

REFLECTIONS / REFRACTIONS

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University Lowbrow  
Astronomers

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## *Dew Free Astronomy the Lowbrow Way*

By Christopher Sarnecki

In this brief article we'll explore some of the basic principles of dew formations and low-tech solutions for keeping optics; that is lenses, mirrors, and eyepieces dew free. Before we get started, it should be noted that batteries, used to power dew zappers, and I don't get along. I have learned the hard way how not to treat the ubiquitous 12-volt, rechargeable lead-acid battery. Typically I drain batteries well below their 80% capacity, which if you know anything about rechargeable lead-acid batteries, will soon kill their ability to be rechargeable. Besides, using batteries to power dew zappers is not the Lowbrow way to keep your optics dew free. OK. I know that is a provocative statement, but I strive to keep my observing kit efficient and as lightweight as possible. Everyone knows we Amateur Astronomers pack way too much stuff in to a night's observing run. With the solutions presented here, maybe you'll agree that with a little preparation, you too can keep your optics dew free the Lowbrow way.

Next one needs to know a little about the physics of dew formation. Telescopes and optics act like heat sinks. That is, during the day they soak up thermal energy, or heat from the surrounding air. At night, telescopes and optics give off this thermal energy by radiating heat back into the surrounding cooler air. As we observe, the outside air temperature will continue to fall throughout the night. Our lenses, mirrors, eyepieces are constantly chasing this falling ambient air temperature as they radiate their stored heat into the surrounding colder air. As the nighttime air temperature drops, so does the temperature of your telescope and optics. When the temperature of your optics falls below a certain temperature (i.e. - the dew point temperature), the water vapor in the air changes into liquid water and forms on the surface of cold objects. In observing when our optics reach the dew point temperature, dew typically results, and your observing session may be over. The dew point temperature is a function of how much water vapor (humidity) is in the air. The higher the humidity level in the air the more potential for dew formation given the same temperature of the air. The dew point temperature on those humid late summer nights will occur at a warmer temperature than cooler less humid fall evenings because there is more potential for the water vapor to condense into dew. Dew can form at any time of the year except when the temperature is below freezing. Dew formation does occur when the temperature is below freezing, it's just called frost.

What to dew (pun intended)? Well one way to prevent dew from forming is to keep the temperature of our telescopes and optics from falling below the dew point temperature. Metal and other dense materials like glass (think lenses, mirrors, eyepieces) are great conductors of thermal energy. That is, dense materials like metal telescopes and optics made from glass easily radiate their stored thermal energy into the surrounding cooler air than less dense material. This thermal energy radiation can eventually drop the temperature of the scope and optics the dew point temperature. By contrast, less dense materials are slower to radiate their stored thermal energy. Years ago while our firm was designing the replacement observatory for U of M's Angel Hall, I asked our Mechanical Engineer what was the best, most cost effective way to prevent dew formation on the inside of the metal dome of the observatory. The solution was simple. In order to limit dew formation, all we needed was to add a thin layer of less dense material to the inside surface of the dome. This less dense material, or insulation slowed the transmission of the observatory's thermal energy into the surrounding colder nighttime air. Now it should be mentioned that I am not suggesting we overly insulate our scopes and optics. What we can do is to add a thin layer of insulation to our scopes and optics that will slow the radiation of the stored thermal energy. Telescopes perform best when the optics are close to the ambient air temperature surrounding the telescope. Too much insulation will inhibit the cooling of the scope.

**Intermission – This microbrew review pairs late summer’s/early fall’s cooler temperatures with some delicious porters that will warm yur innards:**

**Smoked Pumpkin Porter, Sherwood Brewing Company, Shelby Township, MI, - Features roasted pumpkin, then smoked to induce a tasty porter hybrid. Very drinkable. Thanks Bro for bring the growler.**

**Founders Porter, Founders Brewing, Grand Rapids, MI – Billed as “Dark, Rich, Sexy”. I don’t know about that last item, but it is a deliciously rich almost chocolaty sweet dark porter. A great warmer for those cooler evenings.**

**Gonzo Imperial Porter, Flying Dog Brewery, Frederick, MD – Yes, you have seen this brew reviewed here before, but it’s simply to good not to review again. Thanks. I’ll have another!**

So how to add insulation to our optics in ways that don’t negatively affect the performance of our scopes? Here are some low cost tricks I use to keep the dew off my optics:

1. To keep dew from forming on finder scope objectives, reflecting telescope secondary mirrors (Newtonian) or lenses (think Schmidt-Cassegrain), or the zero power reflex finders (Rigel, Telrad), make a simple sleeve (dew shield) from 1/4” thick black foam plastic. Fit the dew shield over the tube of the telescope near the objective you are trying to protect. The attached pictures show examples of dew shields. Dew has never been a problem on my finder scope objective since I installed a foam dew shield. Dew shields have a secondary benefit in that they also act to shield stray light from entering the scope’s optic path.





