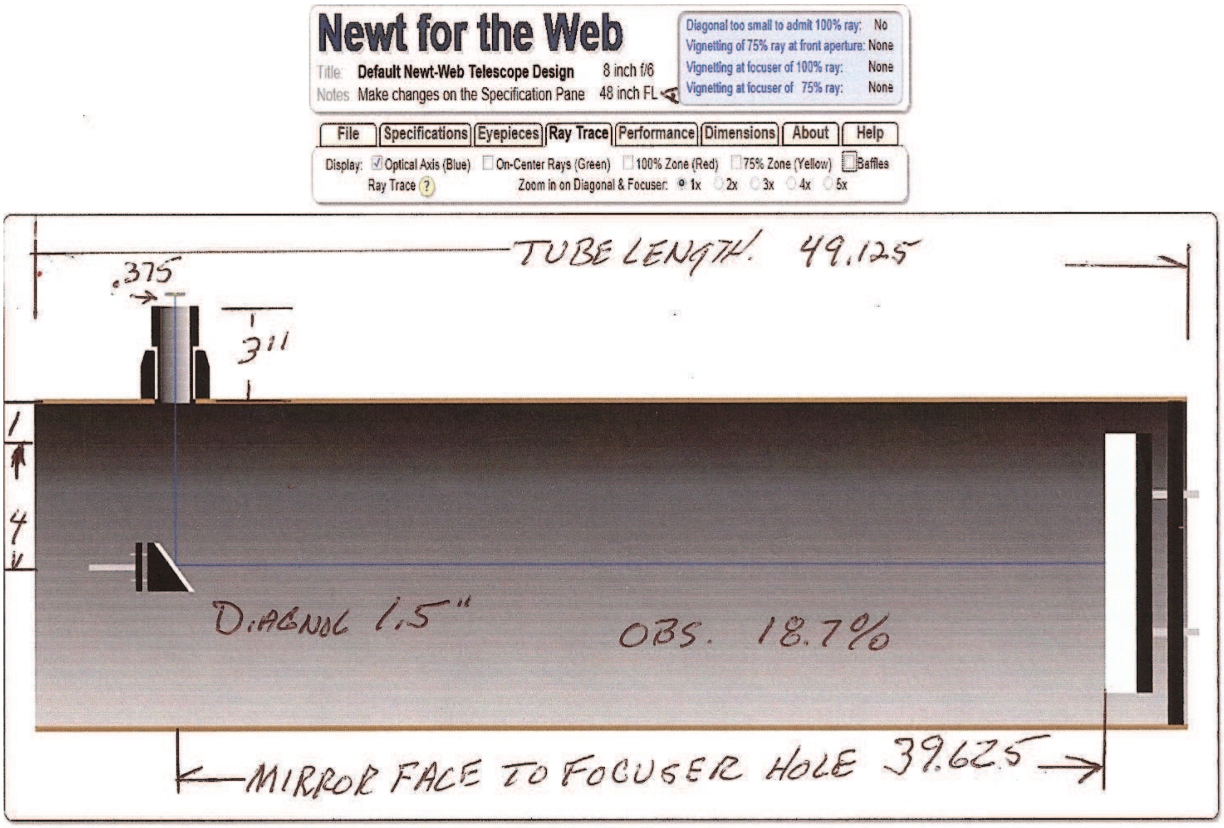
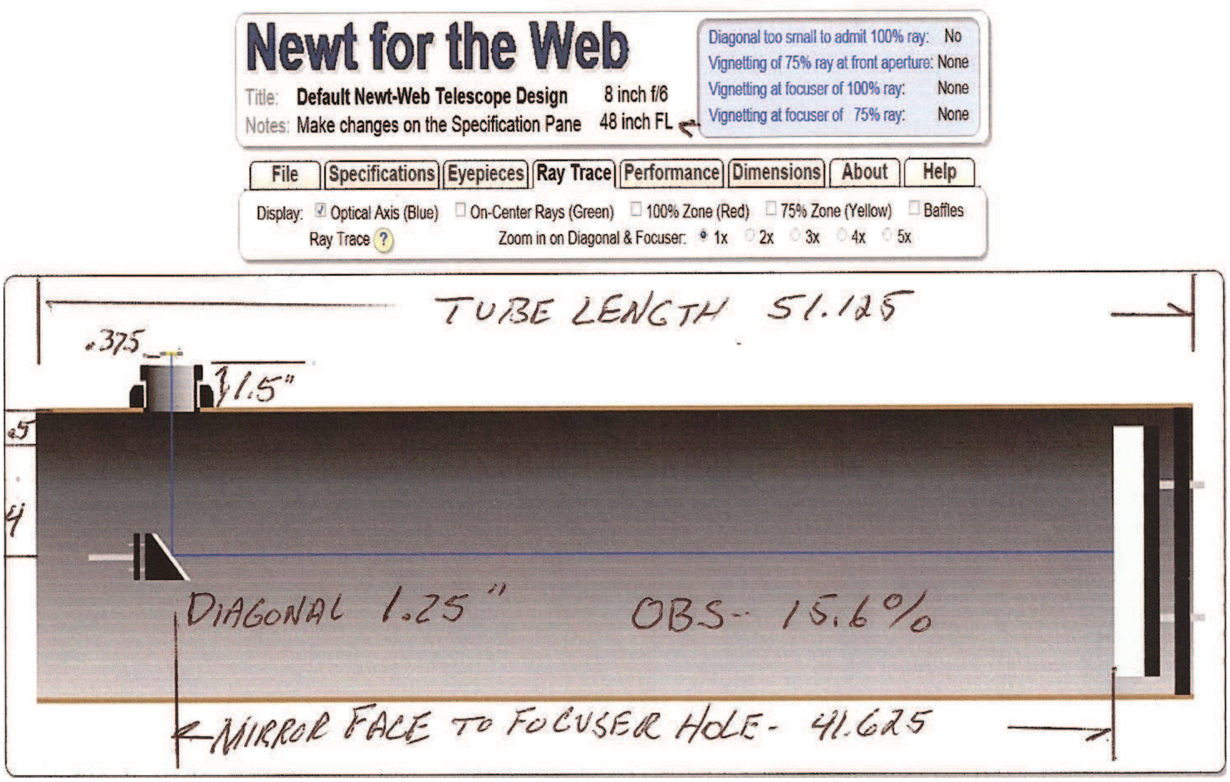
Jack’s (1) presentation discussed the dynamics of building a telescope using the Stellafane web site as a guideline for building a telescope and addressing issues relating to mirror making. We also passed out some handouts referencing the Stellafane web site. One of the web site links used was; http://stellafane.org/tm/newt-web/newt-web.html. From their web site;

