DOWN HOME Gumbo Astronomy
from Chaos Manor South!

Spring 2007
Volume 16, Issue 2

"A Newsletter for the Truly Outbound!"

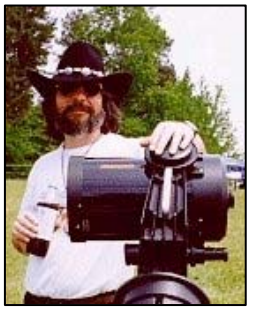
Number 84 (New Series)
<rmollise@bellsouth.net>

In this Issue:

Skywatch
1207 Selma Street
Mobile, AL 36604
U.S.A.

Uncle Rod Mollise's

Skywatch



The Earth Centered Universe Pro 5.0

Uncle Rod Mollise

Nova Astronomics
For Windows PCs
$59.95 ($69.95 with printed manual)

Has Your Old Uncle Rod deserted his southern roots? When it comes to astronomy software, it seems he *has*. It all started with that Little Old Astronomy Program from Colorado, *The Sky 6 Professional*. From there, Unk Rod went on to *AstroPlanner*, which hails from even farther north, way up yonder in Canada. And then there's the program I'm a-gonna bend your ears about today, *Earth Centered Universe Pro*, also from the Frozen Canadian North (as we reckon things down here in Possum Swamp), from a little outfit called Nova Astronomics http://www.nova-astro.com/. We're gonna examine this one in detail, but I'll tell you upfront and right now: if you want *simple, cheap, and effective*, you could do a *whole* lot worse than "ECU."

What's the current trend in astronomy software? More Better Gooder. More features, zillions more features, including things you didn't know you needed or wanted like the ability to superimpose images of the horizons of your favorite observing site onto the computer generated horizon. Miss TSP? Now you can feel like you're back at Prude Ranch every time you boot your astronomy program. Don't like those weird little symbols for deep sky objects? Hows about *real pictures*, tens of thousands of real pictures? And the rest of the sky? Why settle for a symbolic representation of the heavens when it's possible to have a *photorealistic* sky to admire in virtual fashion? *Starry Night*, for example, now incorporates a complete CCD-generated sky (inherited from the not-so-successful *Desktop Universe*).

Yeah, if you want to know the direction planetarium programs are goin', take a look at *Starry Night*. Or *The Sky 6*. And I understand the "next" *The Sky*, currently being referred to as *The Sky X*, goes even farther in the feature-laden "pretty" direction and looks a lot like *Starry Night*. Is that a good thing?

Well, maybe. Certainly *Starry Night* has many fans, and *The Sky 6 Professional* is a very

capable program—it's what I normally use when I need the services of a planetarium-style astronomy program. There's no denying, though, that the prettiness comes at the price of performance. While the publishers of these programs and others like them have done a good job of optimizing performance, there's just no way *Starry Night Pro Plus* or *The Sky 6 Professional* will run as zippily as the (comparatively) simple *Cartes du Ciel*, for example. Sometimes, I also find those beautiful displays *confusing* at 3am and long for the bygone days when *Skyglobe 3.6* was state of the art. At least that program's display was clear and decipherable. All those tons of features? That's good and bad. Yes, it's wonderful that I can change everything—virtually everything—in *The Sky 6*. But there are times when I really don't *want* that. I just want to be able to print a good looking chart of a constellation without messin' around with a lot of parameters.

Yes, sometimes simple *is* good. Thankfully, there's still some of that out there for the computer-wielding amateur astronomer (and that's most of us these days). There's *Cartes du Ciel* of course. *Hallo Northern Sky* is another one. So these programs are the ideal? Yes and no. I've gotten a lot of mileage out of CdC, especially, but it, like HNS, is *shareware*. It's always a work in progress, a hobby project for its author. What if I were to want a simple, clear, capable program that's a *finished commercial product*? Oh, and one that doesn't *cost* too much?

I ain't gonna lie to y'all. I *ain't* gonna give up *The Sky*, but I *would* be willing to spend a few dollars on something to supplement that monster program, something a little *simpler*…

That, my friends, brings us 'round to *Earth Centered Universe*. This program has been on the street for quite a few years, but had mostly escaped my notice. I think its name had something to do with that. In my Rebel Yell saturated cerebellum, "Earth Centered" meant the program must have to do with the Earth, not the sky. Maybe it was a satellite trackin' application? **Bzzzzzt! Wrong!** ECU is a full-featured planetarium-style program that strays into what we used to call the "deep sky program" arena (think *Guide* and *Megastar* and *Skymap*). That is, plenty of planetarium style horizon oriented features and animation, but an emphasis on *charting and printing*.

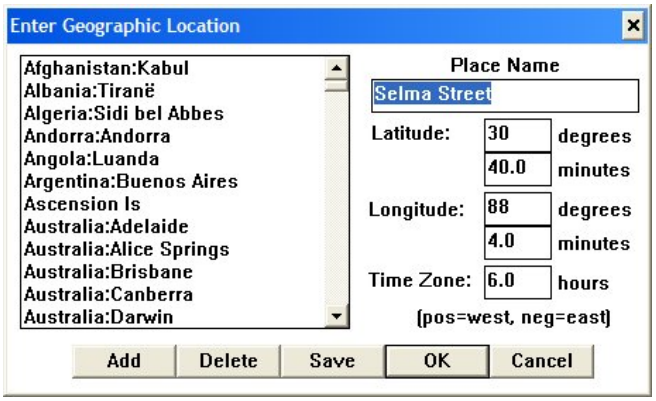
What brought ECU to my notice? I recently happened to hear some folks raving about how nice and inexpensive and friendly the program is. I also recalled that David Levy had recommended it to me a time or two. Why not give it a spin? Contacting the publisher resulted in a review copy coming my way in short order, and I soon set about rediscovering The Simple Life astronomy software style.

I keep sayin' "simple" in reference to ECU, but by "simple," I shore don't mean "lacking features," as the program (I reviewed ECU Pro 5.0, the latest and the greatest), certainly doesn't lack for *features*. A shortlist includes:

- Lightning fast speed.
- Extensive databases including the Hubble Guide Star Catalog, the SAC (Saguaro Astronomy Club) deep sky database (which incorporates the NGC and IC), the Principle Galaxy Catalog (PGC), the General Catalog of Variable Stars, the Washington Visual Double Star catalog, and 300,000 plus asteroids and comets.
- Controls almost all computerized telescopes. Interfaces with some telescopes natively with built in drivers, but also supports ASCOM.
- Animation mode.
- Includes about 2500 astronomical images.
- Can be set to display the sky in an Atlas mode or in planetarium (horizon- oriented) fashion.

- Easy printing of very high quality charts.
- Non-interfering label mode.
- Status displays for local time, universal time, latitude and longitude, RA/DEC, AZ/ALT, field size, magnitude limits, sky darkness, sidereal time, and Julian date.
- Deep sky objects are drawn in correct sizes, shapes, and orientations (when this information is available).
- Ability to add observing notes about any object.
- Sync program time and/or location using a GPS receiver.
- Clicking on an object brings up an extensive information display.
- Easy to make and place field of view targets (finder, eyepiece, CCD, etc.).
- Search and filter comet and asteroid elements by brightness, sky position, visibility, Earth distance, etc.
- Create detailed reports on plotted objects.
- Extensive Internet/online features. Comet and Asteroid orbital elements are online updatable. Advanced web searching is included as part of ECU's internal search engine. Search professional databases like GCVS, NED, and SIMBAD. Display the Clear Sky Clock nearest to the currently selected site. Retrieve weather data for your observing site.

