Orbit

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Roger Hill, Editor

After re-installing my 12" SCT in the home made wedge on my home made pier in my observatory earlier this month, I found that my GoTo were really off. Sigh. Time to polar align. There's a really simple procedure that takes just a few minutes for any equatorially mounted GOTO telescope. I'll write about it in a later issue, but once it's done, it's a pleasure to be able to just punch in the name of the object you want to see, or photograph, and have it show up in the middle of the eyepiece or detector.

I also need to work on my pier. As many of you know, I have a Mark Kaye type of pier, that uses 4 2x4s arranged in a square with an inch and a half hole down the centre. This 8 foot tall pier was mounted 4 feet into the ground inside an 8" diameter hole that was then filled with concrete. Les Nagy has suggested that I put concrete down the centre of the pier, and that this will add sufficient stiffness to it so that the 100+ pounds of equipment mounted on it works well. The other option is to take the wooden pier out. It worked very well when it only held a C8, aluminum wedge and a webcam, maybe 40 pounds. The problem is that it now holds 75 pounds of scope, 40 pounds of wedge, 10 pounds of guide scope, as well as assorted diagonals, cameras, auto guiders, eyepieces and finders. The pier can't handle the load anymore. I'm wondering if I can take the pier out of the ground and replace it with a purely concrete one. Ideally, just taking the pier out, and leaving the concrete behind might work, as I'll have a 5"x5" hole to fill with concrete. One of the things I liked about wood was that it was easy to shorten it, when I went from an 8" to a 12" SCT. However, I don't expect to ever increase the size of the telescope again as my 6' x 8' observatory is already a bit undersized for such a large instrument, so going to a non-adjustable pier makes sense. I'll let you know what happens.

In May, people in eastern Canada had a great opportunity to see a very thin crescent Moon. On Monday, May 5th, New Moon occurred around 8am EDT. With the steepness that the ecliptic makes at that time of year, it was possible (just) to glimpse a New Moon that was perhaps just a bit more than 12 hours old. The weather that evening was not very good, but the following evening was different. It was very nice and clear.

Gary Colwell and I went to the Observatory, to try to photograph the Moon and Mercury close by in the western Sky. I got there shortly after 8pm, and met Gary there. We decided that the field north-west of the observatory beside Milborough Town Line would be ideal to observe from. It's a popular spot...it's the same place where Steve Barnes, Derek Baker and I observed the August 2007 Lunar Eclipse. Gary and I set up, and at 8:38pm, just 14 minutes after sunset, Gary first caught a glimpse of a very thin Moon. I turned my 80mm Williams Optics f/6 towards the thinnest Moon I think I've ever seen. I certainly don't remember ever seeing a younger one. Around 9pm, Mercury became visible about 4 degrees away. It was only after Gary and I got home and examined our images did we spot Chi Tauri grazing the moons limb. We'd been so busy trying to compose our images, that we'd never even seen the occultation. Gary's image is this months front cover photograph.

Anyway, elsewhere in this issue, you'll find some more images from Gary, taken from his observatory at his cottage. (Clear Sky Chart—Split Rock Observatory). His site is a 3 on the Bortle scale (Milky way shows bulge into Ophiuchus. Limiting magnitude 6.6 to 7.0). His site, though, is about 10 km from being a 2 on the scale. Certainly, Gary enjoys dark skies on a routine basis. Incidentally, the Hamilton Centre observatory is a 6 or 7: Milky way at best very faint at zenith. Limiting magnitude 5.0 to 5.5.

There's a report on what sounds like a fun evening at the Observatory from Rick Cudmore, an observation of an exoplanet from Steve Barnes, an article from Carl Roussell on daytime observing, other stuff from the Frugal Astronomer, and some humour. Enjoy.

