

Don Lancaster's

RESOURCE BIN

number sixty seven

Getting started in amateur astronomy.

Our usual reminder here that the *Resource Bin* is now a two-way column. You can get tech help, consultant referrals and off-the-wall networking on nearly any electronic, *tinaja* questing, personal publishing, money machine, or computer topic by calling me at (520) 428-4073 weekdays 8-5 Mountain Standard Time.

US callers only, please.

I'm now in the process of setting up my new *Guru's Lair* web site you will find at (where else?) www.tinaja.com This is the place you go for instant tech answers. Among the many files in our library, you will find complete reprint sets for all of the *Resource Bin* and other columns.

You will get the best results if you have both *Netscape Gold* and *Acrobat Reader 3.0* installed.

Amateur Astronomy Resources

You'll find a superb new *Discovery Park* science center in East Thatcher. I've recently been attending a few of their astronomy club meetings. It sure is neat to have access to a twenty inch telescope for personal use. Complete with CCD camera and computer. It is even neater to gain one-on-one access to the real astronomers slaving away on a nearby hill.

Astronomy is one of the scant few scientific disciplines where dedicated amateurs are actually welcomed.

There's all sorts of genuinely useful things you can do here, ranging from comet photography to sky mapping to asteroid tracking to SETI searching to spectral monitoring.

Uh, you really do have to be well housebroken. Mentioning the sign your alien UFO abduction was under is a four paw.

At any rate, this month I thought we might review a few places to go to snarf up information on becoming an amateur astronomer. Or getting to be an even better one...

First Steps

Their are several obvious routes to getting started in amateur astronomy. You can visit a regional planetarium. *Tombaugh Planetarium* or the *Flandreau Planetarium* are the two closest to me. But I grew up rather involved in what today is called Pittsburgh's *Carnegie Science Center*. But I knew it as the old *Buhl Planetarium*.

Or, join a local astronomy club. Or check a local library for books.

Most community colleges do offer intro astronomy courses. These are a great way to hands-on access experts and telescopes at low cost. They also may host *star party* observation night gatherings.

Or check www.amazon.com for the thousands of astronomy books now in print. Three examples of recent titles are Rick Shaffer's *Your Guide to the Sky* and Dickens's *Summer Stargazing - A Practical Recreational Guide*.

Or, if technical history is your bag, read Lankford's *American Astronomy: Community, Careers, and Power*. Check *Science* magazine, v276 for a review.

I did find a really outstanding text called the *Astronomer's Sourcebook* by Bob Gibson. This shows astronomical

NEXT MONTH: Don looks at some sneaky new toner tricks.

equipment, planetariums, mags, orgs, events, and lots more. It is published by *Woodbine House*.

The only tiny clinker in the works is that this wonderful 1992 text seems to be out of print. But you might be able to find it in a larger library. *Amazon Books* can find it for you.

And just about anything else.

Or surf the web. To surf the web for current content, use *Hotbot* and enter

Amateur Astronomy. You will get some 3112 hits that should lead you to all sorts of interesting byways.

Strangely, I seemed unable to locate much in the way of astronomy ezines. But a few web newsgroups are...

alt.binaries.pictures.astro
alt.sci.planetary
sci.astro
sci.astro.amateur
sci.astro.fits
sci.astro.hubble
sci.astro.planetarium
sci.astro.research
sci.space.news
sci.space.shuttle
sci.space.tech

Some Magazines

There are two primary magazines about amateur astronomy. The first is *Astronomy* magazine from *Kalmbach Publishing*. Their website is located at kalmbach.com/astro/astronomy.html There are scads of hot links and club listings here, along with an extensive book catalog.

The second is *Sky & Telescope* by *Sky Publishing*. These folks have a contest going where they'll pay you \$500 for each new near-earth asteroid that you find. They have *SKY links to astronomy on the internet*, web pages, clubs, ftp sites, newsgroups, and mail lists.

The *Starry Messenger* bills itself as the world's largest classified shopper for astronomy goodies. The website is www.clarityconnect.com/webpages/tsm/

Some of the prices are astronomical.

CCD Cameras

Nobody peers through telescopes any more. Those days are long gone. Instead, electronic devices known as *CCD Cameras* are used. These are a relative of a video camera with a high resolution and controlled integration times. They are more sensitive than the human eye. And more patient.

Until very recently, CCD stood for *Charge Coupled Device*. But the latest of "CCD's" use a silicon detector array technology instead. Silicon is faster, cheaper, better, and more sensitive. At the cost of a slightly higher noise level. But that's quickly being fixed.

Operational CCD news shows up in the NOAO Newsletter you will find at www.noao.edu/noao/noaonews.html

It gets published by the *National Optical Astronomy Observatories*.