Of course you have to install this thing on your 'puter before you can start enjoying all these benefits. Just how much PC will you need? Not much. ECU Pro's system requirements are surprisingly modest: OS wise you'll need Windows 95 (yes, I said 95), 98, 2000, NT, or XP. Wanna put it on your brand new Vista box? I'd email Nova Astronomics before trying *that*. Memory? A spartan 12mb. Your Palm Pilot prob'ly has more'n that. While the docs don't spell out exactly how much space an "everything" installation (including onboard images and the Hubble GSC) takes, I'd estimate that a full install takes less than a gig, which shouldn't be a problem for most folks these days. As far as your processor goes, a "Pentium" is recommended, but no minimum speed is called out. What this all means is that ECU should run just fine on the sleepiest old "observatory computer" you have. Me? I tested it on a modern (but modest) AMD 1.6 gig machine.

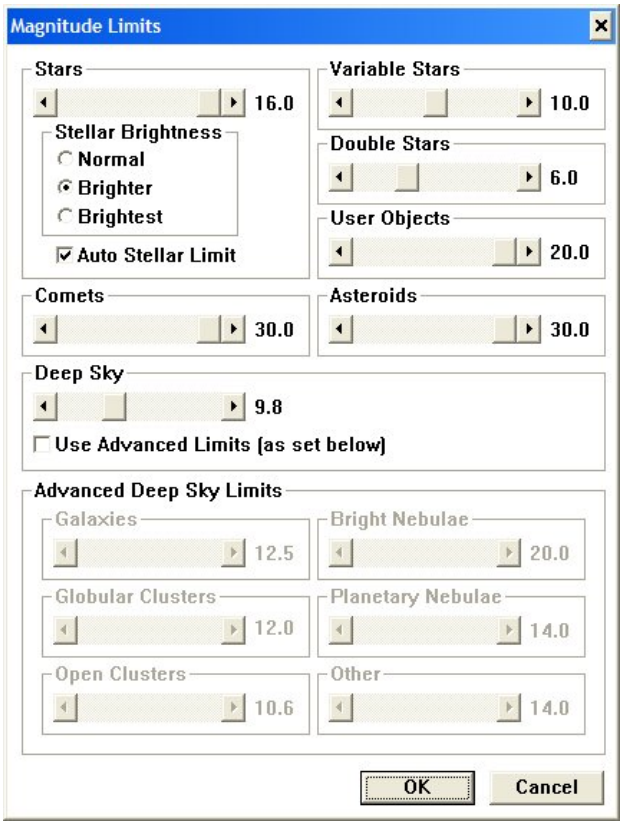


The install itself is mostly what you're used to. Or used to be used to, anyway. You won't get an auto-run after you insert the program's CD. As in the old days, you'll have to click "run" on the start menu and browse to the "setup" file on the CD. Once the installation routine completes, you can start the program by clicking the attractive icon it will have placed on your desktop. Once it cranks up, you will, as is usually the case with astro-ware, *continue* the install process. Mainly in the fashion you're accustomed to: setup location, date, time, and other user/position-specific settings.

Your first stop is the "Set" menu which resides in the more or less "standard" Windows menu bar at the top of the screen (File and Edit are there, anyway). Choose "location," and you'll be able to select your observing site's position either by picking it from a list of countries and cities or by manually inputting your location name, latitude, longitude, and UTC offset. I was a bit miffed to discover Possum Swamp was

not on the list of major cities, but it was easy enough to enter my geographic data.

Next? Get your time set up correctly from the "time" selection under the Set menu. I chose to have the program follow system time, and expected that was all I'd have to do time-wise. Not so. While the program will follow the system clock once you click this option, it doesn't get the word that you're on Daylight Savings Time unless you *select* that in the time menu. Not a biggie, but a little confusing—for me, anyway.



There are quite a few other interesting choices you can make under Set, but you can leave these—things like Solar System computation parameters—alone for now and proceed to set up your "objects." The first thing you'll want to do is set your magnitude limits. This will prevent your screen from becoming a solid white mess of stars when you're zoomed way out. Strangely—or maybe not so strangely—you won't find this setting under "Set," but rather under "Field" on the menu bar. Makes sense, I guess. Best bet in the "magnitude limits" menu? Leave "auto stellar limit" checked. This will add or remove stars as appropriate for your zoom level.

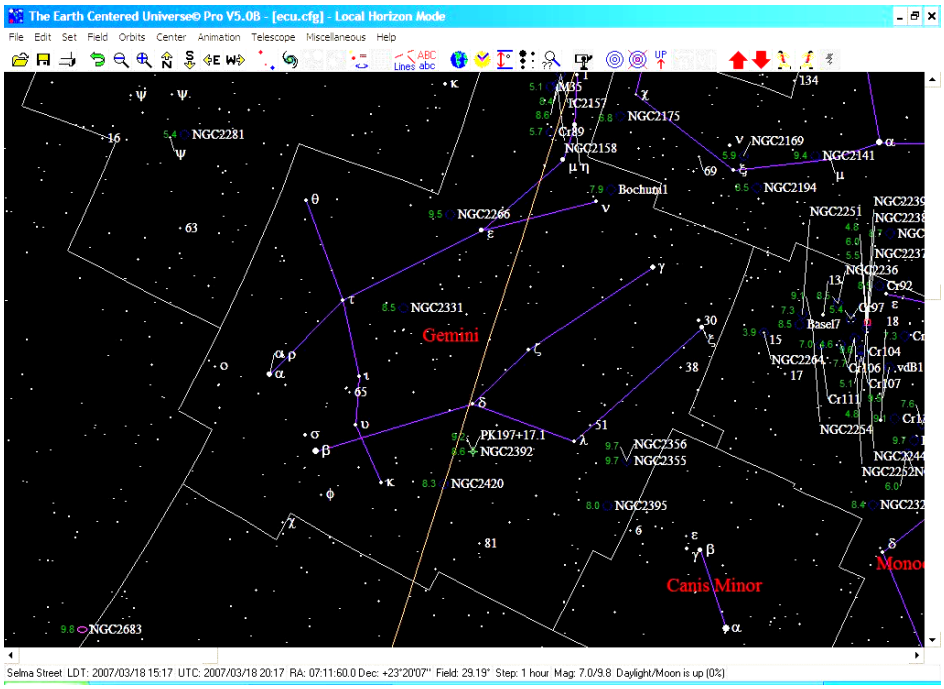
You'll also want to tell the program how dim the dimmest deep sky object it will display will be. This is done with a simple slider control. Be careful here, as the "auto magnitude" setting will *not* affect deep sky objects. What I mean is, if you're zoomed out and you jerk that slider over to "18," your screen will become that mess mentioned above, a near solid mass of DSOs (if you have the PGC turned on anyway). I find a setting of 12 – 13 keeps my screen fairly uncluttered, even with the PGC on, and is suitable for my skies and my telescopes.

Before leaving "Field," you'll also instruct the program as to the DSO catalogs you want it to use. Be sure to check 'em all—well, maybe all except "PGC" unless you're a lot more ambitious an observer than Your Old Uncle. Do be sure to tick "other" in the list of object types. *Not* checking "other" will leave some of your faves undisplayed, as, in ECU's opinion, "other" includes supernova remnants like the Veil and the Crab.

What else in Field? One of the nicest features of the program is turned on in this menu, "auto place labels." Clicking this menu selection to turn it on (no submenu) means the program does its derndest to keep labels from overlapping, even in very crowded fields, on both your screen display and your printouts. It does a good job, as is appropriate for a program that produces some of the very best printed charts I have ever seen.

Almost done, y'all. Last stop in our set up campaign is "stars." You'll find this in the Field menu, and it will allow to specify the stellar catalogs you want to use. SAO, check. Tycho II, check. Hubble Guide Star Catalog, Check. Hey, wait a minute. What the hail? Where are my bloomin' GSC stars? Despite setting the path (C:\ECU\gsc) as I figgered would be appropriate, no itty-bitty GSC sparklers did I see no matter how much I zoomed in. "Well, gull dern it, reckon I'll have to read the *dadgummed instructions*."