“ Newt for the Web (Newt-Web for short) is a Newtonian Telescope Computer Aided Design program. It ray traces a Newtonian telescope design checking for vignetting, optimizes diagonal size, calculates baffle sizes and positions, and produces performance and dimensional data for construction. It runs in your web browser - there is no need to install a program on your computer.”

The following Newt for the Web diagram compares two 8 inch f/6 optical tube assemblies. By using a smaller secondary mirror you can reduce the central obstruction to 15 percent, but this will change your primary mirror to secondary mirror spacing and focuser location. We wanted the audience to understand what happens when you make these changes, *before you start cutting parts and drilling holes*.


Newt for the Web
Title: Default Newt-Web Telescope Design
8 inch f/6
Notes: Make changes on the Specification Pane
48 inch FL
Diagonal too small to admit 100% ray: No
Vignetting of 75% ray at front aperture: None
Vignetting at focuser of 100% ray: None
Vignetting at focuser of 75% ray: None
File
Specifications
Eyepieces
Ray Trace
Performance
Dimensions
About
Help
Display: Optical Axis (Blue)
On-Center Rays (Green)
100% Zone (Red)
75% Zone (Yellow)
Baffles
Ray Trace
Zoom in on Diagonal & Focuser: 1x 2x 3x 4x 5x
TUBE LENGTH: 49.125
.375
3"
1
4
DIAGNOL 1.5"
OBS. 18.7%
MIRROR FACE TO FOCUSER HOLE 39.625


Newt for the Web
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File
Specifications
Eyepieces
Ray Trace
Performance
Dimensions
About
Help
Display: Optical Axis (Blue)
On-Center Rays (Green)
100% Zone (Red)
75% Zone (Yellow)
Baffles
Ray Trace
Zoom in on Diagonal & Focuser: 1x 2x 3x 4x 5x
TUBE LENGTH 51.125
.375
1.5"
.5
4
DIAGONAL 1.25"
OBS. 15.6%
MIRROR FACE TO FOCUSER HOLE- 41.625

2

3

Our goal was to spend more time with hands–on grinding and polishing demonstrations to get audience participation. Tom started off with the grinding demonstration and explained the different (2) steps and type of grinding materials. Some of the grinding questions related to the optics classes students where in. The audience participation carried over to the polishing demonstrations. In the polishing demonstration people are wearing blue gloves. We are using red rouge for the polishing compound and it stains your hands red. This helped with audience participation. But this also led to a lot of discussion on the type of pitch used and what was added to it, to make it soft or hard. Some of the audience participants had a lot of experience and led to another discussion on the type of designs pressed in the pitch lap. We started the presentation about 8:15 pm and sometime after 10:00 pm the audience started to leave.

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When we started planning the presentation Tom and I agreed we did not want to rely on a 100 power point slides that would probably bore our audience. We kept our talks about 20 minutes each with 15 to 20 slides. The rest of lecture would rely on audience participation and discussion. We thought the meeting was a success-full event and would also like to welcome the newly formed Student Chapter of OSA. (4)

In June of this year, the Lowbrows received a request by David Shindell, who is a member of both the Lowbrows and the local chapter of the Optical Society of America, for a speaker to talk to the Optical Society about making telescopes. Since I'm also a member of the Optical Society and have attended a few of their meetings and know what the meetings are generally like, and because I was extremely busy with work that I should have been doing but from which I desperately wanted a distraction, I volunteered to give a talk.

