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University Lowbrow Astronomers

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Volume 36 Issue 3

LOWBROW 2011 YEAR IN REVIEW

AS submitted by Charlie Nielsen

It was another busy year for the University Lowbrow Astronomers. Club and public outreach activities continued on a busy schedule like the last few years, but if there was something that made last year unique it would be the introduction of having remote speakers for several of our monthly meetings. This was accomplished using "Skype", and several speakers were recruited by VP, Belinda Lee and Newsletter Editor, Mark Deprest. They did not come up with some names that most of us would not have recognized; rather they produced several speakers that are well known or famous in astronomy and popular science. These "virtual" meetings began in March with famous comet hunter David Levy. David spoke to us from his Arizona home, about how he discovers comets. We had a full room for this meeting and we all seemed to enjoy his talk and his personal charm. In June we were entertained by popular astronomy equipment reviewer, Ed Ting. Ed spoke to us about some of the best and the worst astronomy equipment to recently hit the market. He was at his New England home. We very much enjoyed Ed and have scheduled him again for 2012. Next was Bob Berman for our September meeting. Bob is a famous astronomy writer, educator and popularizer. He spoke to us about light and color in the universe and I found his talk to be interesting well beyond the title. This was followed in October with famous astrophotographer and supernova hunter, Jack Newton. Jack and his wife live in Canada part of the year and Arizona in the colder months. I believe we connected to him at Arizona Sky Village. I believe he told us that his location in Canada was drier than the one in Arizona. Who would have guessed that? We found his talk on supernova hunting and astrophotography to be very educational and he was very humorous while doing it. Our last Skype meeting was the following month, November. We had the pleasure of being connected to educator and pod-castor, Pamela Gay, from her home in Southern Illinois. Dr. Gay spoke to us about the new media and its effects on astronomy and technology. She was very pleasant and well spoken. I think most of would agree that our virtual meetings went very well. They provided us with the reality of having some top-notch speakers that we would not otherwise likely have due to location and/or expense.

For the other 7 months of meetings we had our speakers in the flesh, so to speak. In January we had Weather Underground co-founder Jeff Masters, talking to us about future extreme weather. The last I knew his site was the second most visited weather related website on this planet! For February our own Mark Deprest presented to us yet again; this time doing "No-Cost Astronomy, Part 2". I like these talks because he presents the software well, and the ones I really like I can download and install knowing they did not blow up his computer, and likely will spare mine as well. In April we had our annual elections, with 2 changes in positions. Liz Calhoun stepped down as Treasurer. Thank you for your service to the membership Liz. You stepped up when we needed you and did a great job. Welcome back Treasurer Doug Scobel. Doug was Treasurer a few years back and held the position for a long time. He ran a fine ship, but I guess we did not beat him up enough to prevent his eventual return. Long time member, Jack Brisbin replaced Paul Walkowski at one of the VP positions, but Paul remains as our representative to GLAAC. Thanks for your service as VP, Paul, and welcome to the officer crew, Jack. Rudi Lindner returned to us in May. Rudi has presented to us many times and he is always very good. This time the subject was refreshing different, Flying Saucers. His talk was a good history lesson and very entertaining. In July we met at Sherzer Observatory on the campus of Eastern Michigan University. Norb Vance gave us an excellent demo of their new and innovatively designed planetarium, while eating massive quantities of pizza and cookies. We had a great time, and even got out of the building without getting food or drink on his optics. The August meeting featured teacher and telescope reviewer, Tom Trusock. Tom is the guy behind the "Cloudy Nights" website. He does really good presentations and this was no exception. He spoke about observing the entire Hubbell Sequence of galaxy types in our autumn skies. He was also our speaker for the August meeting 2 years ago. Our last meeting of 2011 was December (which seems to always be the case) and we had U of M Professor Dr. Xianzhe Jia. He was very pleasant and talked to us about mysterious signals from Saturn.