Humour:

Over the years, at parties attended by various scientists, it was reported that:

- Everyone gravitated toward Newton, but he just kept moving around at a constant velocity and showed no reaction.
- Einstein thought it was a relatively good time.
- Coulomb got a real charge out of the whole thing.
- Cavendish wasn't invited, but he had the balls to show up anyway.
- Cauchy, being the only mathematician there, still managed to integrate well with everyone.
- Thompson enjoyed the plum pudding.
- Pauli came late, but was mostly excluded from things, so he split.
- Pascal was under too much pressure to enjoy himself.
- Ohm spent most of the time resisting Ampere's opinions on current events.
- Hamilton went to the buffet tables exactly once.
- Volt thought the social had a lot of potential.
- Hilbert was pretty spaced out for most of it.
- Heisenberg may or may not have been there.
- The Curies were there and just glowed the whole time.
- van der Waals forced himself to mingle.
- Wien radiated a colourful personality.
- Millikan dropped his Italian oil dressing.
- de Broglie mostly just stood in the corner and waved.
- Hollerith liked the hole idea.
- Stefan and Boltzmann got into some hot debates.
- Everyone was attracted to Tesla's magnetic personality.
- Compton was a little scatter-brained at times.
- Bohr ate too much and got atomic ache.
- Watt turned out to be a powerful speaker.
- Hertz went back to the buffet table several times a minute.
- Faraday had quite a capacity for food.
- Oppenheimer got bombed.
- Crick and Watson wound everyone up
- Pascal and Pythagoras both got caught up in a love triangle
- Planck's attitude was constant
- Nobel said that the party went with a bang.
- Edison lit the party up
- Brunel beat everyone at bridge
- Boyle read the paper, but worried the party would be too base for his tastes.
- Einstein said he would go if there was no dice-playing.
- Socrates questioned whether he would be able to attend.
- Hawking said he could if it were in his light-cone.
- Murphy said that something would probably go wrong anyway.

Question: How many astronomers does it take to change a light bulb?
Answer: 73. One to change the bulb, and 72 to argue that it should weigh about 3 times as much, now that it's cold dark matter.

It is estimated that 3.71×10^{10} "first-star-tonight" wishes have been wasted on Venus.

SETI has decoded the First Message From an Alien Civilization…
Simply send 6×10^{50} atoms of hydrogen to the star system at the top of the list, cross off that star system, then put your star system at the bottom of the list and send it to 100 other star systems. Within one-tenth of a galactic rotation you will receive enough hydrogen to power your civilization until entropy reaches its maximum! IT REALLY WORKS!

An evening at the Observatory—Rick Cudmore

I was at the observatory Wednesday, May 28 and thought I would give a report of what we saw and did that clear night.

I checked the clear sky chart on Tuesday and it indicated Wednesday would be a good night for viewing. Upon arriving home from work, I checked again and all the boxes were dark blue, I decided to pack up and head out. Leaving my scope at the observatory has been a good idea as I now only have to bring a few boxes with me and don't have to set up and take down the scope and mount each time.

When I arrived, Bert and Oscar were in the process of setting up, and shortly afterwards, Carlos arrived. Bert had two scopes set up as did Oscar.

My set up time has been reduced as I only have to roughly check my index marks and looking through the bore of the mount, Polaris is usually right in the centre. I enter a new time and date in the hand controller and that's about it. After completing my 2-star alignment, I'm ready to go. This night I decided to try my first attempt at imaging. I have been receiving a lot of guidance from Andy Blanchard who has been patient and offered plenty of advice.

I checked a few objects visually before starting my imaging by looking at Saturn, M13, M3 and M57. My mount seemed to be finding the objects with very little adjustment. I decided to connect my DSLR and computer and enter the dark side. I thought M13 would be a good start but soon discovered an error with my connection between the camera and computer as I could not get the serial port to register. Andy and I set this up as com port 5 but it didn't want to accept. So without knowing what the problem was I decided to shoot anyway. I took what I thought were shot of M13 plus flats, darks and bias. Another thought occurred was how I was going to know if I was in focus since the software I was using didn't want to operate properly. I tried using the camera's view but really didn't know if I was even close. Another problem was the pictures were not downloading to the computer but were saving on the memory card. This was not going as planned, but being the first time, I chalked it up to experience. (A few days later I discovered the problem but all I managed to capture were some really good darks)

I went over to see the others and Oscar was using a Celestron 8" CPC scope and he allowed me to look through his binoviewer. I wish I hadn't done that as the views were incredible, the 3D image of M13, M57 and Saturn was amazing. I have already starting checking on line (William Optics) as I can see this might be my next purchase. We installed the binoviewer on my scope, a Celestron 8" ASCT and the viewers were stunning. It was interesting to test two different Celestron scopes, both 8". Oscar's scope was very quiet when moving, my scope sounded like a coffee grinder. I was impressed with his scope.