Which is a good time to mention ECU's manual/help system. Help system? What help system? ECU Pro really doesn't *have* one. What you can access from the "help" selection on the menu bar is the 91 page .pdf format User's Manual that accompanies the program. This manual is really very well done, and should work well enough as a help resource in conjunction with Acrobat's search functions. Still, I'd prefer a standard help engine. And, while the .pdf is well-written, it could, in my opinion, stand some *reorganization*. For example, you're told how to install the program, but then the document begins a general menu by menu explanation of ECU's functions. Ideally,



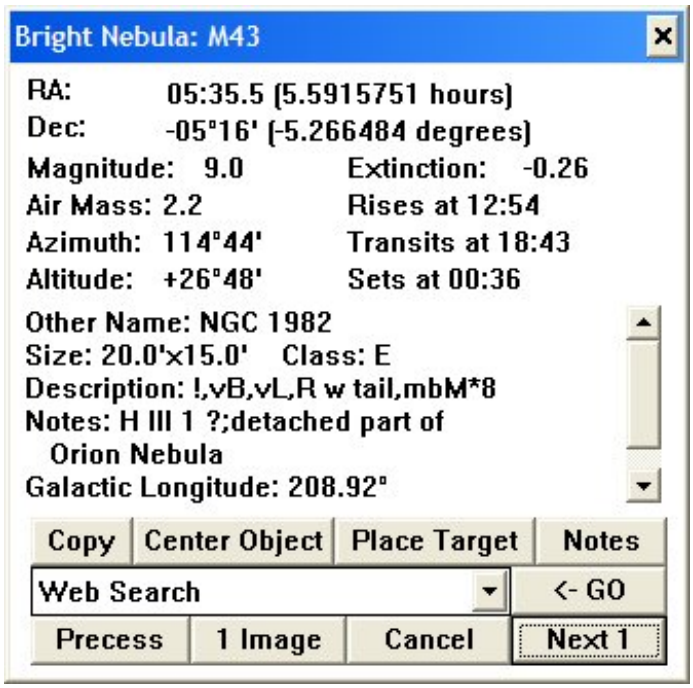
following the install directions we'd have instructions for setting location, time, position and all those other "finish 'em before you start playin' around" things. The help submenu also features online functions that will allow you to check for program updates, contact the publisher for support, and visit the program's website via your Internet browser.

Anyhoo…a look at the manual solved my GSC problem. Seemed as the setup program had not installed the GSC. Seemed, in fact, that this wasn't even an *option*. Oh, the Hubble Guide Star Catalog is on the CD, there's just no option to install it until you get the program up and running. Once you *do* have ECU running, you go to the "Miscellaneous" menu and select "read GSC regions from CD-ROM." The window that appears will have fields that will allow you to select the RA and Dec coordinates of the sections of the GSC you are interested in. Like me, you'll want to read the whole thing to your hard drive, and will just leave the coordinates at 0h – 24h and -90 – 90. This will put all them teeny stars on your hard drive where they will be ready for display at any time. Yeah, I know this seems like a funny way to get the GSC up and goin', but it's really not hard or bad, and once you've done it, zoomin' in will show off those myriads of Guide Stars just as with any other program. But why did the author choose to do things this way?

I'd guess it's a product of the time ECU was born. I don't know exactly when the program was first released, but I'm pretty sure it must have been around during Win 95 days. If you think back to those antique times, you'll remember the GSC was a hard pill for many of our PCs to swallow. The first program I owned that included the GSC was *Megastar*, and it was just *barely* able to fit on the 300mb disk (Doublespaced) of my 25mhz 486. Allowing installation of pieces of the GSC enabled way-back-when users to save disk space, I reckon.

Which brings us to the basic *look* of *Earth Centered Universe*. "Retro" and "simple" are the words that come to mind. You will not find any fancy-dan XP-look 3-D menus and windows here. You get that good, old plain vanilla Win 95/98 look. Which doesn't bother me. The sky itself? Nothing could be farther from the "how pretty can we make it?" virtual skies of *The Sky 6, Starry Night*, and

Stellarium. NO, what you have with ECU is a basic representation of the night sky as seen in the image below. Black skies. Dots for Stars. Standard constellation stick figure lines. Forget simulated sunsets, random meteors, and passing clouds. Planets? Satellite-less dots no matter how much zoom you pour on. And you know what? *I like it*. I



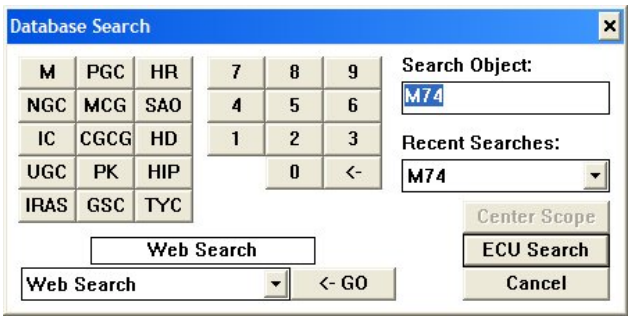
like returning to a simple, uncluttered layout that won't annoy the you-know-what out of me at 3am on a chilly observing field. Yes, Virginia, sometimes The Only Enemy of Good Enough *is* More Better.

Yeah, I know many of your are addicted to fancy-schmantsy when it comes to planetarium programs—though ECU really has more in common with deep sky programs like *Megastar* and *Skymap* than it does with planetariums like *Starry Night* and *The Sky*. Even if you do like "pretty," you will appreciate what you get in return for giving up pulchritude: speed. *Earth Centered Universe* is fast. Very fast. You will never sit waiting for something to draw or update.

What's the user interface like? Simple, as you might expect. This is a program that seems to hark back to the days when a mouse was a new tool. You can use your mouse to draw zoom boxes and center objects and click objects for information, but you will not find extensive right-click menus, and you will find your scroll wheel is *dead*. Click and drag the sky? *You must be kiddin'*. But, just as with the program's non-fancy look, I found its simple interface refreshing. I never had to guess about what a left click would do, and the program's lineup of hot keys means that fumbling around for that silly mouse out in the pitch black dark of your deep sky observing site is not necessary anymore. I did miss, I'll admit, the ability to move the sky around with my mouse, but scroll bars (which can be hidden if you desire) made moving around the sky almost as easy as the click-dragging of *The Sky*.

When you *do* click, what do you get? I mean when you click on an object? ECU's info displays, while Spartan, do include all the information I want: magnitudes, Hubble types for galaxies, Dreyer codes for NGCs, and more. One nice feature is the program's onboard images, which are accessed from a button on the information windows. These images, taken with amateur scopes, are large enough and detailed enough (but not *too* detailed) to give you a good idea of what DSOs will look like in your eyepiece or in your images. One minor annoyance with this image-display system? Let's say you select an object and click the button to display the picture. You dismiss the picture by closing its window. *Oops*, you want to take another look at it. Alas, you'll find the image display button is grayed-out. The only way to get the image back is to deselect the object and reselect it, which will return the image-display button to un-grayed-out status.

How the h-e-c-k do you find objects if you want to read their vital stats or display their pictures, though? This is the area where many astronomy programs of all types fall flat on their you-know-whats. It must be a Programmer Thing to devise fiendishly complex search tools. While some of these are probably very capable, they are hopelessly obscure; especially on a late-night observing field. Here, again, ECU is refreshingly *simple*. Click the magnifying



glass tool on the toolbar and you'll see the window shown here. Use the buttons to type in your search request, click "ECU search" and the program will find and center your desired object. But that's not all, cats 'n kittens. If you want, you can click "Web Search" instead. Doing that will run a Google search (or will search NED or Simbad if you so desire) for the object you've entered. Purty clever.