The Optical Society talks are usually highly technical and often deal with cutting edge research in optics and, while nothing that I'm doing (that I can publicly talk about) is cutting edge, I thought that a description of the things to consider and the tradeoffs one makes in designing telescopes for space flight or for the military might be of general interest. I also felt that, while the talks I've given before haven't make me rich and famous, neither did they kill anyone in the audience, at least while they were being given. Of any possible lingering after effects, I disavow all knowledge and responsibility. Jack Brisbin also volunteered to give a talk, and Paul Walkowski offered to give the talk that he had previously presented to the Howell woodworking class. However, because we were the greater fools, Jack and I ended up giving a talk together.

When I first heard the talk proposed, I imagined that it could consist of a description of the process that I presently use to design telescopes. However, David had a different idea in mind. His idea was to use a beginner's level talk (one aimed at the general public) to interest enough young people to join the Optical Society, which is suffering from the same malaise that inflicts all groups that actually gather together physically in one spot in this post-Facebook age. That problem is falling attendance (or failing attendance) by young people, and I'm happy to say that Dave's plan worked. The talk that Jack and I gave was the best-attended meeting in years (or so David said – it looked just like a well-attended Lowbrow meeting to me).

Jack and I had a great time preparing for and giving the talk, and David was an unfailingly gracious and helpful host, but I never got a chance to inflict on an audience the talk that I thought I would give.

Until now.

How to Design a Telescope

by Tom Ryan

My interest in Astronomy started in the sixth grade and was further encouraged when my parents presented me with a small telescope for Christmas. In the seventh grade I became interested in making, in addition to using, telescopes. This was partly for financial reasons (it was cheaper to make a telescope then than to buy one), but was primarily driven by a desire to actually make things. Up until this point, the world had pushed upon me. I wanted to push back and form the world.

I attended a mirror-grinding class, and so learned a procedure for making telescope mirrors, but like most of the things I did at that age, my understanding of what I was doing and why I was doing it was very limited. Most of the choices made in making that first mirror were made for me. Everyone in the class made a six-inch diameter, f/8 mirror. I remember being surprised when one student made a Sheifspiegler. I hadn't realized such a thing was even possible.

I quickly decided I wanted to make the mount for the telescope, too. I pored over books and catalogs of telescopes and tried to decide which one I wanted to build. Lacking any kind of criteria for judging them, I built several mounts. (This could be called the Edison method, or A Serious Failure of Design.) One mount consisted of an engine block on 8x10 lumber, with the crankshaft as the the polar axis. This was mounted on 12" inflatable wheels, because it was too heavy to pick up and carry and too ugly to leave out for the neighbors to see. Another was a yoke mount which made reaching the eyepiece a frequent challenge. A third was an equatorial, which eventually evolved into a fork mount.

My design method was to prowl the local junk yard, and if I came across anything that looked like it could be a part of a telescope, I would buy it with the thought that I could make the rest of the telescope using it as a starting point. This process continued for many years and resulted in the accumulation of a lot of strange and useless metal parts, including tubes, bearings, pulleys and motors. A junkyard in miniature, so to speak. The only mitigating factor in all of this was that when China recently decided to bid up the price of metals, I sold it all for a ridiculous profit.

This is not the way to design a telescope.

It wasn't until I joined the Lowbrows and met Roger Tanner that I realized I was doing it all wrong. Roger actually designed his telescopes for a purpose, rather than having them grow piecemeal according to what was found in the junkyard that day. This method (called engineering) was a revelation to me at the time, despite having graduated from the University of Michigan, and I've tried to follow his example in all of my subsequent designs. I now design telescopes to meet design requirements.

What are design requirements? Usually, requirements consist of performance specifications, and by this I don't mean, make it a 6" f/8. Usually, performance specifications are something like, the device must be able to view an object field of such and so extent under light conditions varying from something to something else, over a temperature range of this to that, and survive vibration levels of so much and should take up less space than you would like and weigh less than anything you've ever seen and have a resolving power of X line pairs per millimeter over a spectral range of this to that and it should zoom, have bluetooth and should also walk the dog, when the dog needs to be walked. Plus, it must be cheap and easy to make.

There was some exaggeration in the last paragraph (but not as much as you might think), but it does convey the idea that a telescope is not just built to look like other telescopes because we just want a telescope. A telescope is built to perform a specific task. But once that task is specified, how do we decide on which telescope we should build? Which design choices should be made first?

Not surprisingly (at least, to anyone who uses Engineering in their designs), the first thing to consider is a list of objects to be viewed and the resolution at which we will view them, because this will determine the field of view, the wavelengths used, and will affect the focal ratio and sometimes the aperture.

The next thing to consider is the choice of a detector. The detector might be a human eye or a CCD or a photodiode or (less likely nowadays) photographic film, but whatever it is, its choice will have a profound effect on the telescope's design.

The third thing to consider is the environment in which the telescope will live. Is it air? Does it see weather? Is the temperature high or low, and does it change quickly? Is the telescope coddled in someone's garage, or is it going to be subject to violent shaking every time a guy on the other side of the world presses a button? Does it live in an area where price is no object, or (more likely) is the dollar budget as constrained as the photon budget?

