

Rochester Skies

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In full color online at Rochesterskies.org



Tightening up our Belt

It always amazes me when I look at measurements and models that depict our universe. The numbers needed to describe these values of distance or mass are always so fantastically high that one's brain

simply gets numb to them. If one celestial body is x distance from another, would it matter if it was that x was followed by 10 or 11, or 20 zeros? You know, there comes a point where humungous, and humungouser, and humungousest lose their frame of reference.

Recently I came across a small article regarding our asteroid belt. Here, I found some facts about this gravel road in our solar system that surprised me because the figures that described it were *small*! Well, at least some of them. For example, Ceres, the first object (now designated dwarf planet)

discovered in the asteroid belt by Giuseppe Piazzi in 1801, contains nearly $1/3^{\text{rd}}$ the mass of all of the asteroids combined. In fact, more than half the mass of the main belt of asteroids is contained in the four largest objects: Ceres, [4 Vesta](#), 2 Pallas, and 10 Hygeia. Moreover, if you added up the 200 asteroids known to be greater than 60 miles wide, and the 1.7 million estimated to be at least $1/2$ mile wide, plus all the other nuggets numbering in the tens of millions, their total mass is estimated to be less than $1/10^{\text{th}}$ of that of the Moon!

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Tightening up our Belt

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So their total mass is a relatively small number. They cannot rotate very fast either. None of those 200 larger asteroids mentioned above have been observed to have a rotational period greater than about 2 hours. That suggests that if these loose piles of rubble would spin

any faster, they would probably fling themselves apart.

So here's something in space that isn't so big. Asteroids are small, and weak, and poorly built. Really, they're rogues, tiny ne'er-do-wells of our solar system. To our eyes, these unimportant orbiting potatoes cannot compare to the beauty and power of a colorful massive gas planet, an exploding planetary

nebula, or a supermassive black hole churning a galaxy around it. Yet, like their fellow bright wandering rascals, the comets, they pose our most likely external mechanism of demise, if a large enough one fancies our way.

I guess in this case, the numbers imply weak and close are more important than large and far. Go figure.

- Randy Hemann

Endeavor to Persevere

Perseverance is a must if you are an observer that is serious about amateur astronomy. There are so many roadblocks on the way to the stars that it is hard to even list them all. "It's too cold", "I'm too tired", "There's something good on TV" (The Vast Wasteland?!? Are you kidding me?) A veritable uncertainty of events await each and every one of us before we even get out the door, and yes, I'm as guilty as anyone of being waylaid when my heart yearns for the starry skies and my body says "FUGGEDABOUTIT!!"

Then there are those nights when you're all dressed up and nowhere to go. Got the scopes and binocs in the car? Check. Book-bag all packed up with Burnham's Celestial Handbook, the Herschel 400 materials, Rukl's Atlas of the Moon, checklists, journal and even the current copy of your favorite astronomy magazine for those hard-to-find comets and asteroids?

Check. Chair, table, batteries, red light and laser pointer? Check. Coffee, a snack or favorite adult beverage? Check. You look up at your light polluted city sky, spy a few bright stars and say to



yourself, "Dark skies, here I come!"

Then as you're driving out of town, away from the city lights and as you steal quick glances up at the sky, you're seeing stars, but

not enough of them. "What's up with this? Clear Sky Clock said it's supposed to be pretty good!" And you arrive at your favorite astronomy spot, jump out of the car and think, "Uh-oh. This doesn't look so good." 1st and 2nd magnitude stars are visible, but 3rd's are hard to pick out. A steady cold breeze becomes noticeable, and you think, "Dang! It wasn't this windy in town!" Sure wasn't, was it, with all those houses, yard trees and light poles blocking the wind.

I've had nights where I haven't even gotten the stuff out of my van. I've also had other nights where everything started off just great and then slowly went down hill. I've battled dew, high thin clouds, cold, fog, exhaustion, and unexpected company, including mosquitos, critters, and folks I didn't expect.