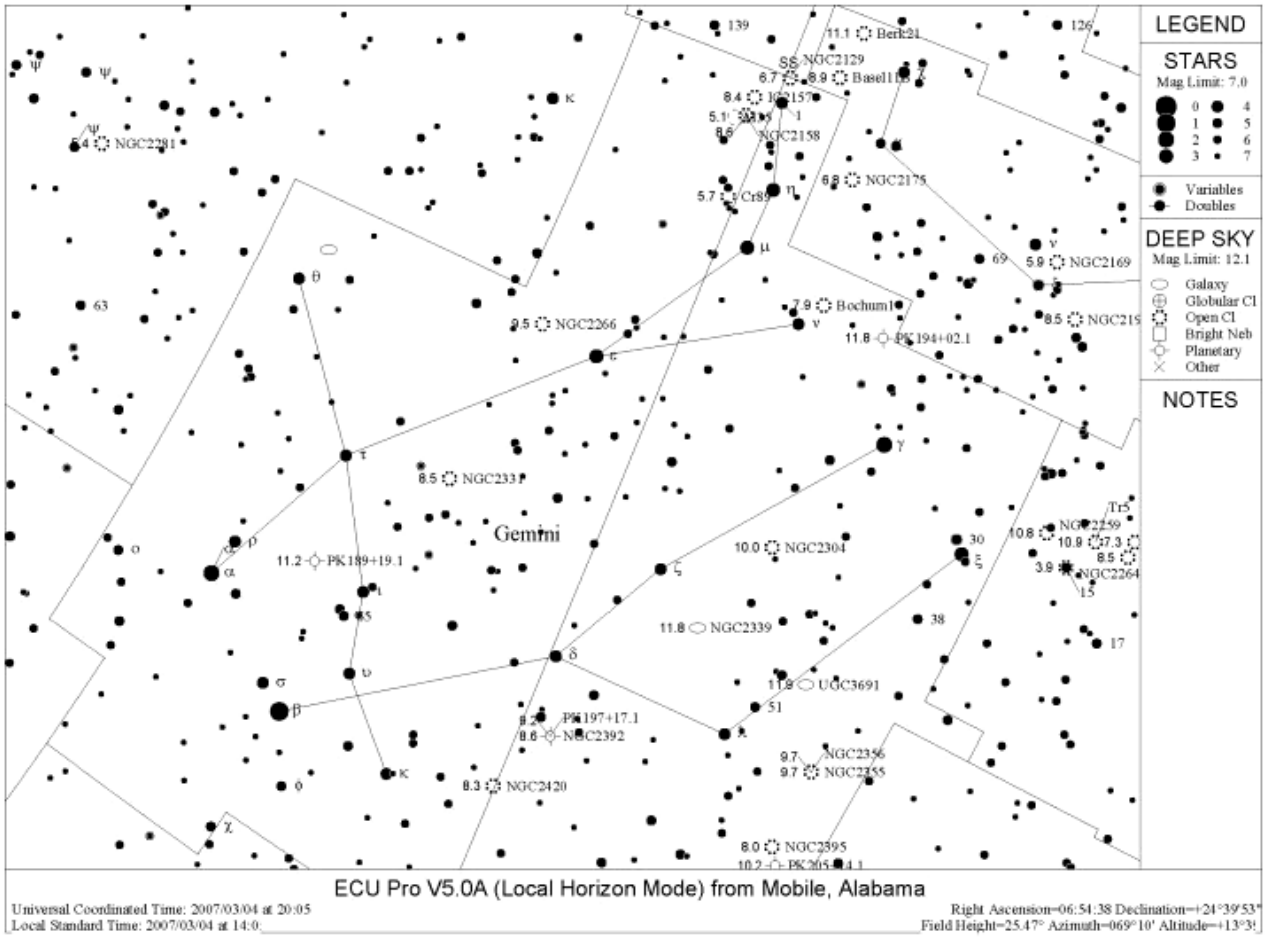
Yes, ECU may be plain, but, as mentioned above, it does have a nice icon-toolbar that duplicates many of the functions found in the menus. While the pictures on the toolbar icons are pretty understandable, I was, at first, really miffed that there's no balloon help. After a while, though, I discovered that passing my mouse-pointer over an icon made a "toolbar hint" (text) appear at the bottom of the screen on the status display. These hints more than adequately describe the functions of toolbar buttons, and once I'd discovered this I had no more toolbar problems. Frankly, if I'd *read the manual*, I'd have known about this feature from the beginning. But who wants to read a manual?

OK, ECU is up and working. What can you *do* with this program? One of the things you'll most want to do is print charts. I've been eschewing print atlases and using computer generated charts since the days of *Skyglobe 3.6*, and I will tell you right now, ECUs charts are some of the *best I have ever seen*. I rate its hardcopy output as superior to that of *The Sky*, much more legible than that of *Starry Night*, better even than *Megastar's* printouts, and, surprisingly, nicer lookin' than the charts generated by what I used to consider the best-in-the-business at printing, that wonderful old DOS program *Deep Space 3-D*. You don't have to twiddle around with settings to produce great looking charts, either; the example below was basically click-and-go.

Another big use for any planetarium? "What's up" right now or next week or next year. As far as "what's up right now," you can save the program's parameters with the display zoomed out enough that when you start next time, you'll get a nice overall look at the sky for the current date and time (you'll be asked if you want to save program status every time you exit). Just make sure you go to the Animation menu and check "lock on current azim and alt" or the *horizon* will move around as time progresses, either in real time or in animation. This has me stymied for a while, but, again, *I shoulda read the manual*. The animation buttons on the toolbar allow you to advance or regress time in user-selectable increments and work easily and well and smoothly. Once you're done animatin', be sure to go back to the Set/time menu and enable "use pc time" again, as you'll find it "off" after using the animation functions.

How about udder stuff? Starhoppin' and printed charts are nice, but many of you will want to use ECU with a go-to or DSC-equipped scope. No problem there. There's a telescope menu that provides a full set of features that will allow you to get your go-to go-toin. ECU includes onboard interfaces for a number of telescopes and DSCs (accessed in Telescope/telescope type and general settings). Most of these onboard drivers, however, are for Meade format scopes. What if you're a Celestron fancier? No problem. Just select "ASCOM" and you'll be able to link up with almost any scope imaginable. You must, of course, download the (free) ASCOM program from the ASCOM website and install it and any additional drivers required for your scope first. ASCOM is a no- brainer, it just *works*, but how about the onboard drivers?

I tested the built-in interface using my Meade ETX 125PE, and am happy to report it worked *very* well. No delays or weird behavior. While the program offers quite a



few telescope functions, basic operation is very simple: select an object, and click the "center telescope" button on its information window.

Cool stuff? ECU is definitely Internet aware. In addition to searching for deep sky data via Google, Simbad, or NED, you can bring up clear sky clocks for your selected location. You can even display your favorite weather report web page. Run across a DSO for which there's no onboard picture? You can get an image of that obscure galaxy via an automatic Digitized Sky Survey download. Internet options are completely configurable via the directory/file/web setup choice under the Miscellaneous menu. In keeping with the simple nature of *Earth Centered Universe*, these web functions are not really integrated into the program per se; whether you want a DSS picture or a Clear Sky Clock, the program just opens your Internet browser in full-screen fashion.

Last words? *The verdict?* This is a beautiful program. I'm not talking about its *looks*; it's definitely a plain-jane in that regard. I'm talkin' about the way it *works* for the deep sky observer, presenting clear, accurate and uncluttered data to help you do what you really want to do: view wondrous objects with your wonderful telescope. I thought I'd long outgrown this sort of program. Programs like *Deep Space 3-D* and *Megastar* are yesterday's astronomy software, right? NEGATORY, GOOD BUDDY. ECU showed me how wrong I was. There is still room on my hard drive for a program that's more interested in *helping* me than *dazzling* me.

GUIDED OBSERVATIONS

Victor van Wulfen

Planning an observing session is often the key to a memorable night under the stars. Knowing when to view an object, where to find it, and what to expect at the eyepiece adds to the overall experience.

Most beginners have been overwhelmed by the night sky at one time or another, as I experienced myself. Plenty of sky to point your telescope at, filled with stars, planets, clusters, nebula, galaxies. But where to start?