All of these things go into deciding the telescope's characteristics, and the number of detailed considerations can be quite high. In truth, when I design a telescope, all of these considerations spin around in my head for a while and eventually, out comes a telescope. I really have no idea what actually happens up there, but I'll try to describe what I think might be happening, while (for brevity's sake) minimizing the description of the (many) Do Loops.

First, let's look at the List of Objects to be viewed.

Normally, this requirement would appear as a field of view (FOV) specification. Maybe someone wants to image Jupiter and only Jupiter, in which case the telescope would end up having a very small field of view. Most telescope designs will work for this. However, if the object to be viewed is larger, like certain nebula or the Milky Way, then the number of telescope designs that will work is more limited. Eventually, with a wide enough FOV, your telescope becomes an All Sky Camera, and the only solutions are a fish eye lens or a Baby Moon hubcap. In any case, let's assume at this point that we have a specified FOV.

The list of objects viewed will implicitly determine the wavelengths at which the telescope is used. If the range of wavelengths is narrow, then both mirrors and lenses can be used. If it is very wide, then mirrors become more attractive.

The next thing to determine is the required resolution on the object viewed, because this leads us to the number of pixels across the image plane, whether that plane is a CCD or a retina. Once we have this number, we may find that no one makes a CCD (or a retina) with the required number of pixels, and if this is the case, then we've encountered our first Do Loop and we have to adjust our specifications. For example, if a person wants a million pixels of real resolution across the disk of Jupiter, then they may actually have to go there and image onto multiple contiguous detectors, and that's a specification problem. We also have a Budget Do Loop that runs with every iteration, but that will be assumed from now on.

At this point, we have a field of view and a wavelength range and we've looked at some detectors. We don't yet have an aperture size, or a focal length, or even a focal ratio, to say nothing of the kind of optics we will use. Fortunately, looking at the available detectors which have the required wavelength sensitivity and pixel count has shown us that we can (hopefully) choose from several detectors, all of which will also have their pixel sizes specified.

Pixel size is important, because it determines the focal ratio in optimized systems.

It is a peculiar fact that all telescopes, big or small, long or short, simple or complex, which are diffraction-limited and have identical focal ratios, focus the light of a star onto identically-sized spots. In other words, the physical width of the spot size of a good telescope depends only on the telescope's focal ratio.

Well, it depends on the wavelength, too, but the wavelength has already been given and is no longer a design variable.

The most efficient designs match the spot size (and, consequently, the telescope's focal ratio) to the detector's pixel size. The exact matching rule is that the spot diameter, or the Airy Disk diameter, should be twice the pixel width, and this comes from the Nyquist sampling theorem. Specifically, the relationship is:

$$\text{Airy Disk diameter} = 2.44\lambda(f/no),$$

where λ is the wavelength, in microns, of either the center or the short end of our telescope's wavelength range, and (f/no) is the telescope's focal ratio, which is the focal length divided by the aperture diameter. If your wavelength range is in the visible, then λ is about 0.5 microns, and the equation says, roughly, that to have two pixels under the Airy disk, your focal ratio should equal your pixel width, when the latter is measured in microns. Therefore, a detector with 9 micron pixels should be matched to an f/9 telescope, and a detector with 25 micron pixels should be matched to an f/25 telescope.

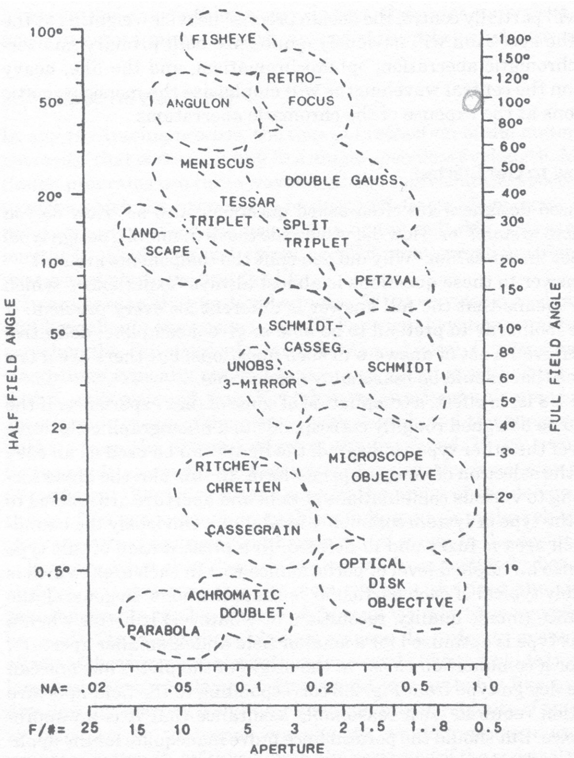
This relationship can be violated in a few special cases. If you are taking videos of planets, then you may want to have many more pixels under the spot size than the two specified above, for reasons that we don't have space to describe. Alternately, if you are making camera lenses for production, your spot size is much bigger than the theoretically perfect one specified in the formula, and your pixel size can be chosen for other reasons. Camera lenses are not telescopes, though, and are usually far from being diffraction-limited. But if you are making an optical system for the lowest possible price that is also diffraction-limited in order to see something that you really must resolve, then you make your spot (the Airy disk) cover two pixels, and you do this by setting the focal ratio to the correct number.