Our club carried on as usual with a multitude of public outreach events, and attempted ones. Our first attempt was on February 11 when we were slated to appear at the U of M Botanical Gardens in concert with our friends from the U of M Student Astronomical Society. But February + Michigan = Clouds, and we did not violate the formula. We were asked to do a series of presentations for AA Schools, grades 3-5, as we did the previous year. It started on March 3 at Bach Elementary, then Haisley on March 14 and Wines on March 29. We made our presence known at the U of M Museum of Natural History on March 25. We were part of the Museum's special day featuring water. We made a poster showing where water could be found in various forms through our solar system and beyond. We borrowed some equipment from the Physics Demo Lab (Thank you Warren Smith) which allowed us to show some spectral signatures of water on a laptop screen (and yes it was hooked up to a telescope). Another demo involved a small vacuum chamber in which we could lower the atmospheric pressure and boil water at room temperature. We made our annual trek to Camp Hazelwood on May 17, and again May 24. It rained on the first date so we ran plan B, which was some indoor demos and activities. The second date allowed us to observe the night sky. We did 2 dates at Leslie Science and Nature Center; July 14 and August 4. We did run both events but the weather was much better for the August date. On August 26 we showed up in Scio Farms Estates, in which the author lives. The sky conditions were not too bad and Mike Radwick captured a real nice image that night. We and our guests from the community had a great time; almost as good a time as the mosquitoes had early in the evening. Our little flying friends were a real serious problem all summer, everywhere we went. On October 8 we appeared yet again at Leslie Science Center for our participation in "International Observe the Moon Night", and we did just that, along with Saturn and a few deep sky objects. We enjoyed a large and happy crowd of guests. Just 3 days later we collaborated with the AA Public Library for a screening of "City Dark", a fine documentary about light pollution. Jack Brisbin did the movie intro and he and I answered questions after the show. This was arranged by Amy Cantu who works for the Ann Arbor Library and has been an active Lowbrow member for many years.

As far as our Peach Mountain open houses go we had 11 successes and 8 cancels. That is a .727 average! Not too bad for around these parts. We also participated in the GLAAC event, Astronomy at the Beach, as always. We had a few ACNO events scattered about the year as well.

Our bank account continued to carry a healthy balance though we did spent several hundred dollars in total for some of our speakers. We had a discussion at a meeting in the fall regarding speaker expenditures, particularly for the "Skype" speakers. General consensus was that we want future meetings of this type, but if we spend as much in future years as this year we would begin to erode the treasury. Therefore we at least need to be cognizant of this as we proceed, and may develop written guidelines in the future. We have maintained a membership count of 100+. Meetings have drawn a minimum of about 20 people to 40+ a few times. Open house attendance varied from as few as single digits to 30 or 40 for some of them. With the Astronomy Department ceasing radio telescope operations in July of 2012, our future on Peach Mountain is very uncertain. This will almost certainly be our biggest challenge in many years, but I remain optimistic that we will find a solution.

That concludes my 2011 report, under the fear that something worthy of writing about is escaping my memory. If I find in the next few days or weeks that it is true then I guess the Newsletter Editor gets an addendum to this article to print. It would be shorter so you may not fall asleep this time.

Charlie Nielsen

Feb. 5, 2012

Editorial Comment:

Thank you, Charlie for all of your hard work, and the to all of the Lowbrows who made 2011 another great year of amateur astronomy, thru various outreach programs. You all deserve a big round of applause!

Nucleosynthesis

Dave Snyder

There are approximately 90 chemical elements found in nature. How were these elements created? A complete answer to this question is complicated and beyond the scope of this article, but it is possible to take a few simple concepts along with addition and subtraction, and obtain a rough understanding of how elements are created. In brief, elements are created in the big bang, stars and supernovae. They start with hydrogen and step by step work their way up to uranium and beyond.

Atoms consist of protons, neutrons and elections. Nucleosynthesis (the process of creating elements) for the most part ignores electrons. This leaves protons and neutrons in several hundred different combinations; each with a different number of protons (Z for short) and neutrons (N for short). Hopefully this will be clear with a specific example, the element carbon.

All carbon atoms have 6 protons, Z=6 for all carbon atoms. There are different variations (isotopes) of carbon. One isotope of carbon is called carbon-12. Whenever you see an element followed by a number, such as carbon-12, the number represents N+Z. A is the symbol used for N+Z, so we have three symbols A, N, Z. For carbon-12, Z=6 (all carbon atoms have Z=6), A=12 and N=A-Z=6. Another isotope, carbon-13 has Z=6, A=13 and N=A-Z=7. A similar procedure works for other isotopes and other elements.