Pulling out a star chart and locating an object is easily done, actually finding it often proves to be much more difficult. Especially when a very faint object is chosen, as it may not be visible through your telescope. And when the object ìs found, what is it you're looking at? My first telescope was a Meade ETX-125EC and although the Autostar controller has an extensive object database, I still found it hard to know where to look and what to expect.

Having started visual astronomy like this, star hopping and using GOTO to objects that were quite possibly beyond the reach of my telescope, I decided to conquer the sky in an orderly fashion. Instead of slewing from east to west and from zenith to horizon trying to find something, anything to observe, I picked a single constellation. In an attempt to observe all objects within its boundaries my telescope was actually able to grasp.

Burnham's Celestial Handbook got me started. Neatly ordered per constellation, the books gave me great insight into objects that should be within reach of 5 inches of aperture. I picked no double stars with a primary component fainter that magnitude 7, no galaxies fainter that 11th magnitude. Compile a list, sort it by right ascension and take it out under the stars. The first time out with the objects to be observed scribbled on a sheet of paper was a great step forward. No more guessing and endless searching. I now knew where to look and finding objects proved to be easier than ever. So easy that I soon ran out of objects and found myself reaching for a star chart again. *If only I had added more of the constellation's objects to my list.*

Owning an ETX, I had the option to write tours to upload to the controller. The small lists now became text files containing a multitude of objects sorted in categories for object types. I added short descriptions, magnitudes, sizes and double star colors. Finally I could navigate a constellation with great ease. Still, there was room for improvement. Reading descriptions on the short, 16-character, scrolling line of a digital controller turned out to be quite inconvenient. The idea grew to compile observation guides, containing all the objects in the tours. I include all data I could find on a particular object, adding new ones as I found them.

Plenty of cloudy nights led to a growing number of guides, each with celestial objects sorted in categories. "Stars" for beautiful doubles and the brighter constellation members, open and globular clusters, nebulas, galaxies, planetary nebulas and more double stars. The Autostar tours were now just an addition to the guides, making it even easier to sweep an entire constellation using the eight inch LX200 I now own.

After completing 54 guides for constellations visible from mid-northern latitudes,

containing over 2000 individual objects, I decided to not keep these to myself. My enjoyment in observing had increased greatly and I sincerely hope the guides can do the same for fellow astronomers around the world. I have since published my own website where the guides can be downloaded, as shareware, at no charge. They come in both English and Dutch, the latter being my native language. You can find my Guides at http://www.clearskies.nl/

The guides are written using Microsoft Word (2003). The data on deep sky objects comes from Robert A. Strong and Roger W. Sinnott's SkyAtlas 2000.0 Companion 2nd Edition, with Mr. Sinnott's personal approval. I consider their book an excellent source and a treasure trove of information. The guides can be downloaded and printed to be used at the telescope. Each object description includes its celestial coordinates. For those who own an Autostar controlled telescope the matching Autostar tours can be downloaded and used too.

As you download and open the guides you will notice the Word files are locked, except for the places where you can insert pictures of deep sky objects, make a sketch or where you can enter your personal notes. I decided to do this to prevent a publisher to simply download everything, run off with my work and publish it without my consent. Pictures of objects are not (yet) included as I don't want to violate any copyright the pictures on the internet may have. Should anyone know an open source with quality pictures, please let me know so I can include them! Finder charts may also be an option for future additions as well.

Still, the guides are growing. Logs were added, also to use at the telescope to quickly know what objects you never observed before. Matching AstroPlanner files for Paul Rodman's great planning and logging program are a recent addition. New objects and designations are constantly being added, such as the Herschel 400. Writing new guides for 'southern' constellations will keep me busy for quite some time!

Should you want to give my guides, tours and logs a try, feel free to download as many as you like! I greatly appreciate feedback (victor@clearskies.nl); as with so many guides and objects errors are sure to be made. Should you have a more detailed description of an object, better coordinates, or in case you found an error or something I missed, please let me.

Clear skies and enjoyable observations to all.

Caroline Herschel: The First Woman to Discover a Comet

Tom Collins Jr.

We amateurs read many articles on Nebulas, Double Stars, and Galaxies by famous astronomers of the past, and most have one thing in common, they were written by male astronomers. That doesn't mean there were no prominent women astronomers in the 19th century and before, however. Caroline Herschel followed the footsteps of her brother William Herschel in studying the stars.

Born in Hanover Germany, March 16, 1750. Caroline was sickly as a child, which stunted her growth and her parents came to the conclusion she would live her life as an old maid. Her brother William, now living in Bath England, sent for his sister to train her in music. William was an accomplished musician and conductor at the time and trained his sister with voice lessons making her one of the finest Sopranos of the time and she began to sing professionally. Not only did he train her in music, but in his hobby also, Astronomy, Mathematics and Telescope making.

Caroline was a natural in these fields and her brother was amazed at how fast she learned and her ability to memorize views of

the stars. In 1783 Caroline discovered her first three Nebulas and five comets.

Comet C/1786 P1 (Herschel)

Herschel's first comet discovery came on the night of 1st August, 1786. She found the comet at a magnitude of about 7.5, though poor sky conditions meant that confirmation of the cometary nature of the suspected intruder had to wait until the following night. The first reported naked-eye sighting of Comet Herschel occurred on 17th August, and Charles Messier observed a tail 1.5 degrees long through his telescope the following night.

On the next night, 19th August, Caroline's brother, William Herschel, described the comet as being "considerably brighter" than the globular cluster M3, indicating a brightness of between 5th and 6th magnitude. Observations continued through to 26th October. Calculations show that the comet had earlier reached perihelion on 8th July at a distance of only 0.41 AU.

Comet 35P/Herschel-Rigollet

The next discovery of Caroline Herschel came on 21st December, 1788, when she found a comet around one degree south of Beta Lyrae. Like her first comet, the brightness was around magnitude 7.5, and brother William described it as "a considerably bright nebula, of an irregular form, very gradually brighter in the middle, and about five or six minutes in diameter". The comet was followed until 5th February, 1789, and its orbit was believed to be parabolic, the comet having reached perihelion on 21st November at a distance of 0.75 AU.

We now move to France, where Roger Rigollet discovered an 8th magnitude comet on 28th July, 1939, nearly 151 years later. Within a few days, L.E. Cunningham used orbital calculations so suggest that this new comet was identical with Herschel's comet of 1788, and this was subsequently confirmed. Periodic Comet Herschel-Rigollet reached a peak brightness of magnitude 7.3 in early August, but after perihelion on 9th August, it slowly faded. The last observation was made on 16th January, 1940, at Lick Observatory.

When the new system of comet nomenclature was introduced at the beginning of 1995, Comet Herschel-Rigollet was given the prefix 35P to indicate that it was the 35th periodic comet to be observed returning to perihelion. Comet Herschel-Rigollet's next return to the inner Solar System is not expected until the end of the 21st Century, something for our descendants to watch for.

Comet C/1790 A1 (Herschel)

Caroline's third discovery came on 7th January 1790, with the new comet being reported at a brightness of 7th magnitude. The comet's apparition was quite poor, being seen only on three other days, the last being 21st January. Two days beforehand, Charles Messier described the comet as nebulous with a bright condensation, and compared the comet's brightness to Pegasus' globular cluster M15. On the basis of the observations available, perihelion occurred on 15th January at 0.76 AU.

Comet C/1790 H1 (Herschel)

1790 was a good year for Caroline. Her fourth discovery, and her second for the year, came on 18th April. The comet was 7th magnitude and showed no tail. By the beginning of May, Comet Herschel had brightened to 5th magnitude and was developing a visible tail. Perihelion came on 21st May, at a distance of 0.8 AU, by which time the tail had lengthened to four degrees. Comet Herschel's closest approach to Earth came in early June, admittedly at a distance of only 0.7 AU. Nevertheless, the comet brightened to 4th magnitude with a one degree tail. The last sighting of Comet Herschel came on 29th June.