Now we have the telescope's field of view, the wavelength range, and the focal ratio. Next, we can use the detector's physical width to determine the telescope's focal length. Remember, we have a field of view we'd like to place onto the detector. Our object in the sky will be nicely framed by the detector at only one focal length. If the focal length is too great, the object won't fit onto the detector, and if the focal length is too small, the object won't fill the detector. The focal length calculator is an isosceles triangle, with the short side being the detector's width, and the angle between the equal legs being the angular field of view. Then, the distance from the vertex of the equal-length legs to the middle of the short leg is our telescope's focal length.

And finally, with the focal ratio and the focal length known, we can determine the final requirement, the aperture, since

Aperture = (Focal Length)/(Focal Ratio).

There. That part was easy, wasn't it? We still don't know exactly what our telescope looks like, but fortunately, most of the work in determining this next design step has already been done for us. In his excellent book, Modern Lens Design, Warren Smith published the following chart.



This remarkable chart (which includes telescopes, but which also covers many other optical designs) shows the design solutions to the input requirements of focal ratio, here misleadingly called "Aperture", and of field of view, here called "Full Field Angle". So, if our telescope must have a field of view of 0.5 degree and a focal ratio of f/8, then a Newtonian telescope is where we should start our detailed design. On the other hand, if we need to cover a field of view of 20 degrees with a focal ratio of f/2, then we should be looking at a split triplet refractive design. (The penciled circle on the chart represents a system I designed for the military, since patented.)

The procedure described here is a far cry from the way most telescopes are designed. Usually, someone buys a mirror at a swap meet, and.....but we've already discussed that method. The real way to design a telescope is by using specifications. And Engineering.

I suggest you try this method yourself. Choose the objects you want to see, put them on a spreadsheet along with their angular extents and desired resolutions, then use the method described above to design the telescope that can image them, and see what you end up with. It might surprise you. Be especially careful to leave out your preconceived notions of what a telescope should look like. Remember, aperture is chosen last. Your intuition is no guide, here.

When I was 15 years old and prowling the junk yard, I let intuition be my guide, and I ended up making another junk yard. When I was 30, I assumed my intuition was wrong about how to design telescopes. I used engineering instead and became a fairly successful telescope designer. My success in this area is due almost entirely to the fact that I knowingly set aside my own opinions and base my work only on objective facts, no matter where they lead.

Now that I'm almost 60, I find a strange thing is happening. I'm seeing case after case in my daily life where my animal intuition has led me astray. This is very disturbing, because it is affecting the fundamental characteristics of the person I think I am, and is leading me to question my actions and beliefs daily.

Jeff Hawkins, in his book On Intelligence, says our "intelligence" can be entirely explained by assuming that our brains are simple devices that remember patterns, play them back, and compare that playback to what we experience. So basically, we are a bit of hard wiring from the days when we were reptiles, plus a collection of previously memorized patterns stored in the recently evolved mammalian cerebral cortex. But which patterns get stored for playback? Do we remember all that we experience?

We are proud to think that our beliefs result from rational, well reasoned arguments based on facts, but David McRaney, in his book and blog You Are Not So Smart, says we are blind to objective reality. He says our opinions are derived from filtered data, cherry-picked to confirm our already-held beliefs. For example, think of an opinion you find repugnant. Got it? Think a bit more on this. Blink. Stop reading for a minute. Now you've got it? Now do research into the reasons why that opinion might actually be correct, and make an argument to your spouse and your friends in favor if it. Shying away already? Welcome to the junkyard. Lots of reptiles here.

Rationality is hard. We're not built for it, but the rewards we could get from achieving it are very great.

Thanks, Roger.

This essay only addressed the basic, initial choices made in the design of telescopes, and didn't go into detail about esthetic or environmental trades. We'll leave that for a later article, to be published only after we've determined that the number of dues-paying Lowbrows, after reading this, has not dropped precipitously.

I Like to Observe Comets!

by Mark S. Deprest

When Lowbrows want to know something about comets, they come to me. When I plan an observing session, I always check the positions on the brightest of comets at the time. When visitors join us at Peach Mt. and ask about comets, everyone sends them to me. That's right I'm the "Comet Guy". I don't know if every club has one, but our club does, and I guess I'm it!

It's true I know something about comets having been fascinated with them since Hale-Bopp & Hyakutake came close back in 1995 – 1996. However, they were not the first comets I have seen with my telescope, that distinction belongs to Comet 6P d'Arrest seen on August 5, 1995 at Peach Mt. Observatory with my 8" Dobsonian a.k.a. "Gilda". Interestingly enough I saw this first comet of my collection with a moon that was 2 days past first quarter high in the sky. Estimates on that particular comet at that time were about 8th magnitude. A well respected and seasoned amateur astronomer, warned me that magnitudes for comets are not the same as magnitudes for stars. That magnitudes which are listed for comets are overall magnitudes and depending on how diffused the comet is will greatly affect its visual perceptibility. He also warned me that I may not be able to see this particular comet, citing the size of my scope may not be large enough to pick this comet out of the sky glow or background.