2. Protect eyepieces on finder scopes by connecting the finder scope's eyepiece lens cap to an elastic thread and then to the finder. If dew is expected, cover the eyepiece with the cap when not in use. You will never have to go looking for the cap because it is always attached to the finder.



3. Insulate eyepieces with a doubled up cotton sock with the toe cut out. Of course don't forget to wash the sock first. I read about this idea in one of the astronomy magazines then tried it out. I have to say the initial reaction was my eye enjoyed the warmer than normal eyepiece temperature until the continued drop in air temperature cooled the eyepiece past the dew point and the result was a cold eyepiece complete with a wet sock. Next time out I will experiment with some other material, perhaps 1/4" foam to insulate the eyepiece.

*Following the suggestions in this article will only delay the temperature of the optics from reaching the dew point. But that may be long enough for your night under the stars or until Mother Nature decides it is time to send in the clouds. Dew shield solutions and insulating your optics are not necessarily the best way to keep your optics dew free. That involves dew heaters powered by batteries. But these ideas do provide low cost, low-tech solutions that keep the dew at bay on most nights.*





## Observing Chair

Jim Abshier

During outreach events like the monthly open house nights on Peach Mountain, observing usually consists of people looking through the telescopes for at most a few tens of seconds. A standing position at the telescope is adequate for this type of viewing. For detailed examination of an object, and particularly if the object is being sketched, however, a comfortable seated position is preferred. I like to sit down when I observe and have used a combination of various chairs, stools and even a cushion on the ground to find a comfortable position at the eyepiece. I finally decided that what I needed was an adjustable observing chair. Such chairs can be purchased, but they are expensive, and I figured that I could save a lot of money by building my own. An internet survey yielded several designs for home-made observing chairs. These examples provided me with some ideas on how to build mine. The simplest example found is called the Denver Chair, which uses standard 2x4 lumber and plywood. The chair seat is held in place by friction material normally used for stair steps. Other designs used notched wooden rails to provide more certain control of seat position. Examples of this approach include the Catsperch and Walt's Custom Observing Chair.



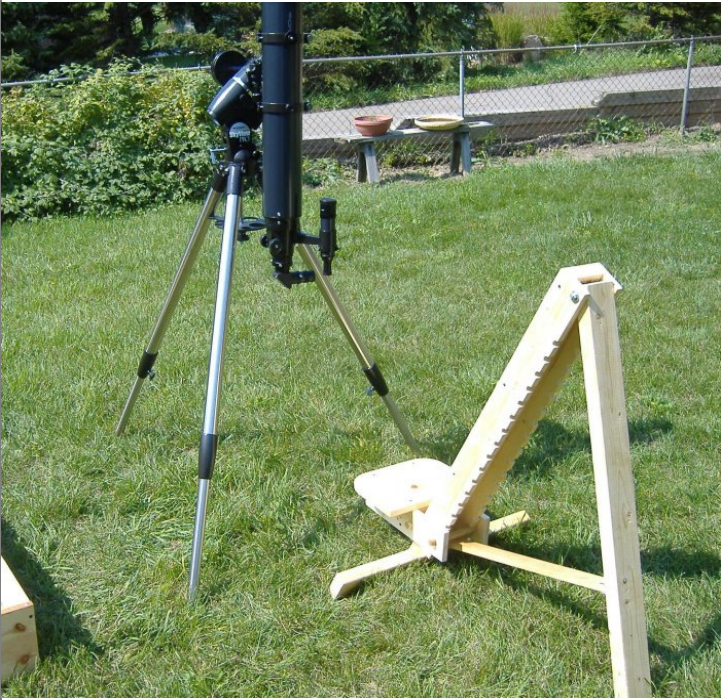
I liked the simplicity of the Denver Chair, but wanted the more positive control of the notched board approach. For my observing chair, I incorporated (shamelessly stole) ideas from all of these chairs. The basic structure of my chair is 2x4 lumber, and the seat is held in position by notched boards. A picture of my observing chair is shown in Figure 1. The notched boards are made of 1x4 lumber with the notches produced by a  $\frac{3}{4}$  inch drill and drill press. A fixture on the drill press held the lumber in place for drilling the notch (half of a hole). The seat is made of 1x10 and 1x4 lumber with  $\frac{3}{4}$  inch dowels. The seat could be made of plywood, but I happened to have some 1x10 lumber available. The brace is 1x2 lumber with a hinge at one end. The other end of the brace has a hole reinforced by an aluminum plate. The hole in the brace slides onto a  $\frac{1}{4}$  inch bolt to hold it in place.