One memorable occasion

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was the night of March 12th, 2005 at Eagle Bluff where I was going to try my first Messier Marathon. It was an RAC event where I turned out to be the only RAC member present. But I got company all right. A Girl Scout chaperone named Steve Ekeberg from St. Paul strolled by and I showed him Mercury, Saturn and the Great Orion Nebula. I got a “Wow!” on Saturn, an “O.K.” on Mercury and he didn’t have a clue on the Orion Nebula. He asked if he could bring the Girl Scouts by later and I told him “No problem.”

Five minutes later, I had 22 girl scouts crowding around my two scopes. I had my Celestron G8 and my 4.5” Newtonian back then. I showed them what I had shown Steve plus the Pleadies, the Perseus Double Cluster, the Crab Nebula and M37 in Auriga. The Girl Scouts really liked the Pleadies. It was probably a ‘Seven Sister’s’ thing.

I started in on my Messier Marathon at 8:45, but at 10:30 I had another wave of Girl Scouts come through. By 11:05 I was back at it, but by 2:30 a.m. both of my scopes were icing up just as I was getting ready to tackle the Virgo group of galaxies. My first attempt at a Messier Marathon netted 30 of the 110.

The next year’s Messier Marathon had a great turnout from the RAC. Bruce Gehring, John

Attewell, Brandon Wyman, Jeff and Gerrarda Newland, Dave Bailey and myself were there, plus Phil Yehle and Mike Rowlands from the LaCrosse Area Astronomical Society. Along with Rachel, Molly, Brent and Meghan (counselors from Eagle Bluff) we had thirteen people ready to go with Messier fever.

That fever became a fog, literally, at 11:33 p.m. It closed in so thick that it was hard to see the parking lot, much less the sky, so the blanket of fog sent us off to bed

Photo courtesy of pdphoto.org



with a total of 26 Messier objects, or to put it another way, two per person. It was a night of fun and frustration.

Frustration for me always reaches a peak in the cold wintertime. Going back through my journals I can see that after the month of October my viewing sessions are very sparse. November, December and January are just too darn cloudy, windy and cold to get out much. I’ve been able to get out more now that I’ve

got reliable winter gear, but it is still a struggle.

February and March bring a respite from the extremes of temperatures and a resumption of observing. March is one of my favorite months to observe because the nights are still long and with sap rise in late March I don’t work as much in the woods. But February and March bring unexpected company sometimes.

We all have had our share of experiences with critters. How many of us have listened to the beautiful sound of the owls down at Eagle Bluff? Or dodged deer late at night going to or coming from the Environmental Learning Center? There are so many nocturnal creatures and it is we and not they that are probably more surprised at an unexpected visitor to their territory.

On the night of August 26/27, 2003, Mars made its closest approach to Earth in 60,000 years. I was up on the hayfield on the Myrah home farm to observe it. But even though I meant to stay out all night, I packed it up after two hours. In the darkness of the night, with only the stars to light the field, I heard a loud stomp and a cough from about 30 yards away. I didn’t know what the heck it was, but I knew something was out there, so I packed it up and hit the trail.

I mentioned the incident to my favorite nephew Matthew who knew right away what it was.

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"That's the sound deer make at night when they're trying to get you out of the way." I had been deer hunting a few times in my life, but never knew they did that. Mystery solved.

One mystery that never fails to amaze me is when the Moon rises and the coyotes start sounding off. Down at the Flatin Farm hayfield, I have three distinct packs surrounding my favorite observing spot. One pack to the east, one to the south and one to the west-northwest. So many times I have



been hunting a deep sky object and been totally engrossed in what I'm doing when I hear the coyotes start yipping and howling. Invariably I look up, look to the east, and there is the Moon peeking above the horizon. It is simply beautiful how they greet the Moon, and I am never afraid of the coyotes.