Nucleosynthesis proceeds primarily by three processes: fusion, neutron absorption and beta decay.

Take two atoms, merge them together, and create a bigger atom. That's the essence of fusion. For example we can fuse a carbon atom (Z=6, N=6) with a helium atom (Z=2, N=2) to create an oxygen atom (Z=8, N=8). It is possible to start with hydrogen (Z=1) and after many fusion steps produce elements through gallium (Z=31).

Neutron absorption takes an atom, adds one neutron, and builds a bigger atom. (Z is unchanged, and both A and N increase by 1). Neutron absorption typically starts with iron (Z=26) and after dozens of steps can produce elements up to uranium (Z=92) and beyond. Note that fusion produces lighter elements and neutron absorption heavier elements but there is overlap, elements between iron (Z=26) and gallium (Z=31) are produced by both processes.

Fusion frequently produces atoms that have too many protons and not enough neutrons; this imbalance leads to a process called beta decay where a proton is changed into a neutron. (A is unchanged, N is increased by 1, Z is decreased by 1). During neutron absorption, the opposite problem occurs, atoms with too many neutrons and not enough protons. This imbalance also leads to beta decay, but in this case a neutron is changed in to a proton. (A is unchanged, N is decreased by 1, Z is increased by 1).

Fusion

Fusion occurs in several steps:

Big Bang: The big bang starts as a high temperature mixture of exotic particles. As it cools it becomes a mix of protons and neutrons, with more protons than neutrons. A single proton equals hydrogen (Z=1); fusion reactions among the protons and neutrons result in helium (Z=2) and lithium (Z=3). Fusion stops at lithium because expansion prevents further reactions. This takes about twenty minutes or so.

Hydrogen burning: About 100 million years after the big bang, hydrogen, helium and lithium create the first stars. Stars spend most of their lives in the main sequence where they burn hydrogen into helium. This is a slow process; over billions of years hydrogen burning will decrease the amount of hydrogen in the universe and increase the amount of helium.

Helium burning: After a star leaves the main sequence, it converts helium into carbon and oxygen. Like hydrogen burning, helium burning is a slow process.

Carbon burning, neon burning and oxygen burning: The next three steps occur faster, but only take place in stars over 8 solar masses. This results in a variety of elements up through silicon (Z=14).

Silicon Burning: The next step is very fast. It produces elements up through gallium. The end point of silicon burning is a supernova. The last few fusion reactions do not generate energy, and the star cannot continue to exist. It explodes and distributes the atoms produced into the universe. Atoms that can be formed in the reactions mentioned so far are known as "primary nuclei."

Secondary reactions: Once heavier atoms have been distributed into the universe, new stars can form from those heavier atoms. Such stars have higher metallicity than stars formed immediately after the big bang (metallicity measures elements heavier than helium). These stars have additional fusion reactions, forming what are known as "secondary nuclei." For example, some high metallicity stars have a method of fusing hydrogen known as the CNO cycle. It produces nitrogen (Z=7).

Neutron absorption

There are two forms of neutron absorption. In the s-process, neutrons are added slowly ("s" for slow). In the r-process, neutrons are added rapidly ("r" for rapid). S-process occurs in certain massive stars, the location of the r-process is not known, but is believed to be associated with supernovae. The exact atoms produced by the r and s processes are different; the r and s processes each produce about half of the heavy isotopes, the r-process tends to produce atoms with more neutrons than the s-process does.

Other Processes

What I described so far accounts for most, but not all of the atoms in the universe.

Beryllium and boron: Beryllium (Z=4) and boron (Z=5) are produced by a process known as spallation. High energy particles (primarily electrons and protons) interact with small atoms (primarily carbon and oxygen) to produce even smaller atoms such as beryllium and boron.

Fluorine: When a neutron star is formed, it results in a large flux of neutrinos. The interaction of neutrinos with neon atoms (Z=10) result in fluorine atoms (Z=9).

Various other isotopes: Other processes such as the rp-process and the inverse beta-decay result in a few isotopes of various other elements.

