



## Astrophotography and Digital Imaging

by Chris Patel

### What comes first the chicken or the egg?

In astrophotography, what comes first — mount, scope or camera? The answer is they all come at the same time!

This month and next, I will cover mount types, selection and usage. Yes, I know you probably have a mount already and while some are more suitable for astrophotography than others, the good news is that most are adaptable to some type of astrophotography. When you start talking about upper end systems, it is not uncommon for someone to spend anywhere from \$5,000 to \$15,000 on a good mount and more often than not the mount is more expensive than the scope that sits on it! That statement demonstrates how much importance imagers place on the mount in order to achieve great results.

*(Don't stop reading now - you do **not** need to spend that much, really!)*

The simplest mount is a sturdy camera tripod. You mount a manual SLR film camera to it with a 40 to 50mm lens, add a shutter release cable and you are ready to shoot star trails. You need a dark sky to prevent sky glow from saturating the film. Shooting star trails is a neat way to capture the rotation of the heavens.

You might frame a specific constellation and capture its movement over a few minutes, allowing you to recognize it still from the brighter stars. You can also select an interesting backdrop which will add a lot to your picture. Take a look at my star trails picture from Peddler Hill. If you have been there often, you can recognize the tree line to the north. Getting the red glow of astronomer's lights also adds to the detail.

If you have a digital camera that has the ability to take timed exposures longer than three minutes, you can use that instead of film. You will have to experiment a bit with exposure times: for film you could try different lengths of exposures starting at 10 minutes, then add 5 minute intervals until you're at a half hour. For digital, it is more complicated due to the chip introducing some electronic "noise" to the picture, but the idea is the same — experiment with different exposure lengths.

Which ever way you do it, record the details of the exposure so you can go back and review which combination gave you the best results and then refine them.

There are other tricks you need to learn such as the "hat" trick. Once you have your camera on the tripod, film advanced to a new frame, shutter release cable ready to go and focus set to infinity, you want to cover the front of the lens with something - in this case, hold your hat over it. When you open the shutter, it will generate vibration and if the lens is exposed to the sky, this vibration will manifest itself on the film as a shake. The idea is to not let the lens see sky until the vibration has subsided. *Open the shutter...remove the hat.* You want to do the same before you trip the release to close the shutter at the end of the exposure. *Cover the lens with the hat...close the shutter.* Now you know the "hat" trick!

There are a lot of great sources of information on the Web. Just do a search with a variety of word combinations. There are also two very good books on film astrophotography which I can recommend: *Astrophotography for the Amateur* by Michael Covington and *Wide Field Astrophotography* by Robert Reeves. Both are great sources of information on techniques and also contain significant technical depth if you really get interested in this aspect of the hobby.



So you think star trails look like blurred shots and you have a yen to capture images like the Hubble Space Telescope do you? Well slow down and remember, baby steps are far easier than jumping off a cliff!



The next step up in my mind before you get to a full blown mount with drive system is called a “barn door tracker” - sometimes also referred to as a “Scotch” or “Haig” mount after its inventor, George Haig of Glasgow, Scotland. It is a way to track the movement of stars across the sky using a simple device that looks like two small boards joined at one side with a hinge. There is usually a tripod ball mount which allows you to point the camera at different areas of the sky and either a manual or motor drive to move the boards. The web will give you lots of ideas and plans on how to build your own. Sky and Telescope magazine also had an article on how to make a motorized one in their June 2007 issue.

These mounts are good for taking exposures of several minutes with a 40mm to 50mm lens, giving you a nice wide field shot of a good portion of the sky. How big a portion of the sky? Usually a constellation size area or larger depended on the focal length of the lens. Thinking about using a longer focal length lens to capture the Orion Nebula with this type of mount? Tell yourself in a Jersey accent – forget about it! This mount is only meant for short focal length wide field shots.

The two books I mentioned above also have sections on using a barn door tracker mount.

If you already have a German equatorial mount, you can do Piggyback astrophotography. Piggyback is a method where your camera is attached atop a telescope and then the mount is the tracking platform. There are lots of ways to accomplish the attachment of the camera with lens to the scope. Some folks even remove the scope and attach the camera and lens directly to the mount. Why do this? Well if you have a scope with a narrow field of view and you want a very wide field, you can easily accomplish this using a short focal length lens on the camera which you could not do through the main scope.

Next month, I will cover the three most common mounts found today, Dobsonian, Fork and German Equatorial. Astrophotographers have used all of these types to capture some very nice images. Look on the web for images taken with all three of these types. In the meantime, keep it simple and get out there and capture some star trails!

*It's our club, let's continue to make it grow and diversify! - Chris Patel*

*Over this series of articles I will also cover camera selection criteria, scopes suitable for imaging, focusing, software selection, and basic processing. If you have specific topics you would like me to speak to, please email me directly at [cpatel823@sbcglobal.net](mailto:cpatel823@sbcglobal.net). If you would like to see some of my work, please view my flickr page at <http://www.flickr.com/photos/cpatelastrophotos/>.*

(See page 3 for suggested dates for imaging sessions at Peddler Hill.)

Peddler Hill – panorama by Chris Patel