Carlos was using a 6" dob and was having trouble finding M81/82, we even tried using a laser pointer and star hopping but no luck. I found the objects in my scope so Carlos could see what he was looking for and he used that as a reference point. GoTo is handy.

Every time I look through Bert's scope, the objects are rock steady. He was viewing M27 with a filter. I cannot remember what object the other scope was tracked on.

I packed it in about 1 am as I had to go to work the next day. Bert and Oscar continued into the early hours and Carlos had left before me. Other than my imaging problems, I thought the night was great and probably one of the best this year. I got see what other members are viewing and to look through different scopes and equipment. Note to self, buy more bug spray as the mosquitoes are out early and disappear as it gets cooler.

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A general working on the Manhattan project had great faith in Enrico Fermi's work, but it looked as if the other scientists' theory about splitting the atom and causing a chain reaction using uranium rather than thorium was gaining favour.

The general, despondent, thought that he would give Fermi one last chance. He wrote up a requisition for one more shipment of thorium and passed it on to his clerk. Just as he did so, he began to smile rather than pout.

His clerk asked, "Why the sudden change in mood, sir?"

The general replied, "That's because I just realized that I approved Fermi's last thorium."

Tips for Daytime Observing—Carl Roussell

Introduction

Most people consider daytime astronomy as being limited to solar observing only. Wonderful views of the thin crescent moon lying close to the sun are often overlooked. Mercury and Venus are best seen when the sun is above the horizon; the planets' higher elevation means a thinner atmospheric path for the light to pass through leading to sharper images. Jupiter and Mars are also good daytime targets. An equatorial mount is necessary for this kind of work.

Setup

Daytime observations rely on the use of the telescope setting circles to locate sky position since it is impossible to star hop to find your way around as you would during night time sessions. If you do not own a personal observatory with a permanently mounted telescope, alignment to the north celestial pole needed for using the setting circles may seem an impossible task. All that is needed to achieve an adequate polar alignment is following a two step process.

The first step occurs at night. When preparing for an regular observing session you will need to set the polar axis as standard practice. Try to be as precise as possible as this will ensure that when your telescope is aimed to a new set of coordinates there will be less slewing necessary to find the desired object.

If satisfactory results are achieved at this point, you are ready for the second step. Mark the position where the legs are sitting. Markings can be paint, stones or whatever will let you find the exact position where the feet of the telescope stand are sitting. Following this process the scope can be repositioned in nearly the same orientation at the next session. If no changes were made to either the altitude or azimuth adjustments of the mount, then when preparing for a day session you can be fairly certain that you will have a decent polar alignment, and stand a fair chance of finding "something" in a blue sky.

I count the striations on the stone tiles at my observing site to set my own scope. The west pointing leg of the tripod is placed on its' spot, then the whole stand is rotated around this point till the remaining two legs are sitting correctly. My total setup time is usually fifteen to twenty minutes. Also, observations at this time of day tend to attract as good deal of attention, so be prepared to answer a lot of questions about what you are doing and allow people to look through and see what you are doing.

Eyepieces and Filters

Choosing a low power eyepiece will give a large field of view (FOV) possible making it easier to find your target. This will work fine for Venus and the Moon which each have large angular size and high surface brightness. Mercury and Mars (when the latter is distant from the Earth) have rather small apparent diameters and surface brightness. Using a medium ocular power will allow the disks of these planet to be seen, but also will decrease the field of view making the search more difficult.

Coloured filters can darken the background sky and allow your target to me readily stand out. Normally I use a 15mm Plossl and W21(orange) filter when doing my planetary work. This combination gives a FOV of about 3/4 degree with 80 power, this gives enough magnification to see the disk of Mercury or Mars and provides the necessary contrast to see the planet against the background sky. Other filters that have proved useful are W23A (red) and W12 (yellow). You will have to experiment to find what combination works best for you.