Some of the atoms found on the earth or in the earth's atmosphere have a different history than the atoms found in space. Most of the argon (Z=18) in the earth's atmosphere was formed from beta decay of potassium-40 (Z=19). The elements between bismuth and uranium are found on earth (all radioactive), and are formed via decay chains starting with either uranium or thorium (Z=90). Most helium on earth was formed by decay of radioactive materials such as uranium and thorium. Approximately 20 radioactive isotopes, most notably carbon-14 and hydrogen-3 (the later also known as tritium), are produced in the atmosphere or on the earth's surface when high energy particles (usually electrons or protons) collide with atoms (often oxygen or nitrogen).

More….

For those of you that want to explore nucleosynthesis in more detail, I offer a few hints.

I did not discuss binding energy. Binding energy is a form of energy that holds atoms together; calculating binding energy is useful for understanding beta decay, some details of the s-process and r-process and why some fusion reactions release energy and some absorb energy. A simple way to estimate binding energy is to use the liquid drop model. This model is relatively easy to understand and use, however it doesn't work very well for small atoms like helium or beryllium.

Beta decay is not the only decay mechanism; there is alpha decay, fission and others; these other decay mechanisms play small roles in nucleosynthesis. Heavy atoms (such as uranium and thorium) generally decay using alpha decay. There is a method of organizing isotopes called a Segré chart. Many of these charts have the colors black, blue, red, yellow and green (the so called Strasbourg coloring scheme). A good test of whether you understand the liquid drop model is to try to explain why the colors in a Strasbourg colored Segré chart are arranged the way they are.

When you have a star with many different types of atoms (this is particularly true during silicon burning), the exact sequence of nucleosynthesis steps can get complicated; understanding these reactions might require computer simulations and an understanding of thermodynamics.

Isolated protons cannot participate in beta decay (which is part of the explanation for why hydrogen burning is so slow). Beryllium-8 is unstable (the liquid drop model predicts it should be stable), this is part of the explanation for why helium burning is so slow.

Some fusion reactions are not quite as simple as I implied in this article, a more complete explanation requires quantum mechanics.

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Death from the Skies

Norbert Vance

There's a book title that should get your attention. Follow that by a subtitle, "These are the ways the world will end…" and you might feel compelled to pick up a copy and read it. That's what "Bad Astronomer" Dr. Phil Plait hopes you'll do, and a lot of other people. It turns out that folks who would have not picked up an astronomy book have done otherwise, and learned some fascinating astronomy along the way. They've also had the bajeebers scared out of them but in a scientifically responsible way.

One thing Dr. Plait is known for via his popular blog and webpage Badastronomy.com is to take a critical look at what Hollywood and the media have sensationalized ad nauseam over the past few decades. Additional experience involving the HST (valid work), instructor at Sonoma State University, a PhD thesis involving the 1987A supernova, and a few years as President of the James Randi Educational Foundation back his credentials. During a presentation here on February 15th at EMU's packed Student Center Auditorium - 250 capacity that was overflowing- the Bad Astronomer did good! A very entertaining and thought provoking talk got the students and lay people in attendance laughing and thinking about what could be a serious problem for all humanity, death from above.

Dr. Plait's favorite target is the Bruce Willis farce, "Armageddon". He picked on "Deep Impact" and "The Core" along the way to lambasting the diet most are fed about threats from space, offering a much more scientific reality. His book covers just about every way a natural disaster from space could do us in. The EMU presentation covered just chapter one and that was enough for most. I will let the reviews on Amazon, for example, speak for the rest; overwhelmingly positive results. Personally, I found the writing simplistic, but that's what, sorry, Dr. Phil wants. No "Five Ages" here though he does quote the Fred Adams book. The Bad Astronomer has found a shtick that works. It works for him certainly but most importantly it raises public awareness of space science and responsible use of the facts- just the facts -to wash away misinformation, irrelevant speculation, or out and out lies.

The scientific community certainly needs trusted warriors in the face of conspiracy theorists, anti-science drones, and charlatans in a day and age when one would have thought we would see less. Dr. Plait handles naysayers in calm but firm ways, makes humor and lightness to ward off negatives, and writes in a way that most can understand. Hats off to him for this! I had the pleasure of giving him a tour of our new planetarium and Sherzer Observatory after the talk and, like many, found him very approachable. Having spent 3 years in Ann Arbor he knew the area and the richness of amateur astronomy here. He would be very much at home at a star party behind his Takahashi refractor. Yes, he's a refractorphile as witness his gawk at the 10-inch apo in Sherzer. Too bad it was drizzling that evening or we "would have been up there all night" as he put it. Darn!