I love a challenge and this sure seemed like one to me. So, undaunted I set about printing finder charts and hoped for clear skies on Saturday night. When Saturday night came and clear skies prevailed, I drove to Peach Mt. and set my little 8" Dobsonian up in front of the observatory. At about 23:00 EDT my efforts were rewarded with a small fuzzy smudge centered in my eyepiece that would managed to ignite a burning passion somewhere deep inside of me. I was hooked on seeing more of these solar systems travelers that has continued for almost 2 decades.

Now, I'm being told that I have reached a milestone, 100 comets and still that passion burns, that incredible fascination with these ancient visitors. I am reminded of the words to Led Zeppelin's "Kashmir":

Oh let the sun beat down upon my face, stars to fill my dream
I am a traveler of both time and space, to be where I have been
To sit with elders of the gentle race, this world has seldom seen
They talk of days for which they sit and wait and all will be revealed

Hey, I'm not a poet, I'm an amateur astronomer with fascination for comets and since you know a little bit about my first comet, let me tell you a little something about my 100th comet.

First of all its official name is 168P Hergenrother, yes, I know it just rolls off the tongue ... It currently has a magnitude estimated at about 9.4 and has very recently been confirmed that the nucleus has split. (for more info on this go to: http://bit.ly/SmFVk3)This instability in its composition resulting in this nuclear split is no doubt the cause of its current brightening. Because this comet with a 6.9 year periodic orbit discovered in 1998 was not suppose to get any brighter than 15.1, but on September 6th of this year Juan Jose' Gonzalez-Suarez reported a comet in outburst when it brightened to 11.2 magnitude. On the night of October 20th at the Club's Open House, I pulled out my charts and slewed my scope to the point in the sky where this comet was hiding and bingo! I estimated its overall magnitude at 9.5 and fan shaped coma about 3' in size. As the night went on I returned to the comet and after the moon set, I went back to it and noticed it was sporting 2 tails! The most prominent extended about 15' toward the east and a smaller, fainter tail extending about 6' toward the east-northeast. Now, I'm not ready to say I was seeing the nucleus splitting, but there was a second tail! At any rate my latest comet is my 100th and very memorable.

The New Lowbrow Blog

by Dave Snyder

A month ago, I created a Lowbrow Astronomy blog as an experiment.

So what is a blog?

Google defines a blog as "A Web site on which an individual or group of users record opinions, information, etc. on a regular basis." But that's only part of it, most blogs are meant to be read by other users.

Blogs have become quite widespread. The types of opinions and information found on blogs vary widely as does the nature of the audience. Blogs have become at least in part because of software that allows people to easily create and update a blog.

Why create a Lowbrow blog?

If the Lowbrows wish to have any kind of public presence at all, we need to have a web presence. We have an existing website, but it's showing its age (it was created about 15 years ago) and it needs work. While I could continue to add to the existing web site, I wanted to explore alternatives. My goal was to create a new web presence that shows outsiders some of the diversity of the club. A possible solution: keep the existing web site, but augment it with a blog as a place to add new content.

Is this working?

So far, I'd say yes, it is easy to add content to the blog. It also has the advantage that the work can be distributed among two or more people (which is difficult with the existing web site). At the moment, there are two people who are writing posts, and there is the possibility of adding other people as well.

What are the challenges?

While setting up the blog was easy, the hard part is thinking of new things to say on a regular basis. We will need help from club members to make this work.

There are several possible sources of content; In particular people in the club regularly use the club email list and the newsletter to express themselves. We cannot copy all the club emails or all the articles in the newsletter to the blog, but with the author's permission, some could be used as content for the blog. Quite frankly there is a lot of interesting material within messages in the email list and within articles in the newsletter, and it's a shame that most of it is not shared with a larger audience. It may take a while before the club sees the blog as yet a third way to express themselves.

Anything else?

To see the blog, go to http://lowbrows.blogspot.com. The 7 most recent posts are shown in reverse chronological order. To see older posts, use the "Blog Archive" (at the bottom) or the "Older Posts" link (near the bottom).

If you'd like an email update as new entries are added to the blog, go to the blog and look for a box on the upper right marked follow "Follow by Email..." Enter your email address and press "Submit."

Some sample posts.