CCD Astronomy magazine was a fine stash of info on computers, cameras, controls, software, and such. They do still have a web site at www.skypub.co.cda.shtml But they've just merged on back into their main *Sky & Telescope* magazine. On the theory that CCD is now mainstream technology.

Their winter 97 publication appears to have been their last separate issue.

A CCD Information and Tech Forum is found at www.eio.com/cdintro.htm This includes construction projects plus a CCD newsletter.

The fine *Cookbook Camera Home Page* found at wvi.com/~rberry/cookbook.htm is sponsored by Richard Berry's *Astro PIX*. It has a lot to offer in the way of instructions, FAQ's and nice images for downloading.

A related *CCD Camera Cookbook* and other books are sold by *Wilmann-Bell*.

Some optical trade journals include *Advanced Imaging*, *PEI Photo Electronic Imaging*, the *IEEE Photonics Technology Letters*, and *Optics and Photonics News*.

The latter published by the *Optical Society of America*.

An Astronomy B&B?

I haven't yet had a chance to check these folks out, but there seems to be a combination Observatory and Bed & Breakfast in a rural setting one hour east of Tucson, Arizona. For a modest fee (\$35 to \$95 per night extra), you gain essentially unrestricted personal access to some decent telescopes (up to a 20 inch) and optional CCD's at a low light pollution site.

They call themselves the *Vega-Bray Observatory*. Their website is www.communiverse.com/skywatcher/observer.y.html, email is skywatcher@communiverse.com. Phone is (520) 745-2390.

Let me know if you find any similar sites in your neck of the woods.

Radio Astronomy

In the early 1930's, a Karl Jansky of Bell Labs noticed that radio noise was coming from certain point sources in outer space. And thus pioneered the

science of *radio astronomy*.

Your sky is full of radio sources. In those microwave and *submillimeter* (or quasi-optic) bands.

Some popular wavelengths include the molecular resonance frequencies. Including hydrogen at 21 centimeters, water at 1.35 centimeters, and carbon monoxide at 2.6 millimeters. There are also two useful atmospheric windows near 0.4 and 0.6 millimeters.

A *radio telescope* is basically a high gain antenna and radio receiver. By changing where it points, a radio sky map can be created. Better yet, two or more radio telescopes can be set up as an *interferometer*. Making the effective aperture match your distance *between* the antennas, instead of the diameter of a single antenna. Special *correlation techniques* will be needed to properly combine multiple signals.

There is a *Society of Amateur Radio Astronomers* whose web site is found at www.irsociety.com/sara You'll find some good tutorial stuff here. Along with lots of fine web links. They also publish a *SARA Journal*.

Jeff Lichtman's new title *Amateur Radio Astronomy: Systems Procedures, and Projects*, is now available by way of *Radio Astronomy Supplies*.

Radio Sky Publications has a website at www.win.net/~radiosky/

They also print a *Radio Astronomy Projects* book, lots of software, and support a well done FAQ site.

The *SMT* or *Sub Millimeter Telescope* lies on a small hill that's right in front of my driveway. Typical observation wavelengths are 0.4, 0.6, 0.8 and 1.3 millimeters. Or 230 to 750 Gigahertz. I've heard their thirty three foot dish also makes a fairly respectable 2 meter ham radio antenna.

Bolometers and liquid cooled diode downconverters are currently used as detectors. For ham radio DX, you just hang a dipole at the focus.

Arrangement for tours is through *Discovery Park*. This science center's website is www.discoverypark.com The SMT is at maisel.as.arizona.edu:8080/smt.html Check them out.

All day tours are \$30. These usually are on Saturday. They do fill a week or two in advance.

More on the submillimeter *mystery band*: [HACK84.PDF](#) & [EMERGOP4.PDF](#) on my www.tinaja.com. And also check the *International Journal of Infrared and Millimeter Waves*.

The VLA or *Very Large Array* is sort of in my side yard. Over on the Plains of San Agustin in west New Mexico.

new from DON LANCASTER

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Ask the Guru I or II or III	\$24.50
Hardware Hacker II, III or IV	\$24.50
Micro Cookbook I	\$19.50
PostScript Beginner Stuff	\$29.50
PostScript Show and Tell	\$29.50
Intro to PostScript Video	\$29.50
PostScript Reference II	\$34.50
PostScript Tutorial/Cookbook	\$22.50
PostScript by Example	\$32.50
Understanding PS Programming	\$29.50
PostScript: A Visual Approach	\$22.50
PostScript Program Design	\$24.50
Thinking in PostScript	\$22.50
LaserWriter Reference	\$19.50
Type 1 Font Format	\$16.50
Acrobat Reference	\$24.50
Whole works (all PostScript)	\$380.00
Technical Insider Secrets	FREE