I have had critters scare the living daylights out of me before. I had a deer walk up on me the night of October 1st and 2d, 2006 at 4:15 in the morning. I was consulting my star chart when I heard that stomp and cough again. I bet I had a two foot liftoff from a standing still position, but when I landed I

knew what was up and probably woke the neighbors for a mile around with a Marine Corps yell and not printable barracks language.

On other occasions I've had farm dogs walk up on me in the dark and that is not comfortable until you see just what is making that noise. I know they are just curious and are probably looking for a treat of some kind, but I shoo them away in a kind, but firm manner because I just don't need them hanging around.

Those of you that made the 1st annual Star B-Q can relate to this next story. I was out there the Monday night after the event got done and had Herschel the cat walk up on me in the dark. That furry fat tabby was actually rubbing against my leg before I knew what was going on. I jumped back, flipped my caplight on to see Herschel looking up at me and listened to a nice friendly "Meow". Herschel I don't mind, but there are other kinds of 'cats', I don't care for.

February 15, 2009 is one of those nights with a different kind of cat. We had had a warm spell, not enough to melt all the snow, but to where the nighttime temperatures only made it into the middle '20's. I was out at the Flatin Farm hayfield having a great night, nailing a bunch of wintertime Herschel 400's and I didn't want to go home or get shut down for anything. About 9:30 I was going after NGC 2244, the open cluster in Monoceros that sits inside the

Rosette Nebula when all of a sudden my nose started acting up. I sat up, away from the eyepiece in my telescope. I sniffed. Skunk. I had a slight NW breeze coming at me and I could smell a skunk getting stronger by the minute. The warm spell had brought those critters out of hibernation and this 'polecat' was heading my direction.

I looked around at all my stuff: telescope, binoculars, table, chair, book-bag, ammo can for my

eyepieces, filters and power-pack. Even if I wanted to - and I didn't want to - there'd be no way I could get my stuff together before that critter would be on me, and then there'd be no



telling what would happen. Instinctively, I did the only thing I could think of. I whipped out my laser pointer and started scanning the hayfield. That brilliant, narrow green beam of light swept the tall grasses of the hayfield and lit up every clump of grass it hit. I tried to see if I could spot the skunk, but to no avail. I kept it up for a few minutes and shut it down. The smell was less noticeable and soon disappeared.

I resumed my search of the heaven's after finishing NGC 2244 and was recording NGC 2251 at 10:43 p.m. when the old schnozz

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caught another whiff. Old Pepe LePew was back and he was wanting to cross that hayfield real bad. Again, I weighed my options on packing up and again rejected it for more laser pointer action. If any of the local booze cruisers heading to or from Dorchester to my beloved

Legion would have been passing by, they'd have gotten a real light show. It is amazing how much light

that thing throws when it hits a ground object like grasses.

Again, I shut it down and Pepe was gone, this time for good.



Photo of Comet Lulin (C/2007 N3) Copyright Richard Richins, used with permission.

I stayed wary and alert for the rest of the session, but was able to get observations on NGC 2264, Saturn and Comet Lulin. I packed it up at

12:30 a.m. after a six hour observing session.

Some nights you just have to pack it in, and there's other nights where you just don't want to. Like Chief Dan George in the Clint Eastwood movie 'Outlaw Josey Wales', I

"endeavored to persevere" and came away with a night that is testimony to the crazy obsession of amateur astronomy.

- Dean Johnson

Solar Bright White Light

If anyone asks you which star is closest to the earth, don't say "Proxima Centauri." If someone asks you if you can stargaze in daylight, don't say, "Nope." The brightest, biggest, baddest star of them all (by appearances only) rests a mere 93 million miles away, less than 10 light-minutes from our home sweet home. It is so close that we can literally feel it breathing down our necks on hot

summer nights. That star, of course, is our very own Sun.

Every spring, I curse that Sun as it steals more and more of my precious night observing time away. As the days grow longer, the nights get shorter - painfully so as astronomical twilight passes 11PM and ends before 4AM. That short window has led me to desperate acts like going to bed when the kids do at 7PM and setting the

alarm for 10:30PM. A few nights of staggering back into bed at 2AM convinced me that this is a short-term solution to a long-term problem.