(see page 10)

Lowbrow Calendar

Saturday November 10, 2012. *(10:30AM). Saturday Morning Physics. (Hosted by the University of Michigan Physics Department). Alicia Aarnio (U-M Astronomy). "The Sun as a Star."*
Saturday, November 10, 2012. *May be cancelled if it's cloudy or too cold. (Starting at Sunset). Open House at Peach Mountain [follow this link for up to date information].*
Friday, November 16, 2012. *(7:30PM). Monthly Club Meeting.*
Saturday, November 17, 2012. *May be cancelled if it's cloudy or too cold. (Starting at Sunset). Open House at Peach Mountain [follow this link for up to date information].*
Saturday December 1, 2012. *(10:30AM). Saturday Morning Physics. (Hosted by the University of Michigan Physics Department). Keren Sharon (U-M Astronomy). "Gravitational Lensing—Nature's Largest Telescopes."*
Saturday December 8, 2012. *(10:30AM). Saturday Morning Physics. (Hosted by the University of Michigan Physics Department). Heidi Wu (U-M Physics). "Cosmic Rhapsody: From the Echo of the Big Bang to the Orchestration of the Universe."*

Wednesday, October 24, 2012

Lowbrow Open House 10/20/12

Wow! Here are a few pictures from our most recent open house.
http://ottumcanon5d.shutterfly.com/pictures/8

Posted by Veronica at 12:38 PM

Labels: Lowbrow Open House 10/20/12, star parties

Which Galaxy Is Earth In? Most Gen-Xers Don't Know It's The Milky Way, Report Shows

If you accept the thesis that an understanding of science and technology is important for a healthy and thriving economy, then stories like this are troubling. It is like a broken record, yet another survey shows that people in the United States do not understand science.

This time it was a survey of 4000 Americans between the ages of 37 and 40. Participants were shown a picture of a spiral galaxy and then asked a few questions.

Only 43% said that the picture showed a galaxy similar to our own galaxy. Men did slightly better than women, and people with a college education did better than those without a college education.

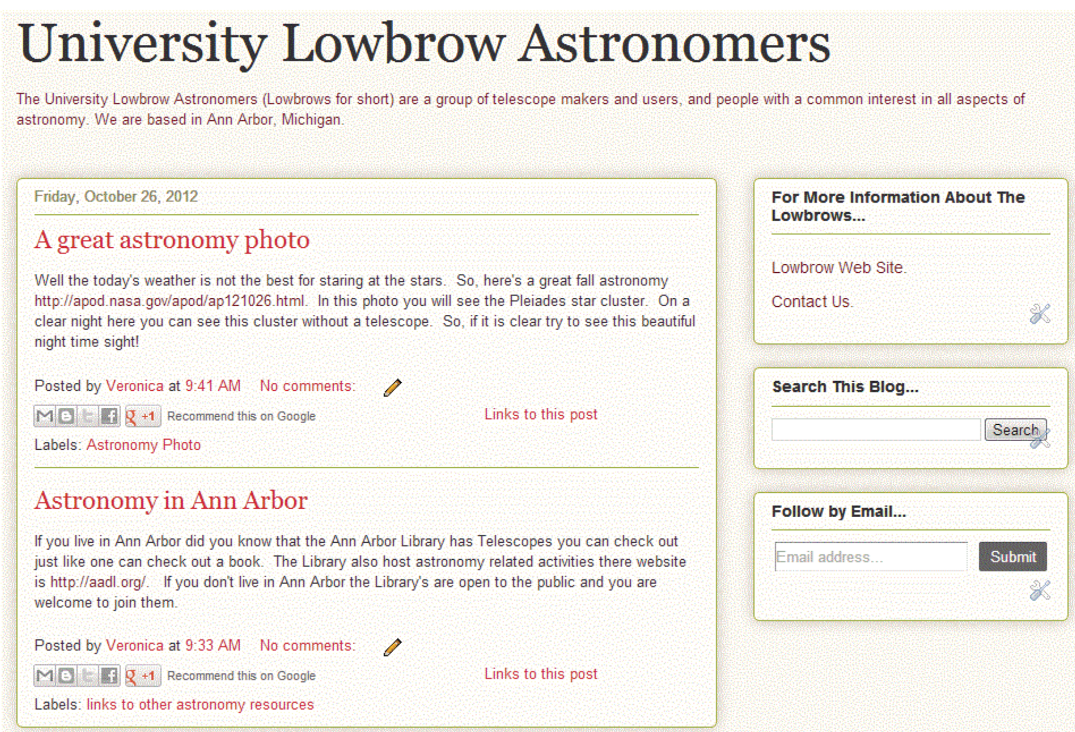
The author of the report, Jon D. Miller (the University of Michigan Institute for Social Research), has concluded that one of the factors that distinguish people with a good understanding of science is exposure to college level science classes.

For more details see Which Galaxy Is Earth In? Most Gen-Xers Don't Know It's The Milky Way, Report Shows (http://www.huffingtonpost.com/2012/10/23/galaxy-earth-gen-x-milky-way_n_2006102.html).

Posted by Dave Snyder at 8:54 AM

Labels: science education

To see all the posts, go to http://lowbrows.blogspot.com



University Lowbrow Astronomers

The University Lowbrow Astronomers (Lowbrows for short) are a group of telescope makers and users, and people with a common interest in all aspects of astronomy. We are based in Ann Arbor, Michigan.

Friday, October 26, 2012

A great astronomy photo

Well the today's weather is not the best for staring at the stars. So, here's a great fall astronomy http://apod.nasa.gov/apod/ap121026.html. In this photo you will see the Pleiades star cluster. On a clear night here you can see this cluster without a telescope. So, if it is clear try to see this beautiful night time sight!