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Ongoing details on Book-on-demand publishing, a new method of producing books only when and as ordered. Reprints, sources, samples. **\$39.50**

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A complete collection of all Don's Nuts & Volts columns to date, including a new index and his master names and numbers list. **\$24.50**

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Check Don's Guru's Lair at <http://www.tinaja.com> for interactive catalogs and online samples of Don's unique products. Searchable reprints and reference resources, too. Tech help, hot links to cool sites, consultants. email: don@tinaja.com
FREE US VOICE HELPLINE VISA/MC

SYNERGETICS
Box 809-NV
Thatcher, AZ 85552
(520) 428-4073

FREE catalog: <http://www.tinaja.com>

SOME AMATEUR ASTRONOMY RESOURCES

Advanced Imaging
445 Broad Hollow Rd #21
Melville NY 11747
(516) 845-2700

Flaundreau Planetarium
University of Arizona
Tucson AZ
(520) 621-4515

Photo Electronic Imaging
57 Forsyth St NW #1600
Atlanta GA 30303
(404) 522-8600

SETIQuest
174 Concord St
Peterborough NH 03458
(603) 924-9631

Synergetics
Box 809
Thatcher AZ 85552
(520) 428-4073

Amazon.com Books
Box 80387
Seattle WA 98108
(800) 201-7575

IEEE Photonics Tech Ltr
445 Hoes Ln
Piscataway NJ 08855
(908) 981-0060

Planetary Society
65 North Catalina Ave
Pasadena CA 91106
(818) 793-5100

Sky & Telescope
PO Box 9111
Belmont MA 02178
(800) 253-0245

Tombaugh Planetarium
PO Box 533
Alamogordo NM 88311
(505) 437-2840

Astronomy Magazine
PO Box 1612
Waukesha WI 53187
(800) 533-6644

Int JI Infrared & mm Waves
233 Spring St
New York NY 10013
(212) 620-8000

Radio Astronomy Supply
190 Jade Cove Drive
Roswell GA 30075
(770) 992-4959

Soc Amat Radio Astron
247 N Linden St
Massapequa NY 11758
(516) 798-8459

Vega-Brey Observatory
Bed & Breakfast
Benson AZ 85602
(520) 745-2390

Carnegie Science Ctr
One Allegheny Avenue
Pittsburgh PA 15212
(412) 237-3400

KeelyNet
Box 1031
Mesquite TX 75149
(214) 324-3501 BBS

Radio Sky Publishing
PO Box 3552
Louisville KY 40201
www.win.net/~radiosky/

Soc Amateur Scientists
1549 El Prado
San Diego CA 92101
(800) 873-8767

VLA Astronomy Site
PO Box "O"
Socorro NM 87801
(505) 772-4011

CCD Astronomy Mag
PO Box 9111
Belmont MA 02178
(800) 253-0245

Mercury
390 Ashton Avenue
San Francisco CA 94112
(415) 337-1100

Saucer Smear
Box 1709
Key West FL 33041
(305) 294-1873

Starry Messenger
PO Box 6552-W
Ithaca NY 14851
(201) 992-6865

Wilmann-Bell Pubs
PO Box 35025
Richmond VA 23235
(804) 320-7016

Discovery Park
1651 32nd St
Safford AZ 85546
(520) 428-6260

Optics & Photonics News
2010 Massachusetts NW
Washington DC 20036
(202) 223-8130

SETI Institute
2035 Landings Dr
Mountain View CA 94043
(415) 961-6633

SMT Telescope
University of Arizona
Tucson AZ 85721
(520) 621-5290

Woodbine House
5615 Fishers Lane
Rockville MD 20852
(800) 843-7323

Website is www.nrao.edu/doc/vla/html/VLAhome.shtml Visitors are welcome. Take the Magdalena-Datil expressway on through the theater and industrial districts.

Then hang right at the fifth cow.

SETI

The universe is a pretty big place. So big that it is utterly preposterous to assume we're the only semi-literate and semi-intelligent lifeforms present. Hence *SETI*, an acronym for the *Search for Extraterrestrial Intelligence*.

In 1947, our sun suddenly turned into a radio star. *Roller Derby*, *Captain Video*, and *Kukla, Fran, and Ollie* just became our goodwill ambassadors to outer space. These signals have now swept out beyond some 524,000 *cubic light years* of space. And have reached dozens of candidate systems. At field strengths that we can easily measure here on Earth today.

As to incoming signals, our abilities to measure and process weak signals over long times and wide bandwidths has improved dramatically in the past few years. While federal funding for SETI has been sharply cut back, this is probably the greatest thing to ever happen. We've now got web surfing professionals and amateurs doing a lot more much better.

On the other hand, we are getting a lot smarter about communications.