The only other option this time of year for astronomers who are not nocturnal by nature is the Moon, and a fine target it makes at first or last quarter. However, another mean trick of physics puts

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Solar Projection

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the Full Moon right where the Sun passes on the Winter Solstice, far too low for casual observing from a tree-lined yard. And packing up the telescope and driving to a clear site in daylight seem a little, shall we say, desperate.

The Sun is a fascinating target. Pictures of Solar prominences and boiling surfaces from hydrogen-alpha (Ha) filters enchant. But the price tag for even a small, low-quality solar telescope is expensive.

White light offers some advantages. Almost any telescope will do, provided you can afford the full-aperture filter to cover the front end of your telescope. With large telescopes, glass filters do not come cheaply. Worse, all these filters come with warnings not to expose them to air and to check them before every use for damage. Some suggest putting your hand at the focal point and seeing if you can feel the heat as a way to make sure the filter is, in fact, working. I simply could not take such a risk with my eyesight for what is, in effect, a diversion for my scope-time-starved soul.

One particular method of Solar observing caught my eye, however. No costly filters are involved. There is almost no risk to eyesight. And best of all, photography is quite easy as well. The technique is called Solar projection, and no book gave me a step-by-step guide to how to go about doing this. With a little gumption,

however, I managed to create a setup that works quite well.

The first problem is the telescope itself. A large aperture is not an advantage for Solar projection because light gathering isn't necessary and resolving power is limited by the

more than the cost of a glass Solar white-light filter, I received a complete 80mm refractor with a unit finder, two Plossl eyepieces (more on that in a minute) and a Go-To mount. My expectations were low, and in many ways this has been a good thing, but for Solar projection, this setup has been ideal.

The Go-To mount is a real helper for chasing the Sun. First, the mount itself is really shaky, so having the ability to move the telescope without touching the tube helps dramatically. Aiming at the Sun is not horribly difficult - you just have to look the opposite way you would when hunting anything else: at the ground. Specifically, the shadow of the telescope is your finder and when the OTA makes the smallest

shadow, you've hit the Sun. The LightChariot has a hidden menu that enables Solar tracking and Solar System alignment, such that once the Sun is centered, a simple press of the "Align" button begins rough tracking. It is obvious that the mount is not tracking in a high precision way, but it does keep the Sun fairly centered.

Next, eyepiece selection becomes crucial. The fewer elements your eyepiece has, the better. The eyepiece is very close to the focal point, so a lot of heat can build up, especially with multiple elements. I shudder to think what would happen to an Ethos eyepiece. However, if your department-store special comes with a pair of decent Plossls, you have

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This side view shows how simple the setup really is. Even with carting everything from the garage, setup takes about 5 minutes.

atmosphere. 80mm is considered a maximum. And telescope type matters a lot, too. Heat will be the primary problem, and it will melt any glue you can find. This rules out Catadioptrics and Newtonians (the latter typically having the secondary mirror glued to the holder.) Okay class... if we know the three basic types of telescope and two are eliminated, that must leave... THE DEPARTMENT STORE SPECIAL! That's right: the best telescope for white-light Solar projection is a small refractor.

I purchased a Skywatcher LightChariot 80, which is very similar to the Celestron NexStar SLT lineup, on clearance closeout for \$150 shipped. For this sum that was little

Solar Projection

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eyepieces that you can not only use for Solar projection, but not mourn for if they should fail. Thus, the two Plossls that came with the LightChariot (a 25mm and a 10mm) were ideal for the job.

I created a small mask out of cardboard to place around the focuser draw-tube. This serves to cast a shadow on the paper where the Sun observations will occur, which definitely improves contrast. You can see Sunspots without a mask, but the mask just makes it easier.

I use my children's easel to hold up a piece of plain office copier paper about 18-24" from the eyepiece. Then I focus the telescope using the Sun's edge as a guide. When it looks sharp, if there are Sunspots, then I'll focus on the spots. Otherwise, it's a "no spot" day and time to pack up. If there are spots, however, it is easy to sketch them on that office paper for future use.