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Venus can often be seen mid-day if one knows exactly where to look without optical assistance, and can be seen easily in my 6X30 finder except when near inferior or superior conjunction.

Setting Circles

With the telescope lens cap covering the objective lens or mirror center the Sun in the finder scope using the projection method, and set the RA and Dec values for the day and time. The telescope is then repositioned to the coordinates of the next target using the setting circles. This took some practice but is well worth the effort involved. Don't forget to remove the lens cap after repositioning but before looking through the main scope. Atillo Danko's "Clear Sky Chart" can provide RA and Dec values for the date and time of the planned observation.

Tips for Daytime Observing—Continued

Focusing

Venus and the Moon are rather easy targets, but Mercury and Mars can be tricky. I have found that by first locating and focusing the telescope on an easy target, then moving on to a more difficult one, the chances of a successful observation increased. Since the background sky is so bright, the focus becomes very important. A slightly out of focus image that would still be visible in a dark sky will get washed out and not be seen in the bright daytime sky. When changing from one filter to another you may not be able to see the target until you refocus. This takes some real practice to get good at. Even after five years of doing this sort of observational work, about twenty percent of the time there is nothing to show for my efforts. Sky conditions, setup and focusing problems and the occasional inquisitive neighbour can all add up to an unsuccessful observation. So keep at it.

Safety concerns

- Never leave the telescope untended. Someone might try to look at the sun.
- After finding you target, replace the lens cap for the finder to avoid any stay views of an unfiltered sun..
- If you are observing an object near the sun, keep the target image at a lower altitude. That way the telescope slipping or the wind will not let the sun cross the field of view.

Editors Note:

A number of years ago at StarFest, on a day when big fluffy clouds lazily drifted across the sky, Les Nagy and I along with some others easily saw Venus in the daytime sky without any aid whatsoever. Well, the clouds helped our eyes focus, as did the Moon, which was not far away, either. Using Venus to set the setting circles on my C8 and for focus, I offset the scope and found Mercury. I tried for Mars, but couldn't find it. That day and night, Les Nagy, Bill Parker, Charles Baetsen and Myself observed all nine (as there were at the time) planets in less than 24 hours.

Bert Rhebergen is another who delights in daytime astronomy, frequently finding 1st magnitude stars during the day.

RH

"X" Marks the spot.

Michael Boschat of Halifax sends along this observing note:

An item of interest is the "X" on the moon that can only be seen at certain times and at certain locations on the Earth, so timing is critical. This particular lunar illumination can be seen near the first quarter moon phase, and lasts for approximately three hours.

Below is a listing for the fully formed Lunar "X" illumination Dates and Times for 2008 visible from southern Ontario:

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Jun 11 0234 UT
Aug 08 2306 UT
Oct 06 2126 UT
Dec 05 0050 UT
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Photo by Roger Hill. Taken from Hamilton Centre Observatory on January 25, 2007 at 8:20 EST, using the Centres 16" Ritchey-Chretien and a Canon 10D mounted at prime focus.