Comet C/1791 X1 (Herschel)

On 15th December, 1791, breaking a 20 month drought of comet discoveries by anyone, Herschel came across another comet, which had already brightened to 6th magnitude and was described by Caroline as a "pretty large, telescopic comet". Despite perihelion occurring on 14th January 1792 at 1.29 AU, the closing solar distance was not enough to compensate for the increasing distance of the comet from Earth, and so the comet faded, last being seen on 28th January by Messier.

Comet C/1793 S2 (Messier)

Caroline Herschel discovered another comet on 7th October, 1793, at a brightness of around 5th magnitude. Unknown to her, Charles Messier had earlier sighted this comet on 24th September, when it was 6th magnitude, and thus the comet was named after Messier. Perihelion came on 5th November at 0.4 AU, and Messier was able to recover the comet on 29th December following solar conjunction. The comet was last seen on 8th January 1794, despite still being brighter than 7th magnitude.

Comet 2P/Encke

On the evening of 17th January, 1786, the comet was first sighted in the constellation of Aquarius by the famous French comet hunter Pierre Mechain. At the time, it was likened in brightness to the magnitude 6.3 globular cluster M2.

After notifying Messier of his discovery, both comet hunters and Jean-Dominique Cassini observed the comet two nights later on 19th January. Moving rapidly into evening twilight (future astronomers would determine that perihelion was on 31st January), the comet was not sighted again, and thus an orbit could not be calculated on the basis of two observations.

Nearly ten years were to pass before the comet was sighted again. Caroline Herschel came across it while observing on 7th November, 1795. Her brother, William Herschel, noted that the comet was visible to the naked eye, while Alexis Bouvard compared its brightness to M31, the Andromeda Galaxy.

The comet was observed for a period of three weeks (perihelion was on 21st December), with other notable astronomers to observe the comet including Johann Bode and Heinrich Olbers. An orbit calculation was attempted, but the only conclusion reached was that the orbit was not parabolic.

Yet another ten years passed before the comet was "discovered" again. This time, the comet was first seen on the night of 19th October, 1805 by European observers Jean Louis Pons, Johann Sigismund Huth, and Alexis Bouvard. Huth estimated it to have a

brightness of 5th magnitude, with a 5 arc minute wide coma and a tail 3 degrees long.

At this time, Johann Encke entered the picture. Encke was a German astronomer who was to later on become the Director of Berlin Observatory. Encke studied the positions that had been reported of the comet, and suggested that the positions fitted an elliptical orbit with a period of 12.1 years - incorrect, but much closer than other astronomers who were still trying to derive parabolic orbits.

It wasn't until 1818 that the comet's appearance is noted again. Pons sighted the comet on 26th November, and it brightened over the next few weeks to display a similar appearance to the globular cluster M2, just as in 1786.

The comet remained observable for nearly seven weeks, enabling a good set of positions to be determined. Whilst it was Olbers who first suggested that this comet was the same as those observed in 1786, 1795, and 1805, it was left to Encke to mathematically prove that it was the same comet returning with a period of 3.3 years.

In 1819, having obtained an orbital solution for the comet, he calculated its orbit back over time, taking into account the perturbations caused by the known planets with the exception of Uranus, and in six weeks he confirmed that the four comet appearances were in fact the same comet.

Having confirmed the periodic nature of the comet, Encke proceeded to predict the next return of the comet, with a perihelion date of 24th May, 1822. Sure enough, on 2nd June, 1822, Karl Rumker recovered the comet whilst observing at the private observatory of Sir T. M. Brisbane at Parramatta, New South Wales, Australia (the observing circumstances for comet Encke that year were not favourable for the Northern Hemisphere). This was only the second comet for which its return had been successfully predicted, the first being Halley, and in a similar fashion to Halley, the comet was named after Encke.

Thus, were it not for an inadequate number of accurate observations preventing an early reliable orbit calculation, periodic comet Encke could have easily had the alternate name of periodic comet Herschel....or comet Mechain...or comet Pons-Huth-Bouvard.

Comet C/1797 P1 (Bouvard-Herschel)

Caroline's final comet discovery came on 14th August 1797 when Eugene Bouvard and herself independently discovered the 3rd magnitude comet within a few hours of each other. Being so bright and easily visible, numerous other observers found the comet the following night. At the time of discovery, Comet Bouvard-Herschel was only 0.17 AU from Earth, and it moved even closer, passing only 0.0879 AU from Earth on 16th August.

According to reliable records, this is the 13th closest approach of a comet to Earth. The closest approach was the lost periodic comet Lexell, which passed only 0.0151 AU from Earth on 1st July 1770 (the comet of 1491 allegedly missed Earth by a distance of only 0.0094 AU but its orbit calculation is unreliable). More recent close encounters with comets have been IRAS-Araki-Alcock, which made its closest approach on 11th May, 1983 at 0.0312 AU (ranked 3rd in the records), and the Great Comet Of 1996, Hyakutake, which flew by at a distance of 0.1019 AU (equal 19th) on 25th March.

Following the close approach of Comet Bouvard-Herschel, it faded rapidly and was last seen on 31st August. Perihelion had earlier occurred on 9th July at a distance of 0.53 AU.

Caroline's comet discoveries not only established a precedent for female astronomers, but remained a record for comet discoveries by women until the 1980s, when another female astronomer with a similar first name not only beat her record but firmly established herself in the

history of comets. Her name....**Carolyn Shoemaker.**

During her lifetime Caroline made many contributions of her own and assisting her brother William. Some of these were;

- 1783 - Discovered three nebulae
- 1786 - August 1, Discovers Comet Herschel (C/1786 P1)
- 1787 - Became the paid assistant for her brother by King George III
- 1788 - December 21, discovers Comet Herschel-Rigollet (35P)
- 1790 - January 7, discovers Comet Herschel (C/1790 A1
- 1790 - April 18, discovers Comet Herschel (C/1790 H1)
- 1791 - December 15, discovers Comet Herschel (C/1791 X1)
- 1797 - August 14, discovers Comet Bouvard-Herschel (C/1797 P1)
- 1799 - The Royal Society publishes her star catalogs
- 1822 - Returns to Hanover after William's death
- 1828 - The Royal Astronomical Society awards her the Gold Medal
- 1832 - King of Denmark honors her discoveries with a medal
- 1835 - Royal Astronomical Society awards honorary membership.
- 1838 - Royal Irish Academy awards honorary membership
- 1846 - King of Prussia awards gold medal for science
- 1848 - January 9, dies in Hanover, Germany

Caroline Herschel is to be admired not only for her contributions to astronomy, but, in an age when women were discouraged from any scientific endeavor, for pursuing her career with such *zest*. If she were observing today, with our new instruments and knowledge at her disposal, I'm sure her name would be as well-known as "Carl Sagan" and "Stephen Hawking."

Keeping an Older Telescope Up To Date

Jack Huerkamp

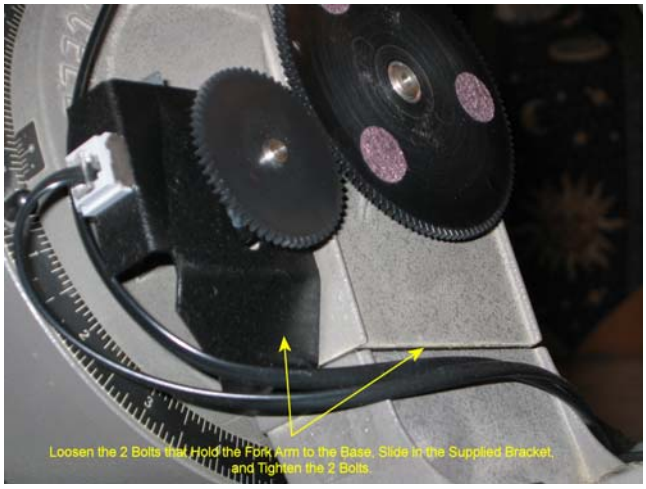
In 1982, upon returning from the Texas Star Party, I purchased a Celestron 8 from Orion Telescopes, to complement my 17.5-inch conventional Dob. It has a 1981 serial number and it came complete with 4-inch Declination and 8-inch RA setting circles to aid in locating deep sky objects. It has dual spur gear drive motors which provided good tracking for visual observing once a target was located. It is a nice telescope. However, by today's standards, it is a dinosaur. It didn't have a "brain" for locating objects or digital settings circles to take the commands from the "brain" and point the scope. You either had to rely on the accuracy of the setting circles or star hop to targets. But the circles were small and inaccurate, and it was getting harder to star hop due to increasing light pollution. I liked the portability of the C-8, but I wanted an easier way to find objects.