As many of you may be aware, this has been a period of minimal Solar activity, which some have even

fit my schedule, this exercise has been fun and kept me "in the hobby" at a time of year that I usually find large gaps in my log book.

It is worth noting that while you can obtain an Astronomical League award for your work, and even complete part of the Galileo award this way, there is no practical scientific value to amateur observing of the Sun. Because the Sun is so important to life on Earth, it is constantly observed by several satellites in more detail and at wavelengths our living under the (life-giving) atmosphere prevent.

So maybe the next time you're looking for something new, the next time you're making those excuses Dean talks about at night, or the next time you realize that sleep is sometimes better than observing in the middle of the night, consider getting out an old refractor and taking an indirect glimpse at the Sun. Who knows? You might just find yourself a Solatic.

- Scott Regener



From the front, it is easy to see the difference the cardboard mask makes. The easel greatly simplifies the task of holding the paper square and steady.

called a new Maunder minimum. Many days, I have set up my telescope and seen nothing. But those days when a spot appears makes it worth it.

I wouldn't say observing the Sun in white light matches the thrill I get from catching a faint comet or galaxy, but for the low cost and the ability to observe during hours that

This picture was taken from the side, which caused some distortion. You can see one prominent sunspot that was approximately the size of Earth. Two fainter ones were detectable visually.





Bolivian Skies

I spent most of July where my wife is from: Bolivia. I was planning on spending some time this trip at her Uncle Angelo's ranch, three hours outside the city of Santa Cruz. The American idea of a ranch differs from the Bolivian reality. His ranch consists of over 20,000 hectares, which is more than 49,000 acres. To say this place was big was an understatement.

We arrived around 7:30pm and it was already starting to get a little darker and I noticed the sky was clear except for a strand of clouds just overhead. As I sat patiently waiting for the sky to darken completely, and in-between conversations with

Claudia and her family, I sneaked a peek outside again and noticed how so clear the sky was and was only minutes away from getting my Canon 50D out to take some wide field pictures when I was informed that we needed to go into this little town about 30 kilometers away. Holding back my frustration, I said let's go as I wanted to get back as soon as possible to enjoy the southern night sky that I have never seen in complete darkness like this. As we made our way down the 7-kilometer driveway and had to make several stops to open and close gates that confined the cattle to certain fields I kept sticking my head out the driver side window in amazement. The clouds I thought I saw in the

evening were not clouds at all unless that is what you call the edge of the Milky Way galaxy! In all my years I've never seen the stars like I was seeing before me. I felt like I could reach out and touch the edge of the universe, as it was never so clear as it was at this moment.

You have to remember there is no large city within 2.5 hours of his ranch. You are in complete darkness and no light pollution of any kind out in the jungle stretch of the Amazon basin. It is completely and utterly dark.