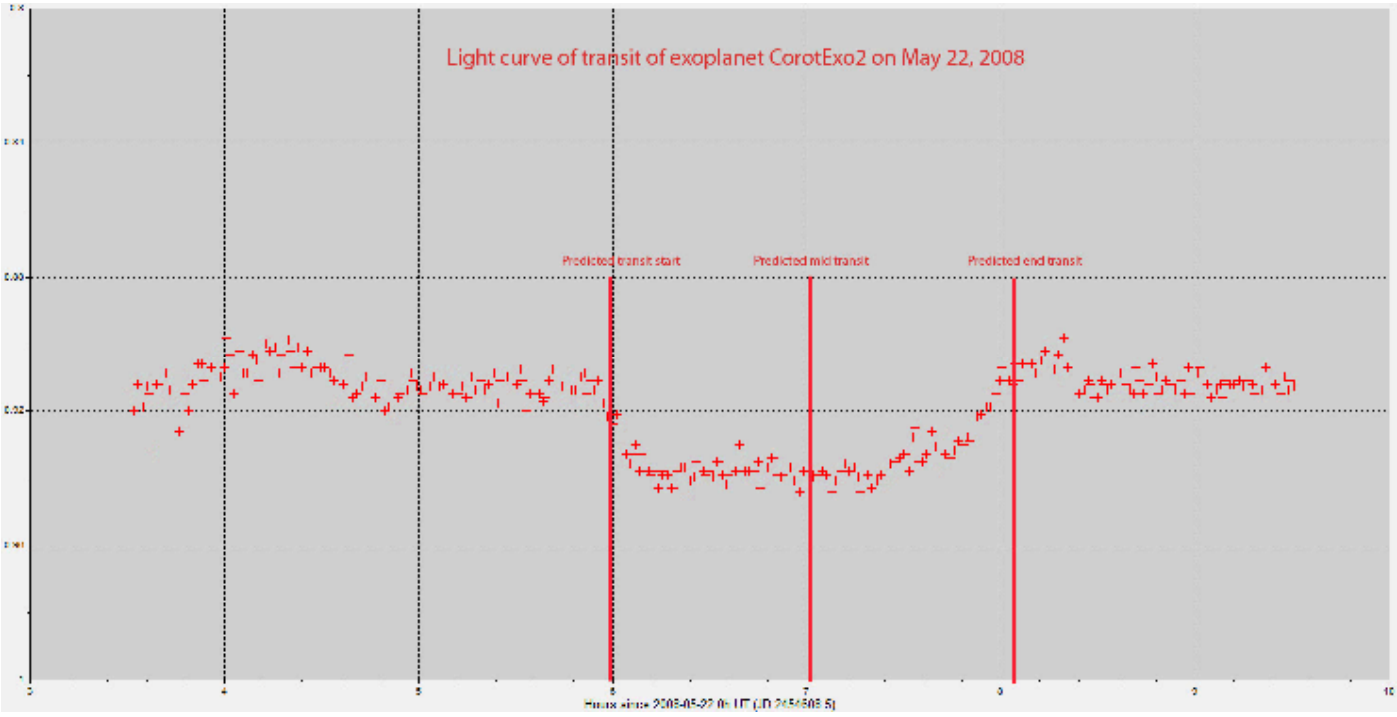
Extra Solar Planets—Steve Barnes

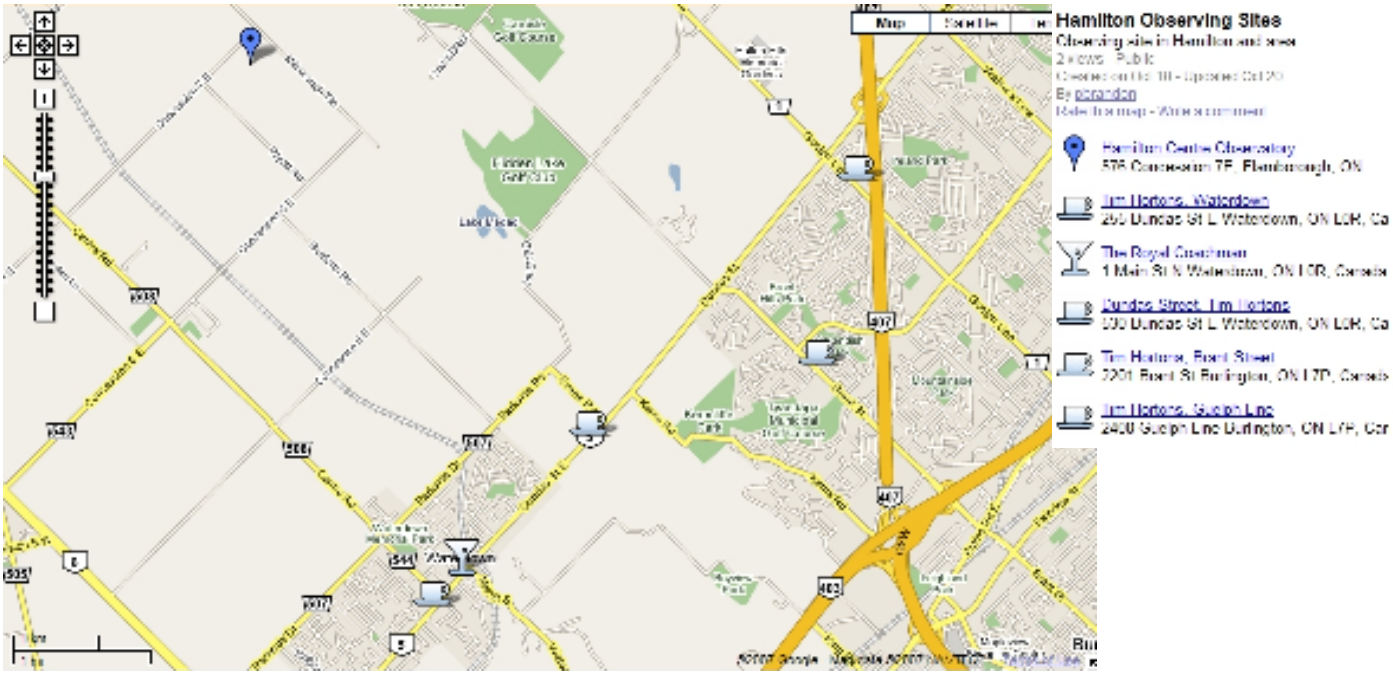
It has been just over a decade since astronomers first confirmed what they had long suspected that planets do exist around other stars. Since that time they have found almost 300 other worlds and for about 30 of those we are fortunate enough that they line up in such a way so that the planets pass in front of (or transits) the parent star as seen from earth. These are the so called transiting exoplanets. Almost all of the planets found transiting their parent stars are the so called "hot Jupiter's". They get there name because they are typically of Jupiter size and mass (or larger). When they pass in front of a typical star they block out about 1-2% of the light from the star for the duration of the transit an amount that is readily observable even with amateur equipment.

As many of you know I am now involved with a project that will search for these transiting exoplanets. We will be looking at M-dwarf stars. M-dwarf stars are cool stars that are much smaller than a sun like star. Because the M-dwarf stars are smaller we can search for planets of smaller radius than we can around larger stars with the same photometric precision. Also, the "habitable" zone is much closer in for M-dwarf stars so the periods are shorter than for a sun like star. The aim of the project will be to search these M-dwarf stars for planets of approximately 2 earth masses in the habitable zone. This works out to a period of about 14 days or so .