Current Schmidt Cassegrain telescopes from Celestron and Meade have all the latest bells-and-whistles, including digital setting circles (DSCs) interfaced with computers to provide complete alignment and GoTo operations. They even have built-in GPS systems to automate the set-up process. So I had two options:

- Sell my antique and buy a new SCT.
- Upgrade my old clunker by adding DSCs to interface with the Argo Navis computer that I own and use with my 17.5" TeleKit and Byers 812 German Equatorial.

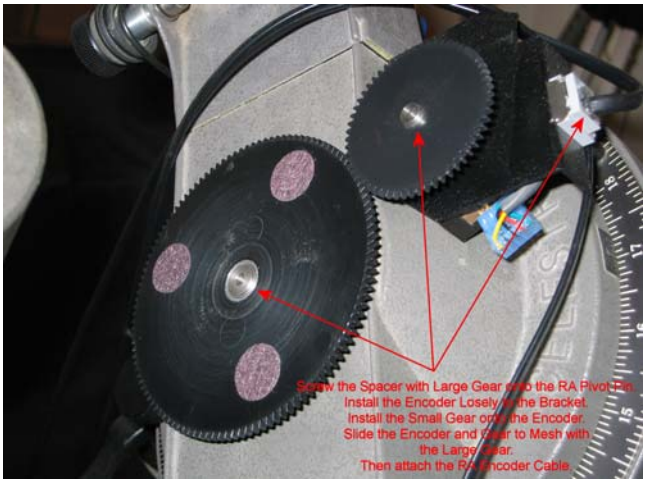
I chose the second option and contacted Gary Kopff of Wildcard Innovations, the creator of the Argo Navis, to obtain an encoder kit for my C-8. Gary informed me that there were many variations on the threading for the screws that attached the Declination setting circle to the fork arms. Also some of the pivot posts for the Celestron's had 8-32 threads, some had 10-32 threads, and some had none. So before he could supply a kit, I had to do some investigation. I removed the plastic cap that covered the RA pivot and found that my RA pivot post did not have threading.

I removed the Declination Setting Circle and found that it was attached with a 10-32 screw. With this information, Gary was able to supply me with the kit needed for my scope. Within a few days a package arrived from JMI, and I proceeded with the installation. I removed the snap ring that holds the fork to the base and tapped the pivot pin with the required 10-32 threading. I re-assembled the fork to the base and started the RA encoder assembly by loosening the two bolts that hold one of the fork arms to the base. This was necessary for the installation of the encoder bracket.



Once the bracket was installed, the large drive gear with spacer was screwed onto the RA pivot pin.

Once the large gear was installed, the RA encoder was attached to the bracket and the small gear installed. The encoder and gear were moved and aligned with the large gear

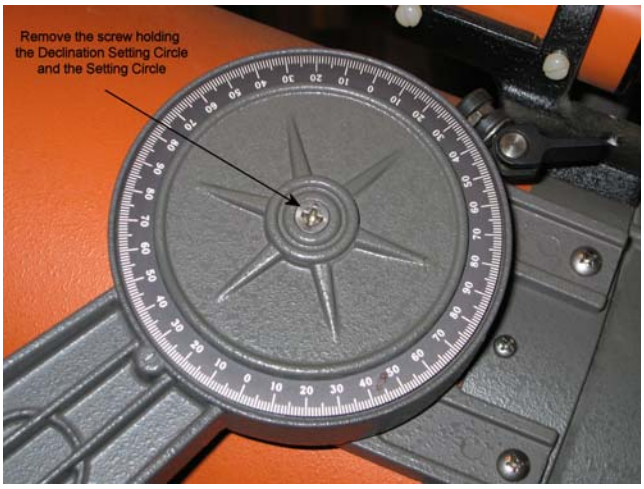


to provide for proper meshing. The encoder cable was then attached to the socket on the bracket.

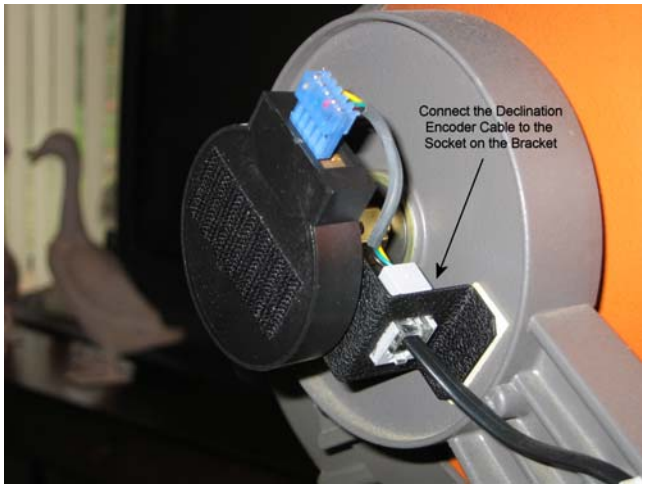
The cover was then attached to the large gear, completing the RA encoder installation. The RA encoder had 5000 steps; but due to the 2:1 ratio provided by the gears, the RA encoder effectively has 10,000 steps.

The Declination encoder installation was simpler since taping the proper threads was not needed. The screw and 4" setting circle were removed.

Then the spring washer and brass adapter were screwed onto the fork arm.



Once the brass adapter was in place, the Peal-n-Stick backing was removed from the Declination encoder bracket and the encoder's shaft was inserted into the adapter. Pressure was applied to the ends of the bracket to stick it to the fork arm. Then the Allen screw in the brass adapter was tightened to the encoder shaft. The Declination encoder has 10,000 steps as gears are not used in its installation. Thus, each axis has the same number of encoder steps.



The Declination encoder cable was then inserted into the socket on the bracket. Peal-n-Stick wire clips were applied to the fork arm and the cable routed down it to the base of the scope.

To complete the Declination encoder installation, the plastic encoder cover was installed using the supplied Velcro.

Finishing the kit's installation, the supplied Argo Navis bracket was attached to the tripod.

The Argo Navis was then inserted into the bracket and the encoder cables connected to it.

How well does the system perform? Perfectly! The Argo Navis is turned on and the OTA is set to the 90 declination position. The ENTER key on the AN is pushed, and then a two star alignment is performed. The AN is now aligned, and it is time to select a target from one of the catalogs in the AN. The display indicates the offset in RA and Dec from the target. Tthe scope is moved to zero out the display and when both sets of numbers are zero, look in the eyepiece. The target will be there.

I have used this system twice since installing it in late November, and each time the system found target after target. I now spend more time observing and less time trying to locate those elusive faint fuzzies. If you have an older, brainless telescope, you should continue adding a system of digital setting circles and a brain to it. You may find yourself using the scope more frequently.

Spring Cleaning the 60 Inch

Tom Meneghini

Another observing season on Mt. Wilson is about to get under way in April and it's "dusting and cleaning" maintenance time for the optical components. The mirrors are coated only with a bare mono-layer of aluminum and cannot withstand the alcohol and distilled water potions commonly used on well-coated production telescopes. To remove accumulated dust, pollen and (God forbid) ash, from the mirror surfaces, a no-touch method must be used.