My only problem was I was driving into a small village until 11pm

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Bolivian Skies

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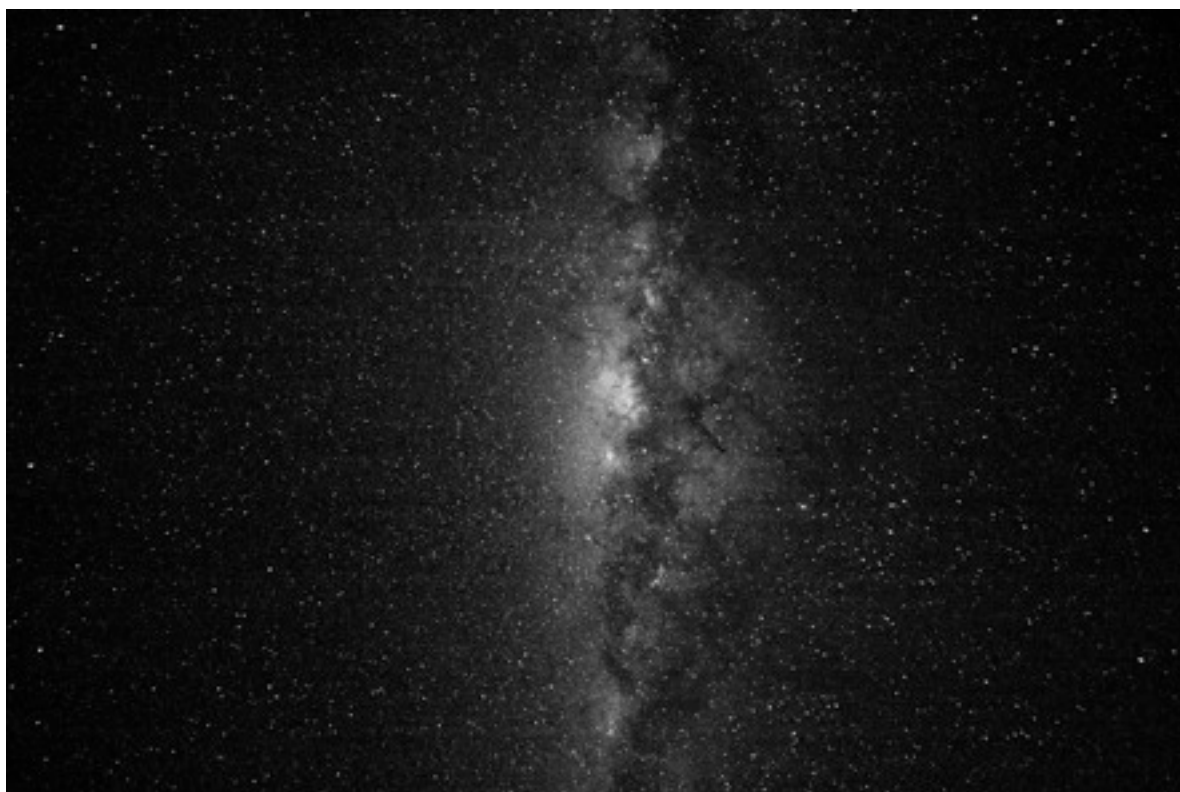
that night. Claudia could see the insanity building in me and knew something of the postal variety might escape if we didn't get back soon. When we did arrive I was getting tired but I knew I had to get some pictures of the night sky just to say I did. So after returning I immediately jumped out of the car, grabbed my camera bag and walked out a couple hundred yards away from the house. I pulled out my Canon and my super wide angle lens and starting taking 15-20 second exposures at a ISO of 3,200. The images looked great on the LCD screen but I knew without stacking them and using a lower ISO there would be a lot of noise but it was the moment and I just had to take some pics.

After an hour I was pretty exhausted from the long day and called it quits, only to return to the

h o u s e
and laid
flat on
the deck
to stare
at the
sky. Dear
G o d I
wished I
had my
telescope
here and
h a d
several
months
to image.
What a
sight to
see.

As I've progressed into astronomy I now understand why it is so difficult to find dark skies compared to what I had just taken part in. I honestly don't know when the next opportunity will come for me to see this again but I did tell my wife that I was bringing my 80mm scope the next time and plan on leaving me there at her Uncle's ranch for at least a week. I have no need to go anywhere else.

I've included a few black & white pictures of the night sky, not my best, but considering the last