Posted by Veronica at 9:41 AM   No comments:

+1 Recommend this on Google   Links to this post

Labels: Astronomy Photo

Astronomy in Ann Arbor

If you live in Ann Arbor did you know that the Ann Arbor Library has Telescopes you can check out just like one can check out a book. The Library also host astronomy related activities there website is http://aadl.org/. If you don't live in Ann Arbor the Library's are open to the public and you are welcome to join them.

Posted by Veronica at 9:33 AM   No comments:

+1 Recommend this on Google   Links to this post

Labels: links to other astronomy resources

For More Information About The Lowbrows...

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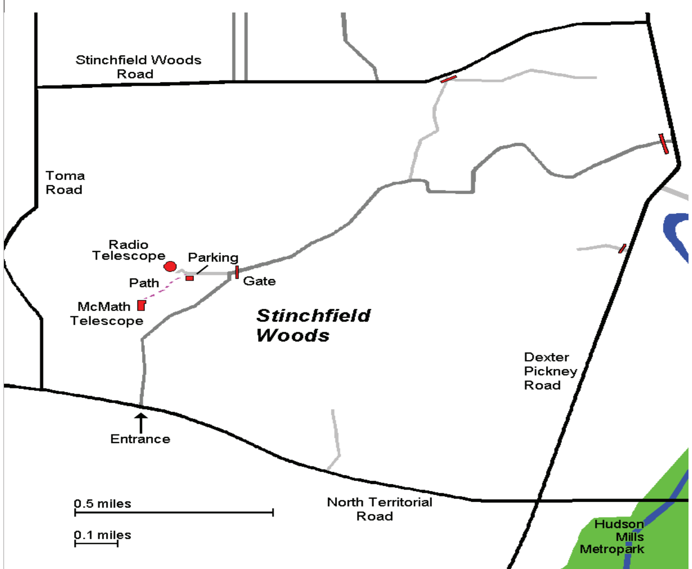
Places & Times

Dennison Hall, also known as The University of Michigan's Physics & Astronomy building, is the site of the monthly meeting of the University Lowbrow Astronomers. Dennison Hall can be found on Church Street about one block north of South University Avenue in Ann Arbor, MI. The meetings are usually held in room 130, and on the 3rd Friday of each month at 7:30 pm. During the summer months and when weather permits, a club observing session at the Peach Mountain Observatory 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" telescope which is maintained and operated by the Lowbrows. The observatory is located northwest of Dexter, MI; the entrance is on North Territorial Rd. 1.1 miles west of Dexter-Pinckney Rd. A small maize & blue sign on the north side of the road marks the gate. Follow the gravel road to the top of the hill and a parking area near the radio telescopes, then walk along the path between the two fenced in areas (about 300 feet) to reach the McMath telescope building.



Public Open House / Star Parties

Public Open Houses / Star Parties are generally held on the Saturdays before and after the New Moon at the Peach Mountain observatory, but are usually cancelled if the sky is cloudy at sunset or the temperature is below 10 degrees F. For the most up to date info on the Open House / Star Party status call: (734)332-9132. Many members bring their telescope to share with the public and visitors are welcome to do the same. Peach Mountain is home to millions of hungry mosquitoes, so apply bug repellent, and it can get rather cold at night, please dress accordingly.

Membership

Membership dues in the University Lowbrow Astronomers are $20 per year for individuals or families, $12 per year for students and seniors (age 55+) and $5 if you live outside of the Lower Peninsula of Michigan.

This entitles you to the access to our monthly Newsletters on-line at our website and use of the 24" McMath telescope (after some training).

A hard copy of the Newsletter can be obtained with an additional $12 annual fee to cover printing and postage. Dues can be paid at the monthly meetings or by check made out to University Lowbrow Astronomers and mailed to:

The University Lowbrow Astronomers

P.O. 131446

Ann Arbor, MI 48113

Membership in the Lowbrows can also get you a discount on these magazine subscriptions:

Sky & Telescope - $32.95 / year

Astronomy - $34.00 / year or $60.00 for 2 years

For more information contact the club Treasurer at:

lowbrowdoug@gmail.com

Newsletter Contributions

Members and (non-members) are encouraged to write about any astronomy related topic of interest.

Call or Email the Newsletter Editor: **Jim Forrester (734) 663-1638 or jim_forrester@hotmail.com** to discuss length and format. Announcements, articles and images are due by the 1st day of the month as publication is the 7th.

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Lowbrow's Home Page

http://www.umich.edu/~lowbrows/

Email at:

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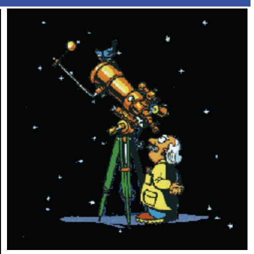
Reflections & Refractions



Website
www.umich.edu/~lowbrows/

Mark Deprest's One Hundredth Comet– Way To Go Mark!

Photo by permission

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