**Figure 1 My Home-Made Observing Chair**

The observing chair is adjustable to accommodate a range of observing positions. Figure 2 shows the chair adjusted for observing near Zenith, and Figure 3 shows the chair adjusted for observing objects near the horizon. Most of the observing chairs I found on the Internet used sturdy wood such as red oak. I made mine out of cheap pine lumber, so it will probably not hold as heavy an observer. It seems to be adequate for my 170



pounds. At least it hasn't broken yet. The chair can be folded for storage or transport to an observing site. Figure 4 shows the observing chair in folded configuration.



**Figure 2**



**Figure 3**

I have found this observing chair to be very easy to use. It is nice to be able to quickly adjust the seat to a comfortable height for a wide range of viewing positions. I find that a comfortable seated position is almost essential for detailed examination of objects in the telescope eyepiece.



**Figure 4 Observing Chair Folded for Storage or Transport**



## The City Dark: The Return of Starlight

by Jack Brisbin

This is a short update on the film *The City Dark*. Some of you may not realize that the University Lowbrow Astronomers are co-hosting the event with the Ann Arbor District Library (AADL). If you go to their website (AADL) and go to the events listing, you will find us there with a short write-up on the film.

Just a few weeks ago, *The City Dark* had its theatrical premiere in Washington DC at the E Street Cinema sponsored by the "Environmental Film Festival in the Nations Capital". After Washington DC the film traveled to the Rappahannock Film Festival in Fredericksburg, VA where it won the "Best in Show Award". While the film is gaining interest in the U.S it has started to travel to other countries. Recently it was in Edinburgh Scotland for a film screening and next month it goes to the British Film Society in London England.

For those of you planning on attending the film screening, it is free to the public so bring your family and friends. To obtain a map of the AADL location just copy the address and Google Map it. Fifth Avenue street in front of the library is closed for construction. This is where they are building the new parking structure next to AADL. The library is on the corner of Fifth Ave and Williams. If you are not familiar with parking in Ann Arbor then park at the parking structure at Fourth Ave and Williams you will be one block from the library. See you there!

**"An absolutely beautiful film...nothing less than captivating."**  
— Austinist

**WINNER!**  
Jury Prize for Best Score/Music at SXSW Film Festival!

**WINNER!**  
Grand Jury Prize, Environmental Film Fest at Yale!

OFFICIAL SELECTION  
GEEK FILM FESTIVAL 2011

OFFICIAL SELECTION  
INDIANAPOLIS FILM FESTIVAL 2011

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WOODS HOLE FILM FESTIVAL 2011

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MOUNTAIN FILM FESTIVAL 2011

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EYCE CANYON ASTRONOMY FESTIVAL 2011

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MALI INTERNATIONAL FILM FESTIVAL 2011

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SXSW FILM FESTIVAL 2011

OFFICIAL SELECTION  
INDEPENDENT FILM FESTIVAL BOSTON 2011

OFFICIAL SELECTION  
GRAND JURY PRIZE - ENVIRONMENTAL FILM FESTIVAL AT YALE

**Coming to Ann Arbor**

**Date: Tuesday October 11, 2011**

**Time: 6:30 pm**

**THE CITY DARK**  
a search for night on a planet that never sleeps

**Location: Ann Arbor District Library  
343. South Fifth Ave  
Ann Arbor 48104**

**Screening will be downstairs in the Multi-Purpose Room.**

**A FEATURE DOCUMENTARY FROM WICKED DELICATE FILMS**

## From the Treasurer's Desk, Part I

A number of you have asked about how to subscribe or renew your subscription to Sky and Telescope and/or Astronomy magazines. Now that I finally understand the process, here are the details.