In preparation for the project and to test the equipment we have observed some known and suspected exoplanets transits. On the night of May 22/23, 2008 the known exoplanet CoRoT Exo2b was predicted to transit its parent star GSC 00465-01282 a magnitude 15.57 K0V star 930ly away in the constellation Serpens. The planet has a mass about 3.3 times that of Jupiter and a radius about 1.4 times greater. The orbit brings about a transit every 1.743 days. We observed the star for the entire night with the Searchlight Observatories internet remote 20" telescope. As you can see from the accompanying graph we managed to observe the entire transit (2.9%) drop and it occurred just as predicted.

Transit follow up observations are very useful (and fun) and would make a great ongoing project with clubs telescope and equipment.
Here are some websites for further reading or interest.
Website of our Chile project (still under construction):
www.searchlightobservatories.com
Amateur site about exoplanets and their ephemerides:
www.transitsearch.org
A free downloadable book with everything you need to know about exoplanet observing with amateur equipment:
http://brucegary.net/book_EOA/x.htm





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May 2008 at Split Rock Observatory and Sundry Places-Gary Colwell

It was a rainy rainy day…..not really, I just couldn't think of another way of starting the article!
I don't know about you but this past winter was one of the worst I have seen in years, both in terms of snowfall and in terms of observing… I designed my observatory to be used all year long, however, with the amount of snow this past winter, there were a few times where digging the place out was more work than I had bargained for.