We are slowly realizing that kilowatts on a transmitter can get replaced by watts on a bird, or milliwatts on the cable. It is finally dawning on us that smart and polite civilizations don't blast excess electromagnetic energy far off into outer space.

We are also discovering that single frequency signals do not make very much sense. An often better choice is *spread spectrum* where information is spaced out over a wide bandwidth.

The crucial point is that a *decently created spread spectrum signal is pretty much indistinguishable from broadband noise!* Unless you happen to know the magic despreading codes.

Thus, a small fraction of what we perceive as extraterrestrial noise may in fact be intelligent comm.

But a real bear to decode.

Thus, sitting around and looking for loud single frequency signals may not hack it at all.

A leading organization here is the *SETI Institute*. Their website is found at www.seti-inst.edu They have lots of books, pubs, FAQ's, and links.

Also a *SETI Bibliography*.

One useful mag is Carl Helmer's *SETIQuest* and his companion website seen at www.setiquest.com Free sample issues are offered.

Carl Sagan had lots to say on SETI. His final book on *Pale Blue Dot* did include certain amazing observations.

On four results that had 199 out of 200 odds of being genuine.

But, sadly, not repeatable. There have been lots of false alarms in the past. One so good it was called the *WOW* signal.

Society of Amateur Scientists

For contacts with other interested scientific amateurs, astronomical or otherwise, be sure check into Shawn Carlson's SAS, short for the *Society for Amateur Scientists*. He hosts a rather lively *Amateur Scientist's Forum* email newsletter and archive. Plus his great *Amateur Scientist* hard copy serial.

Website is web2.thesphere.com/SAS

Pseudoscientific Astronomy

There's all sorts of strange people out there who do strongly believe in alternates to traditional astronomy. In such "fields" as astrology, UFOs, alien abductions, cow chopping (not to be confused with cow tipping), alternate physics, and crop circles.

The web has lots of mesmerizingly awful sites on these topics. The bottom line is that I have never seen the tiniest shred of credible evidence existing for any of them. Most of the "research" here is anecdotal urban lore, outright scams, hoaxes which got out of hand, or "not even wrong" observations.

Note that the key difference between astronomy and astrology is that all the

astromonomical predictions do come true nearly 100% of the time. Astrological predictions usually come true at a hit rate *slightly less* than pure chance.

My favorite pseudoscience sites do include *Keelynet*, *Science Hobbies*, and that outstanding *Saucer Smear*. Links to these and similar fictions can be found on the [Pseudoscience Library Shelf](#) and the [Pseudoscience Web Links](#) of my <http://www.tinaja.com>

And, of course, *the* definitive site on cow tipping is www.geocities.com/Area51/Vault/6963 Note that a mere fifteen percent tip is unacceptable.

This Month's Contests

Let's have four contests this month. Tell me about any astronomy resource (amateur or otherwise) I don't already know about. Or sources of hassle free personal observatory rentals. Or find me any current replacement for *The Astronomer's Sourcebook*. Or, best of all, let's revive an older contest that we had fun with a while back.

Assume you're a SETI researcher on

Ulteron IV. You are seeing strangely structured VHF radio signals coming from an unimpressive third rate star on some obscure outlying backwater arm of the *Milky Way* Galaxy. All of a sudden, your "viewing" conditions dramatically improve. Noise statistics do let this happen occasionally. As a result, you receive a lucidly clear ten second video clip of *Roller Derby*.

Send me a copy of the report you'll forward to your supervisor.

For those of you that might have missed the originals, *Roller Derby* was an all-female cross between the Indy 500, ice hockey, WWF Wrestling, salad shooting, and bull fighting. On wheels.

At one time, this was the highest and most culturally sophisticated content available for television broadcasting.

Sadly, commercial network tv has steadily gone downhill ever since.

And never has recovered.

There will be a largish pile of my new [Incredible Secret Money Machine II](#) books going to the dozen or so better entries, plus an all-expense-paid (FOB

Thatcher, AZ) [tinaja quest](#) for two that will go to the very best of all.

Send all your *written* entries to me here at [Synergetics](#), rather than to *Nuts & Volts* editorial.

Let's hear from you. ♦

Microcomputer pioneer and guru Don Lancaster is the author of 33 books and countless tech articles. Don maintains his no-charge US tech helpline found at (520) 428-4073, besides offering all of his own books, reprints, and consulting services. Don also offers a free catalog full of his unique products and resource secrets. The best calling times are 8-5 on weekdays, Mountain Standard Time.

Funding and time constraints restrict this helpline service to US callers only.

Don is in the process of setting up his Guru's Lair at <http://www.tinaja.com>

Full reprints and preprints of all Don's columns and ongoing tech support appear here. You can reach Don at Synergetics, Box 809, Thatcher, AZ 85552. Or send any messages to his US Internet address of don@tinaja.com