### New subscriptions:

For either magazine, you need to enter new subscriptions through the club treasurer, namely yours truly. Sky and Telescope is \$32.95 for one year (no multi-year option), and Astronomy is \$34.00 for one year or \$60.00 for two years. Simply send me a check (or hand it to me at a club meeting) for the correct amount, along with your mailing address, and I'll send it in for you. Same goes for if you have an existing subscription that is not through the club. Those are treated like new subscriptions. There it would be best to include your renewal notice along with your payment. That will help me help the publisher convert your existing subscription so that you can continue to receive your magazines uninterrupted.

### Renewals:

With Sky and Telescope it is really easy, as you simply handle the renewal yourself. They will invoice you at the reduced club rate, and you just send your payment directly to them using whatever payment method you prefer. But with Astronomy magazine, renewals need to be paid by the club treasurer. So you have to send me the money, and I in turn pay the publisher. I will already have your subscription details, so I don't need your renewal notice. But then again it wouldn't hurt for you to provide it to me if you prefer.

As far as I can tell, neither Astronomy Technology Today nor Amateur Astronomy magazines offer club discounts. Please let me know if you know otherwise.

As always, if you have additional questions, then please feel free to contact me at [lowbrowdoug@gmail.com](mailto:lowbrowdoug@gmail.com).

Clear and dark skies!

Doug "your friendly neighborhood treasurer" Scobel

**From the Treasurer's Desk, Part II**

It is now fall, and that can mean only one thing - it's time to order your RASC 2012 Observer's Calendars and 2012 Observer's Handbook! OK, maybe fall means other things that might be more important (such as football, Thanksgiving, and the Tigers being in the playoffs!), but calendars and handbooks are right up there too! Especially the ones published by the Royal Astronomical Society of Canada (RASC). Their wall calendars and observer's handbooks are unique, eminently useful, and second to none.

You can get a preview of these two outstanding publications by clicking on the following links, or copying and pasting them into your browser:

<http://www.rasc.ca/calendar/>  
<http://www.rasc.ca/handbook/>

The RASC also offers The Beginner's Observing Guide, which is an excellent resource for novices, and makes a great Holiday gift too:

<http://www.rasc.ca/bog/>

I wasn't planning on ordering the beginner's guides, but with a quantity of two or more we get a substantial discount, so I might as well offer to order them as well.

The Lowbrow member (yes, your dues must be up-to-date) discount price for these publications depends on the number of items we order. The more we order, the better discount we get. Here are this year's discounted prices (all in U.S. Dollars):

| Total Quantity | Observer's (wall) Calendar | Observer's Handbook | Beginner's Observing Guide  |
|----------------|----------------------------|---------------------|-----------------------------|
| 1              | \$28.00                    | \$38.00             | \$31.00                     |
| 2-15           | \$20.00                    | \$27.00             | \$23.00                     |
| 16+            | \$18.00                    | \$25.00             | \$21.00                     |
| 25+            | \$16.00                    | \$22.00             | \$21.00 (no add'l discount) |

Note that calendar/handbook sales are the only extra fundraising we do during the year, so the prices I quote above are \$3.00 per copy above the RASC's prices. So you may want to think about buying extras for Holiday and/or birthday gifts, or you may even want to sell them at work. The more you order the more money you'll be raising for the club. Last year the Lowbrows ordered 26 wall calendars and 18 handbooks, so if we equal or better last year's orders then we can get the maximum discount, at least for the calendars.

If you want to order one or more of these publications, then **PLEASE RESPOND TO ME VIA EMAIL ([lowbrowdoug@gmail.com](mailto:lowbrowdoug@gmail.com)) NO LATER THAN FRIDAY, OCTOBER 21**. Not coincidentally, that's the date of the October meeting, at which I will also receive your orders. This should allow me time to place the order and for the items to arrive (hopefully) in time for me to begin to distribute at the November meeting. If you send me an email then please indicate which publication(s) you want and how many of each. Please note that as usual, I will distribute these publications at the Lowbrows' regular meetings. I'm afraid I will not be able to ship them to individual addresses.

Orders do not have to be pre-paid; you can pay when you pick up your order. If you order at the October meeting then I can take your money then if you prefer. All I ask is that if you do order, that you actually purchase them when they arrive. But wait, there's more! This year I'll be letting you pay for your orders via PayPal! If you indicate that you wish to pay via PayPal, then once I'm certain of what the selling prices will be (i.e., once I have the final counts) I'll send you an electronic invoice via email. How cool is that? If this works out the way I think it will, then I should be able to start providing PayPal as an option for renewing your dues as well, hopefully by the start of next year.