Well thank goodness spring is finally here, and so is better observing weather! There are many ways that something can mess up a good night of observing….and in the early spring, weekends brought clear skies, but only when the moon was in the sky as well…!...so , being the opportunist I have always been….why not capture a few pics of the moon!..
The Month (for me and my camera) began on May 6, 2008 and was a picture perfect night to capture a few pics of the Moon and Mercury. Roger Hill and I trekked up to the Observatory (Leslie Powis) that evening to snap a few

photos…and yes Roger, thank goodness for your super clamp!....I had conveniently brought my camera, but no tri-pod, so I clamped the super-clamp to the rear door of my car and voila…instant tripod…er…. door-pod !...I have heard of the **Gegenschein** …but check out the "Rogershine!" (Editor's note: That's the Moon, Mercury, and a third roughly spherical object with nothing growing on it. Perhaps Nogginschein? RH)

We had a blast that night, although the mosquitoes were beginning to make their presence known. I couldn't think of a better place to be or finer company to be with. The Moon and Mercury put on a real nice show for us… unfortunately it was so low on the horizon by the time it got dark there was too much atmosphere to take any really dark shots.

Just a few days later, on May 10, there was another lovely moon just approaching first quarter Again I was up at my observatory and took a few more shots of the moon using my 5" Meade refractor. Oh yes….and…. Bi-jillions of BUGS!... (One of the great advantages of having a "roll-off" building style observatory is that you can hop in and close the door and let the bugs try to get blood out of the telescope….not you!.)

Again on May 17, the long weekend…….you guessed it….moon still there….so I snapped another picture.

The following weekend, the moon was still there, but didn't rise until after midnight, so I decided to try some deep sky photography using my 80mm Equinox. The pictures were approx 4-5 minute unguided using my Meade LX200 with the equinox riding piggyback….and I was very pleased with the results…ok they aren't on par with the Hubble, but I was very happy with my first attempt with the 80mm….As I was waiting for the skies to get really dark, I snapped a few pictures of Mars and M44…..what a pretty sight. The picture below shows Mars and M44 on May 23 and 24 in a "sequence" image.

Mars & M44 May 23, 24, 2008

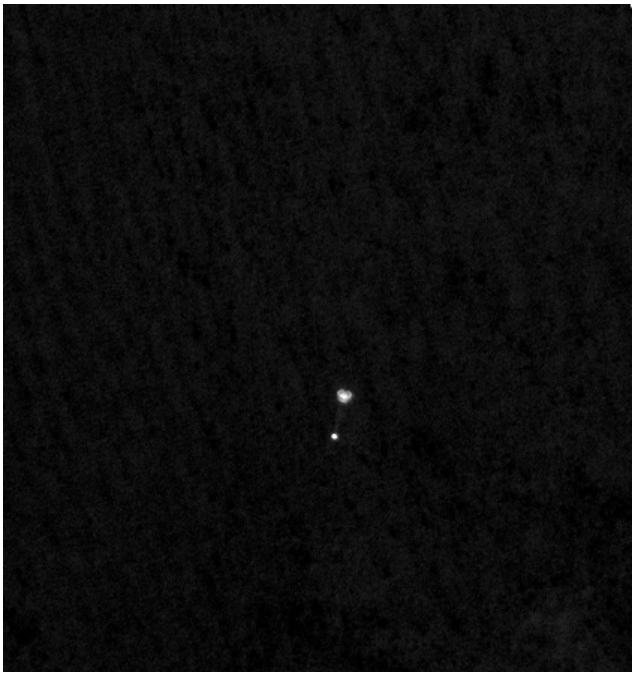
The Leo Trio
M81 and M82

M51
NGC 4565 and Friends

Last weekend, May 31st …a weekend when there was no Moon to speak of….
Was….YOU GUESSED IT…cloudy and rainy most of the weekend….So I went fishing instead!..

Finally...

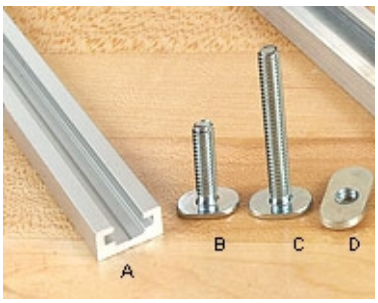
On the evening of May 25, the Mars Phoenix Lander touched down on the Martian arctic tundra. One of the instruments was provided by Canada: a meteorology station. The picture on the left from the surface of Mars on Sol (Martian day) 3.