I do indeed recommend his latest book. It's not, ah… bad.

Norbert Vance

Attached photo: Dr. Phil Plait, Norbert Vance, and EMU Astronomy Club President, Clara Balmer, at Sherzer Observatory. Photo by Jenny Pon, DSC/GLPA

Equatorial open fork mount for an 8” f/6 Newtonian

By David Jorgensen

Introduction: I have always been interested in the heavens and remember when I was young and my eyes were good, looking up at brilliant stars in the dark skies. Later, as an adult, I even taught an astronomy class, just keeping one chapter ahead of my students in the textbook. What fun. But I had never owned a telescope until a year ago when I bought an 8” f/6 Newtonian with a Dobsonian mount. It has been a delight to renew my interest in the night skies.

The Dob mount, based on the altitude-azimuth coordinate system, is very easy to construct, inexpensive to produce, and easy to use and transport. But finding the stars requires experience with the night sky and continued adjustment to maintain their position in the eyepiece. And the alt-az coordinates continue to vary throughout the day. For me, the declination-right ascension system, which provides essentially constant coordinates for celestial objects, was more appealing. So an equatorial mount with a driven right ascension axis became my goal.

Concept and Design: Pointing an RA axis at the north celestial pole tilted from our latitude (~42 degrees) and allowing a declination axis adjustment was a simple concept. An open fork design concept resulted from this thought. The design and construction evolved as materials were found and assembly progressed.

Construction: The basic framework was built with what I had laying around: 2X6 and 2X4 lumber, plywood, and lots of screws, nuts, and bolts. The RA axis shaft was made from 1 inch black iron gas pipe. Then I added (2) 6 inch wheels ($12) from the hardware in Chelsea and a big pneumatic swivel wheel ($1.00 from a garage sale) for portability in my backyard. Right ascension and declination setting circles were generated on paper from my CAD program and fastened to thin aluminum plates for mounting to the appropriate axis.

Right Ascension Drive

Goal: To be able to follow the motions of the stars with the scope for good visual observation and, potentially, do some timed astrophotography.

Concept: I started with a 1 RPM – 4 watt 120 VAC motor and wanted to keep the gear set small.

Design concept: I decided on a double gear reduction system:

60 minutes/hr and 24 hr/day with a 1 RPM motor yields a total reduction of 60X24=1440. Sidereal days are a little different (23.93hr), but thought that for short exposures, this was close enough. I decided to attach a worm gear to the shaft of the 1

RPM motor to drive a 24 tooth gear which would be output to another worm driving a 60 tooth gear which would be fastened to and drive the RA axis.

Gear Design: The “Machinery’s Handbook” lists 2 standard types of involute gears (the interaction of compatible involute gear forms give uniform motion from the input shaft to the output shaft), with pressure angles of 14.5 degree (for high mechanical efficiency) and 20 degree (for increased tooth strength). Gear cutters are commercially available for these 2 standard pressure angles, but I wanted to do it myself. With the limitations of the light machining equipment I have, I decided on a new design: 30 degree pressure angle so that I could more easily make the required gear tooth cutters and make the teeth even stronger. Therefore, I developed a calculation spreadsheet for general gear design. That spreadsheet data was then transferred to my CAD program (TurboCad) to generate a 20X map of the required tooth cutter form. Using an f = 4 inch lens from an old slide projector with the 20X map, I was able to project the cutter’s shadow against the map and hand grind the cutting tools for the required tooth cutter forms.

Gear Manufacture: The gear manufacturing was accomplished using my small milling machine and metal lathe using Delrin plastic and carbon loaded - fiber glass filled nylon material for the gears. A 4 inch diameter 72:1 rotary table was also used for proper gear tooth spacing.

Results: The nominal speed of the drive system was designed for 360deg/24hr = 15 deg/hr. After assembling the gear box I measured the speed and found that it varied with regular periodicity over 24 minutes by about +/- 10% from the nominal speed. Then I measured each 24 tooth dimensional variation from their “true” positions, and found similar variation. Although this is not too bad for visual observation, it is probably not good enough for unguided photography. The 24 tooth gear inaccuracy is the likely culprit, though the 60 tooth gear is now also under suspicion. These gears may have to be re-made with more care. But occasionally I do get fairly good photos when the speed is right. Oh well, more work to do.

