

# The Usenet Underground

BY ROBERT HORVITZ

**T**HOSE WHO KNOW USENET generally describe it with enthusiasm or exasperation — often both. It is the motherlode of noncommercial electronic information — a service, spawned by hackers, that has grown to Amazonian dimensions in a decade. Still growing rapidly, Usenet is already indispensable for academics, researchers and people in technical professions, and it's gradually becoming accessible to the general public.

Brief glimpses of its burgeoning role have already appeared in the mass media. Chinese students in North America used it to organize support for the pro-democracy movement back home. Scientists turned to it for hot news about "cold fusion" and new superconductive materials. The virulent software infection unleashed by Robert Morris, Jr., made headlines in 1988 by clogging it up for a few days. (The untold story there is that the antidote was also distributed through Usenet. Systems that went offline to "protect" themselves had a harder time recovering.)

Usenet is an information cooperative. There is no owner, no control center, no membership fees. It's not even an organization, really. Each Usenet site has someone designated as the administrator, and there is a "backbone cabal" of senior administrators who act as Usenet's custodians. But that's about it, in terms of human bureaucracy.

Within that minimal framework, some 16,000 sites are now linked by phone lines and data circuits to distribute about 3,000 articles, announcements, queries, polemics, reports and comments each day on every conceivable subject. An estimated 580,000 people have regular access to Usenet through local site computers — twice as many as two years ago, ten times as many as six years ago.

What holds this sprawling subculture together is a few basic agreements on message-heading formats, network addresses and software compatibility; the "netnews" software all sites have for managing the deluge of articles; a shared commitment to the

free flow of ideas and knowledge; the willingness of some site sponsors to bear the cost of relaying messages for others; and, most importantly, the time and effort users donate in putting good stuff online. For in the end it's the content which attracts. In terms of quantity and quality, in most subject areas, Usenet is hard to beat.

The vast majority of Usenet sites are in North America, with beachheads in Europe, Asia and Australia. Begun in 1979-80 as a user-run service for student programmers working with UNIX (an operating system for computers), most of the early sites were on college campuses, and most of the messages concerned computing. The volume was small enough that the communication costs went unnoticed in departmental phone bills.

Today, the message traffic is so large that communications costs and staff time are big budget items, particularly at "backbone" sites, where articles and electronic mail converge for forwarding. No one really knows what the total cost of Usenet service is. Each site handles its own financing, and arrangements between sites are negotiated privately. Individual users at most institutionally sponsored sites pay nothing for access. However, the real total cost must run into millions of dollars per year.

Usenet sites today are typically colleges, research centers, high-tech corporations and public agencies. A growing number of non-institutional dial-in points give or sell public access (see list to follow). Computer topics and programming still account for about 40 percent of the postings. But other interests have rapidly expanding support — especially social and political discussions, science, and recreation.

How do Usenetters slog through 3,000 articles a day? They don't. Articles are posted to "newsgroups," which are like continually updated topical magazines that any site can arrange to get. Some newsgroups have "moderators" (editors) who do all the posting. Most do not. Anyone on Usenet can post an article to a unmoderated news-

group, and within a few days it will propagate to every site subscribing to that newsgroup. Or, the poster can put geographic limits on distribution (only the San Francisco Bay area, just Canada, etc.).

There are currently about 600 newsgroups, covering everything from backpacking to microbiology, feminism to Fortran. Here are some particularly interesting, useful, and/or popular ones:

*alt.activism* Discussions among political activists  
*alt.bbs* About BBS systems & software  
*alt.sex* Postings of a prurient nature  
*comp.ai.digest* Discussion of artificial intelligence  
*comp.dcom.telecom* "Telecom Digest" (moderated), about telephony  
*comp.newprod* Announcements of new computer products  
*comp.risks* Risks to the public from computers & users  
*comp.sources.mac* Software for the Apple Macintosh  
*comp.sys.ibm.pc* Discussion of IBM personal computers & compatibles  
*comp.virus* Computer viruses & system security  
*misc.forsale* Short postings about items for sale  
*misc.jobs.offered* Announcements of positions available  
*misc.headlines.unitem* Articles from the UN Information Transfer Exchange  
*pubnet.nixpub* Lists of public access UNIX/Usenet sites  
*rec.bicycles* Bicycles, related products and laws  
*rec.music.gdead* Discussion group for (Grateful) Dead-heads  
*rec.arts.tv* About television programs, past and present  
*sci.energy* The science & technology of energy  
*sci.environment* Discussions about the environment, ecology  
*sci.nanotech* Molecular-scale machines  
*sci.space* Space programs and related research  
*soc.culture.china* About China and Chinese culture  
*soc.singles* Single people and their activities  
*talk.politics.mideast* Discussion of Middle Eastern events  
*talk.politics.misc* Political discussions and polemics of all kinds  
*talk.politics.soviet* Discussion of Soviet politics, domestic and foreign

Anyone can suggest a new newsgroup. But to be added to the "mainstream distribution

mechanism," it must be approved by a margin of at least 100 votes in an electronic referendum open to all Usenetters, after a discussion period. The rules are somewhat looser for starting newsgroups with "alt." in the name. This prefix refers to an "alternative hierarchy" whose distribution isn't as well-sponsored as the mainstream's.