Using a "snow gun" fabricated from a hose, valve, rigid plastic tubing, powered by a tank of carbon dioxide, easy work is made of cleaning those hard-to-get places. The idea of climbing into a telescope to clean it

is hard to fathom. The act of getting inside is surreal. Poking even a plastic probe in the direction of, arguably, one of the best optically figured surfaces in the world is white-knuckle producing. The process is applied to the primary, secondary and (you can see it above the primary) tertiary surfaces.

This is done several times throughout the season, but sparingly so as to not erode the aluminized coating. Every two to three years the mirrors are removed, cleaned and re-aluminized in a chamber at the 100" dome also on the mountain. This venerable lady is nearly a century old and volumes have been written on the contributions of notables who used her such as Harlow Shapley and Edwin Hubble, just to name a few. The mirrors were all figured by George Ritchey under the scrutinizing eye of George Ellery Hale. If the walls could talk!

The 60-inch is available for use by individuals and groups of up to 25 people from April 1 though Dec. 31. The views of planets, planetary nebulae and globular clusters are spectacular. As an amateur myself, I am both fortunate and proud to be a small part of the team keeping this historic instrument alive and available for other amateur astronomers. Details on availability and other requirements may be found at www.mtwilson.edu.

Photograph courtesy of: Dave Jurasevich.

NASA's Space Place

Early Bird Gets the Worm

or "Black Hole Breakfast"

Tony Phillips

We all know that birds eat worms. Every day, millions of birds eat millions of worms. It's going on all around you! But how often have you awakened in the morning, stalked out in the dewy grass, and actually seen a bird

having breakfast? Even though we know it happens all the time, a bird gulping a worm is a rare sight.

Just like a black hole gulping a star…

Every day in the Universe, millions of stars fall into millions of black holes. And that's bad news for the stars. Black holes exert terrible tides, and stars that come too close are literally ripped apart as they fall into the gullet of the monster. A long burp of X-rays and ultraviolet radiation signals the meal for all to see.

Yet astronomers rarely catch a black hole in the act. "It's like the problem of the bird and the worm," says astronomer Christopher Martin of Caltech. "You have to be in the right place at the right time, looking in the right direction *and* paying attention."

A great place to look is deep in the cores of galaxies. Most galaxies have massive black holes sitting in their pinwheel centers, with dense swarms of stars all around. An occasional meal is inevitable.

A group of astronomers led by Suvi Gezari of Caltech recently surveyed more than 10,000 galactic cores—and they caught one! In a distant, unnamed elliptical galaxy, a star fell into a central black hole and "burped" a blast of ultraviolet radiation.

"We detected the blast using the Galaxy Evolution Explorer (GALEX), an ultraviolet space telescope," explains Gezari. Her team reported the observation in the December 2006 issue of *The Astrophysical Journal Letters*. "Other telescopes have seen black holes devouring stars before," she adds, "but this is the first time we have been able to watch the process from beginning to end."

The meal began about two years ago. After the initial blast, radiation diminished as the black hole slowly consumed the star. GALEX has monitored the process throughout. Additional data from the Chandra X-ray Observatory, the Canada-France-Hawaii Telescope and the Keck Telescope in Hawaii helped Gezari's team chronicle the event in multiple wavelengths

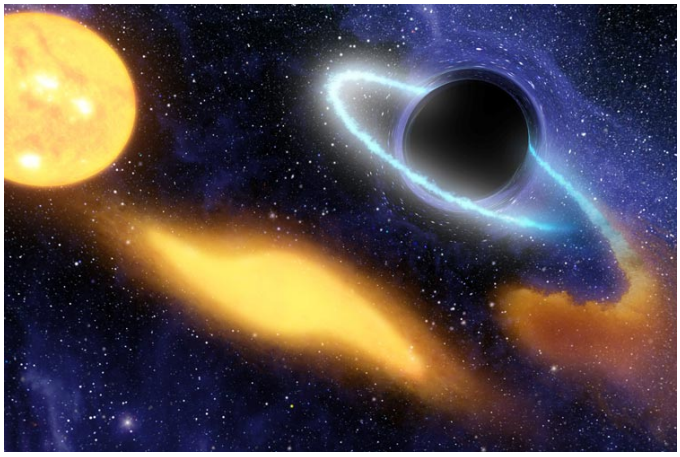
Studying the process in its entirety "helps us understand how black holes feed and grow in their host galaxies," notes Martin.

One down, millions to go.

"Now that we know we can observe these events with ultraviolet light," says Gezari, "we've got a new tool for finding more."

For more on this and other findings of GALEX, see www.galex.caltech.edu. For help explaining black holes to kids, visit The Space Place at spaceplace.nasa.gov.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.



In this artist's concept, a giant black hole is caught devouring a star that ventured too close.

My Back Pages

“Crimson flames tied through my ears
Rollin' high and mighty traps
Pounced with fire on flaming roads
Using ideas as my maps
"We'll meet on edges, soon," said I
Proud 'neath heated brow.
Ah, but I was so much older then,
I'm younger than that now.”

Club Notes: News of the Mobile Astronomical Society and Items of Interest for Gulf Coast Area Observers

Despite a paucity of clear skies, the MAS’ dark site observing sessions roll on. We actually got lucky several times this winter. One of the more memorable observing sessions being the March MOSP (Members Only Star Party), where we went after the Messiers with a vengeance. Quite a few members were approaching the halfway mark (and Uncle Rod videoed nearly 70 Ms with his Stellacam II) before haze and ground fog sent everybody home.

Spring and a young imbecile’s thoughts turn to…Metallica concerts? Probably so, at least in the case of those rascals, Beavis and Butthead. In their eagerness to hit the road as underpaid roadies for 80s HAIR BANDS, the boys nearly forgot their prime function. Luckily, what should be tossed from the Scorpions’ tour bus as it hurtled down Selma Street but that infamous mayo jar. The one Kept on Funk and Wagnall’s front porch for a fortnight. You know, the one full up with…

RUMOURS

Big news? There’s been a lot of talk about Meade being, well, down and out. There may be *some* truth to that, but it hasn’t kept ‘em from debuting a startling new product, the **MySky**. You can read all about this little “star finder,” a challenge to Celestron’s SkyScout, at Uncle Rod’s blog at http://uncle-

rods.blogspot.com/ Suffice to say, though, if this thing works, and if Meade can deliver it on time, and in numbers, the SkyScout may be TOAST.

Among other features, the MySky has a color video screen and can be interfaced to Meade Autostar telescopes (!).

More news in the Star Instruments - RCOS lawsuit? We've heard *some* of the complaints in this case have been dismissed. Some of the most serious remain, however—those claiming Meade misrepresented its product, the RCX400, by calling it an "Advanced Ritchey Chrétien."

New scopes? Not a sign of any. Unless you believe…that Celestron's recent rebate program for CPC buyers means new SCTs are in the offing. I don't know that *I* believe that, but if I *did* believe that, I'd guess, "aplantic SCTs."

--The Anonymous Astronomer

Astropoem

NIGHT

Beneath the night
I feel not small, oh no,
Oh no.
Granny-gown earth trundles her way
Cupboard to sink to table to bed,
While over her shoulder
Universes open.
Chips of stars,
First cold and distant as yearning,
Then come lover-close,
And my eyes become eyes of my heart,
My heart, flower-wide as the sky.
Small?
At my desk, perhaps,
Or tying my shoes.
But beneath the night,
Drowning deeper and darker than dreaming,
I, eye, sky Devour each the other,
And I, I…
become the universe.

Nicholas La Para

The Wrap Up

Hope you liked this one, with its new format designed for easier-on-the-eye reading. Let me know.

Next time? I hope Summer is even fatter than this one. It *can* be if you send me your stuff. I'd especially like to have some OBSERVING ARTICLES next time.

C-ya!

--Uncle Rod

Scott Smith AstroToon