Manual Controls: Added in series with the RA motor drive is another worm and 60 tooth gear to provide manual adjustment of the RA coordinate. That is coupled through a 2:1 right angle gear set to a hand wheel conveniently located for the observer. One revolution of the hand wheel gives a 3 degree (12 minutes of time) change to the RA coordinate.

The declination setting is still a manual “push/pull” to the desired coordinate.

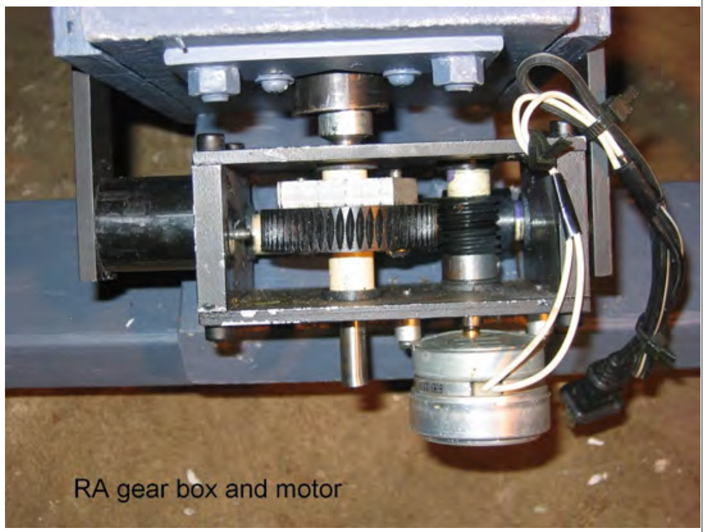
Electrical Power:

Power Source: 12vdc motor cycle battery(~$40) with12 amp-hr capacity or ~ 144 watt-hr energy capacity. Attached to the battery is a 12vdc-120vac inverter($35) for the 120vac requirements.

Power Requirements:

1. 1 rpm RA drive motor – 4 watts – 120vac
2. Dew Heaters – 3 watts total: (5) 10 ohm resisters in series with the12vdc source: (2) resistors on the Telrad screen, (3) at the finder scope objective.
3. Primary mirror cooling fan- 1.4 watts – 12vdc
4. Inverter - 12vdc to 120vac: at idle it uses 5 watts battery power
5. Notebook charging power @120vac:(30watts -5 watts@idle) =25 watts battery power required.

Conclusion: So, if I’m not charging the notebook, the power draw from the battery is about 13.4 watts, giving a usable time of 144 watt-hr/13.4watts = 10.7 hr. I don’t observe for longer than that. Recharging the battery requires only a few hours during the daylight.



RA gear box and motor

Setup: The base is pointed north using a magnetic compass, compensating for the local magnetic declination. This gets me within a degree or two of true north. I use the compass because Polaris is not always accessible with all the trees around. The scope is then adjusted to read 42 degrees declination when pointed at the zenith with leveling screws and a magnetic torpedo level. While pointed at the zenith, the RA setting wheel is adjusted to current local sidereal time. Then the RA drive is turned on. Then I can move the scope to the RA and declination for various objects. They are now easily within the range of the Telrad and spotting scope.

Then the object is manually adjusted to center in the eyepiece.

Results and recent modifications: The original RA shaft support bearings were homemade plastic bushings and had too much stick/slip friction with the steel shafts. They and others were therefore replaced with 7 purchased ball bearings ($40) which reduced the friction dramatically.

A homemade camera mount has been added that accommodates my digital “point and shoot” Canon Power Shot A-80 and a used Nikon D-40 DSLR for piggy back, through the eyepiece, and focal plane photos. Recently I have added a 9 inch length “dew shield” made from an old 5 gallon black paint bucket cut up and fitted to the end of the scope with a long hose clamp. Then I added “flat black’ paint.

Scope “jitter” is about 2 seconds following a focus or position adjustment. High winds may be a problem!

Conclusions: The final result is a large mount (60 lb) which does not fit under the cap of my little Ford Ranger Pickup without significant dis-assembly for trips to “Peach Mountain”. Perhaps I should find a way to easily remove and reinstall the pickup cap so that, in good weather, the mount can ride in the open air. The mount does work fine in my backyard though and is easy to move to an appropriate spot (I have a lot of trees which hide much of the horizon on my property). One of my goals of doing decent astrophotography, though, is still unresolved.