The amazing photo to the right shows the Phoenix Lander, still protected inside its back shell and heat shield, stretched out below its parachute (at the top of the image). It was taken by the HiRISE camera on Mars Reconnaissance Orbiter as Phoenix descended, a speeding bullet photographed by a speeding bul-

The Frugal Astronomer…
Balances a Fork Mount SCT in Polar Mode.

With the addition of a guide-scope and DSLR, my SCT can get ridiculously out of balance. To create a counter-weight system, I went to Lee Valley Tools in Burlington, and bought a Veritas T-slot track: http://www.leevalley.com/hardware/page.aspx?c=2&p=52399&cat=3,43576,52799



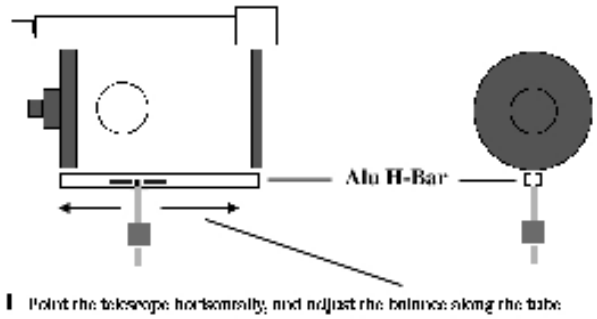
I used a nut (D in the picture) to attach a 5 inch long 1/4-20 bolt, and if I back off the bolt, it will slide along the track. I also put a 5 pound weight between some washers and wing nuts so I can move the weight along the bolt..

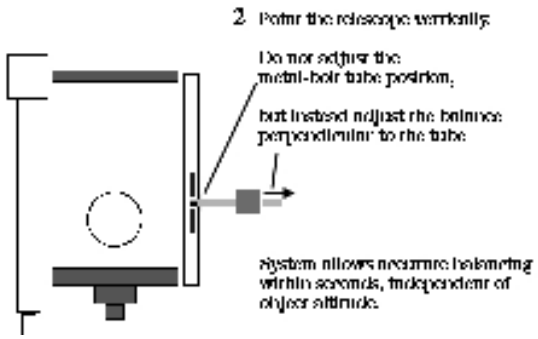
This resulted in a balancing system that allows the weight to move from the mirror end of the scope to the corrector plate, and from beside the OTA to further away. It was just what I needed.

The biggest problem though, was that I had no idea of how to balance it. For that, I turned to the Web, and found a great description of what was needed written by LX200 Guru Doc Clay. His steps to perfect balance are as follows:

1. Aim the telescope due south in the equatorial (polar) mode and tilted about 45 degrees up from the south horizon; have the weight screwed as close to the surface of the OTA as possible;
2. Adjust the weight in this position by sliding it along the length of the OTA until the out of balance situation stops. Lock it down;
3. Turn the telescope straight up (zenith) and carefully unlock...the telescope will want to tilt either north or south;
4. At this point, the Meade and similar weights are useless because they cannot account for the perpendicularity of the torque in this position; here is where this weight system shines.....the telescope in most cases will want to tilt northward from the zenith...if so, the solution is simple....unscrew the counterweight AWAY from (perpendicular to) the OTA until balance is achieved;
5. If the scope attempts to move south, then the weight is too great and you must go to a smaller size and start over.
6. Once done, lock the DEC. and unlock it in RA and turn to the SE sky.....if the scope moves eastward then add some type of temporary weight (I used joggers ankle weights) to the RIGHT fork arm handle; if to the west, then opposite.

A website—www.amtsgym.sdbg.dk/as had a couple of diagrams that make the method clear, although he prefers to have the OTA horizontal for the initial placement of the weight.





So, there you go. For about $25 you can have an extremely flexible balance system. Just be careful when you do this. If you don't keep a hand on your OTA, it can swing through the forks pretty quickly, which is rough on the 12" SCT, because it doesn't swing through the forks!