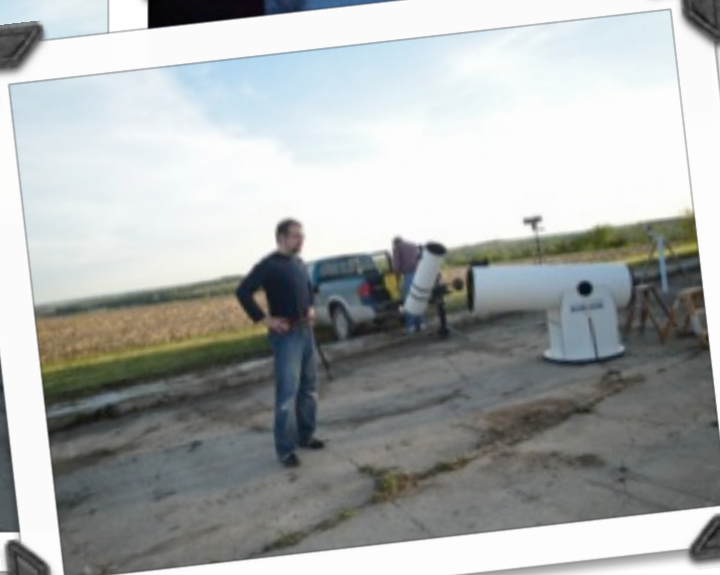


m i n u t e
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anywhere
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planet as I
d i d i n
Bolivia.

- John Preston

Syttende Mai 2010

This year's Syttende Mai festival proved a successful outreach for the Rochester Astronomy Club. Many visitors to the event had their "Galileo moments" looking through the many fine telescopes at the event.



Back to School



It's that time again - time to hit the books! What's that you say? Can't find the time? Don't have the energy? Can't afford to go to college?

When I was in college, I took a course in astronomy for non-scientists. What that basically means is: no math! Well, there was some math, but not the kind that requires you to have advanced beyond the sixth grade. I took that course because I was already interested in astronomy and I needed some credits that weren't in my major. You, on the other hand may not have been so lucky. Or maybe you were as lucky as I was, but still want to go deeper, now that you're more "mature", or whatever the current euphemism is for being older-than-dirt. Maybe you just need a refresher. Well, if you have a connection to the Internet and a fairly modern computer, you need wait no longer.

Thanks to the magic of iTunes, you can now download and listen to lectures actually given at Ohio State University in 2006 and 2007, courses that were named

"Astronomy 161" and "Astronomy 162." Like my college course, these classes do not require or expect a scientific or mathematic background. And the best part of all is the cost: free.

If you don't have iTunes yet because you think you need an iPod, let me assure you: you don't need an iPod. You can download the free iTunes application (for Mac or Windows) from Apple's web site, and from there you need simply search the Store for Astronomy 161. Your instructor will be Richard Pogge, and he is not a dry and dull professor, scattering wit and humor through his lectures, he manages to go through a very thorough explanation of modern astronomy (how do we know what we think we know, or do we just think we know what we don't know) in 90 lectures for the two classes combined.

The idea of creating podcasts of the lectures was Richard's attempt to give his students the ability to relisten to his lectures at any time. He

created web sites that provide class notes and often contain images that he displayed on the classroom projector. And his web site also provides the course syllabus and other pertinent information.

A textbook is recommended for use in the class, *21st Century Astronomy, 2nd Edition*, which is available used on Amazon.com. A recent price checked showed copies available for under \$30. The third edition of the book is also available new, for \$115. Considering the cost of the average college credit, this course is a tremendous bargain.

I confess that I have mowed the lawn to many lectures this summer, and while I have learned some interesting historical tidbits, my knowledge of the universe has not expanded quite as much as I would have liked. However, there are much worse ways to use my time and resources than getting an education in astronomy... again.

- Scott Regener



Astronomy 161 Web site: <http://www.astronomy.ohio-state.edu/~pogge/Ast161/>

iTunes downloads: <http://www.apple.com/itunes/>



Rochester Skies

Upcoming Events

August 12	-	Perseid meteor shower
August 13/14	-	StarBQ in Spring Grove, MN*
September 10/11	-	Dark Sky Weekend at Eagle Bluff*
September 14	-	Monthly Meeting, TBA
October 8/9	-	Dark Sky Weekend*
October 12	-	Monthly Meeting, TBA
October 16	-	Astronomy Day at Gamehaven*
October 20/21	-	Orionids meteor shower

* Events subject to change due to weather. Check Rochesterskies.org for updates

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