Is there more work to do (Yes), and do I have to buy a commercial mount (..…No!).

David Jorgensen (djajorgens@gmail.com)

Since then I have added a pivot shaft to the mount which allows the “fork” to move down to a horizontal position for travel. No requirement to take it apart. Now it fits in the pickup!

The 9th Annual

Astronomy Show & Swap Meet

Hosted by

Ford Amateur Astronomy Club (FAAC)

Saturday, Mar 10, 2012 ***9:00 am - 3:00 pm***

Holy Cross Church Gymnasium, 30650 Six Mile, Livonia, 48152

Included: ASTRONOMY PRESENTATIONS

At 10:00 am, 11:15am, 12:30pm, and 2:00

Planetarium Lectures @ 10am, 11am, 1pm, 2pm

Earn Cash By Selling Your Extra:

Telescopes - Eyepieces - Cameras - Binoculars - Mounts

Tripods - Software - Publications - Accessories, etc.

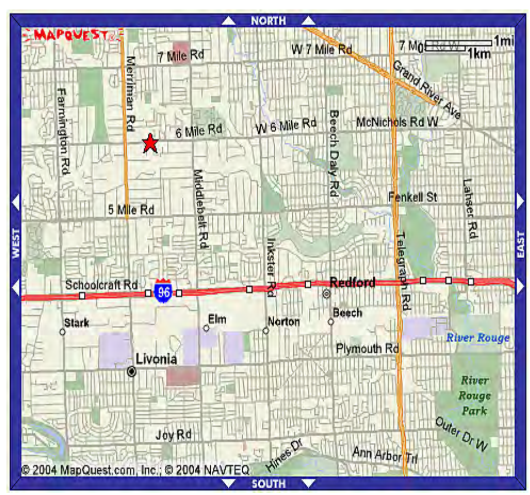
Or, locate that special bargain you might not otherwise find!

Admission: $5.00
(children 15 and younger – Free / must be accompanied by an adult)

Sales Table: $20 at the door as available one admission ticket included

Doors Open: 8:00am for setup.

Location:
Holy Cross Lutheran Church, 30650 Six Mile, Livonia, 48152,
north side of Six Mile, ½ mile east of Merriman.
See STAR on map.



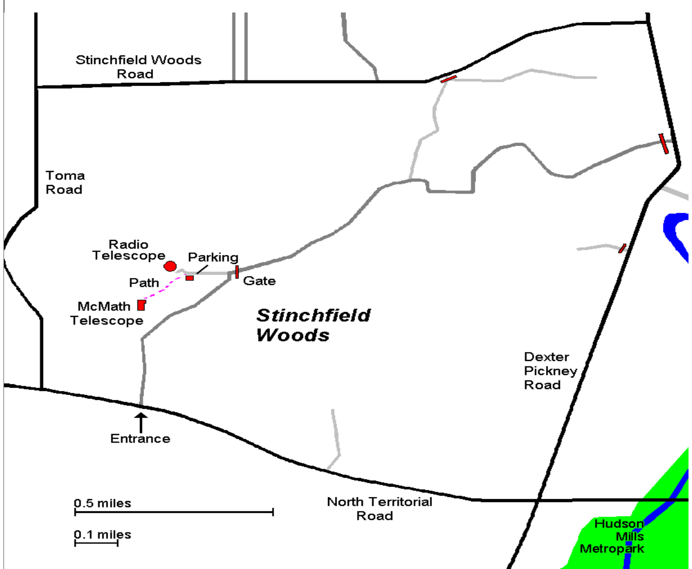
****Advanced ticket sales ended February 15, 2012****

For More Information: Contact Jim via email: w8tu@comcast.net or call (734) 453-1422, or Frank Ancona via email: FrankAncona34@yahoo.com or call (248) 345-0176

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.
(See the website
http://www.umich.edu/~lowbrows/theclub/
for more information on joining the club).

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.

Newsletter Contributions

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

Lowbrow's Home Page

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

University Lowbrow Astronomers

Reflections & Refractions

Website

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David Jorgensen's homebuilt fork mount, for his 8" f/6 Newtonian . Read the article on pages 6 and 7.