**Additional note:** In past years, there has been some involvement of the club treasurer in ordering other annual calendars, such as the Year in Space week-at-a-glance desk calendar, Furman University publications, and the Astronomy magazine wall calendar. Because demand for those items has been tepid at best, I think I'll stick with ordering the RASC publications only. Of course if any of you would like to organize a group order on your own, then that's fine with me.

Clear and dark skies!

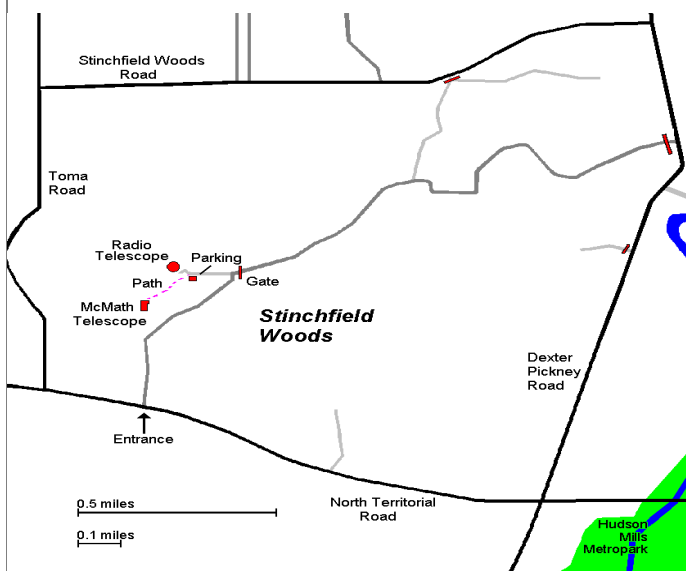
Doug "always looking at the bottom line" Scobel



## 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 3<sup>rd</sup> 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**

**c/o Doug Scobel**

**P.O. 131446**

**Ann Arbor, MI 48105**

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. Members renewing their subscriptions are reminded to provide the renewal notice along with your check to the club Treasurer. Please make your check out to: "University Lowbrow Astronomers"

## Newsletter Contributions

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

Call or Email the Newsletter Editor: **Mark S Deprest (734)223-0262 or [msdeprest@comcast.net](mailto:msdeprest@comcast.net)** to discuss length and format. Announcements, articles and images are due by the 1<sup>st</sup> day of the month as publication is the 7<sup>th</sup>.

## Telephone Numbers

|                       |                 |                |
|-----------------------|-----------------|----------------|
| President:            | Charlie Nielsen | (734) 747-6585 |
| Vice Presidents:      | Jim Forrester   | (734) 663-1638 |
|                       | Jason Maguran   |                |
|                       | Jack Brisbin    |                |
|                       | Belinda Lee     | (313)600-9210  |
| Treasurer:            | Doug Scobel     | (734)277-7908  |
| Observatory Director: | Mike Radwick    |                |
| Newsletter Editor:    | Mark S Deprest  | (734) 223-0262 |
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|                       | Fred Schebor    | (734) 426-2363 |
|                       | Charlie Nielsen | (734) 747-6585 |
| Webmaster             | Dave Snyder     | (734) 747-6537 |

## Lowbrow's Home Page

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

## Email at:

[Lowbrow-members@umich.edu](mailto:Lowbrow-members@umich.edu)



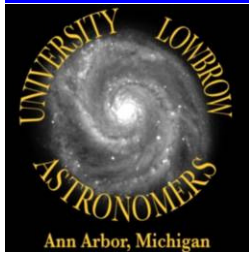


## University Lowbrow Astronomers

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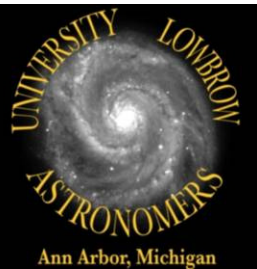
lowbrowdoug@gmail.com

### Reflections & Refractions



### Website

[www.umich.edu/~lowbrows/](http://www.umich.edu/~lowbrows/)



University Lowbrow Astronomers  
P.O. Box 131446  
Ann Arbor, MI 48105



M16  
Eagle Nebula / Pillars of Creation

Michael Radwick  
Sept 1, 2011 - 51 x 40sec  
14.5" F4.3 StarMaster  
Canon 30D ISO 1250

Check your membership expiration date on the mailing label