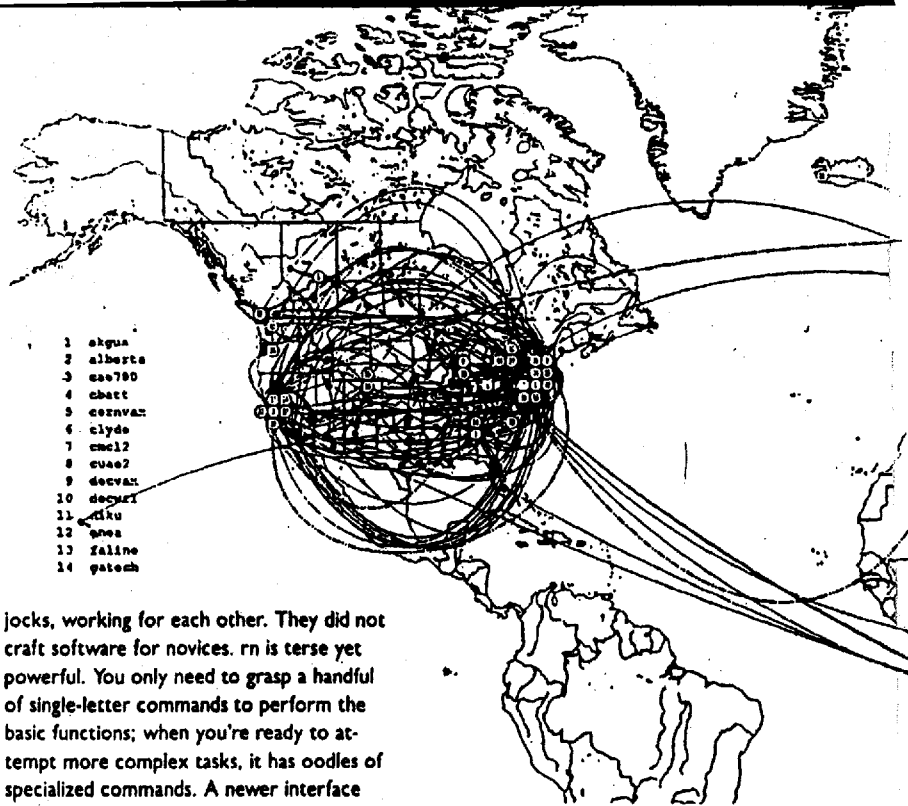
Not all sites get all newsgroups. Some subjects are pretty esoteric, and the sheer volume (around 50 megabytes/week, for all newsgroups combined) may overrun the available storage capacity. For the same reason most sites have to dump articles after a few weeks, to make room for more. Fortunately, some sites archive items from certain newsgroups, and there are ways to order copies through the net.

Each site administrator decides which newsgroups to get, often based on what the users there want. Usenetters can "subscribe" to newsgroups they want to read regularly; when they run one of the programs for article selection, they'll see the subject headings of all recent unread articles in just their chosen newsgroups. They can still call up articles from other newsgroups received at the site. Subscriptions are just an easy way to reduce the time spent scanning and rejecting unwanted material.

Here is a list of one day's worth of articles in "sci.energy," a medium-size newsgroup with consistently good postings. The numbering shows the order of arrival at the WELL (higher = more recent). Numbering may vary from site to site, since not all articles travel the same route. To start reading any of these, you just type the article number. "Re:" means a reply to a previous posting:

- 564 Re: Office Equipment As Energy Users
- 565 Fuel cells — your experience?
- 566 Re: Outdoor Lighting
- 567 Re: "Revolutionary" Solar Cell Technology
- 568 Re: Outdoor Lighting
- 569 Re: Electric cars? Start with wheelchairs.
- 571 Energy-efficient lightbulbs
- 572 Re: energy-efficient lightbulbs
- 573 Re: Office Equipment As Energy Users
- 574 Re: Outdoor Lighting
- 575 Venting clothes driers — inside or outside?
- 576 Re: Energy satellites
- 577 Re: Energy-efficient lightbulbs
- 578 Longer-life lightbulbs — home use
- 579 Re: hydro power and solar power are NOT CLEAN

Each Usenet site has programs that let readers select, display, reply to, and dispose of articles. The above is what one would see using the interface program called "rn." Some find these interfaces intimidating or hard to learn. They aren't difficult, really, once you get the hang of them. But those who developed Usenet were computer



- 1 akua
- 2 alberta
- 3 san700
- 4 cbatt
- 5 cernvax
- 6 clyde
- 7 cmc12
- 8 cuac2
- 9 decvax
- 10 decvax
- 11 riku
- 12 snea
- 13 faline
- 14 gatech

jocks, working for each other. They did not craft software for novices. rn is terse yet powerful. You only need to grasp a handful of single-letter commands to perform the basic functions; when you're ready to attempt more complex tasks, it has oodles of specialized commands. A newer interface named "nn" may be more suitable for beginners. It has fewer commands to learn and nice "help" menus.

**GETTING STARTED**

To use Usenet you have to find a convenient, affordable point of access. Even if you aren't working or studying at a site-sponsoring institution, you may be able to convince a friend who is to capture articles or newsgroups for you on floppy disk. They might even let you dial in to their computer directly to download material, or to visit in person to browse once in a while.

Then there are public access sites. The following is extracted from a list maintained by Phil Eschallier. The following entries all provide Usenet access for free — though they might not carry all the newsgroups you want. Keep in mind that some of the information here may be outdated by the time you read it. Updated versions of Eschallier's list are posted every couple of weeks in the "pubnet.nixpub" newsgroup.

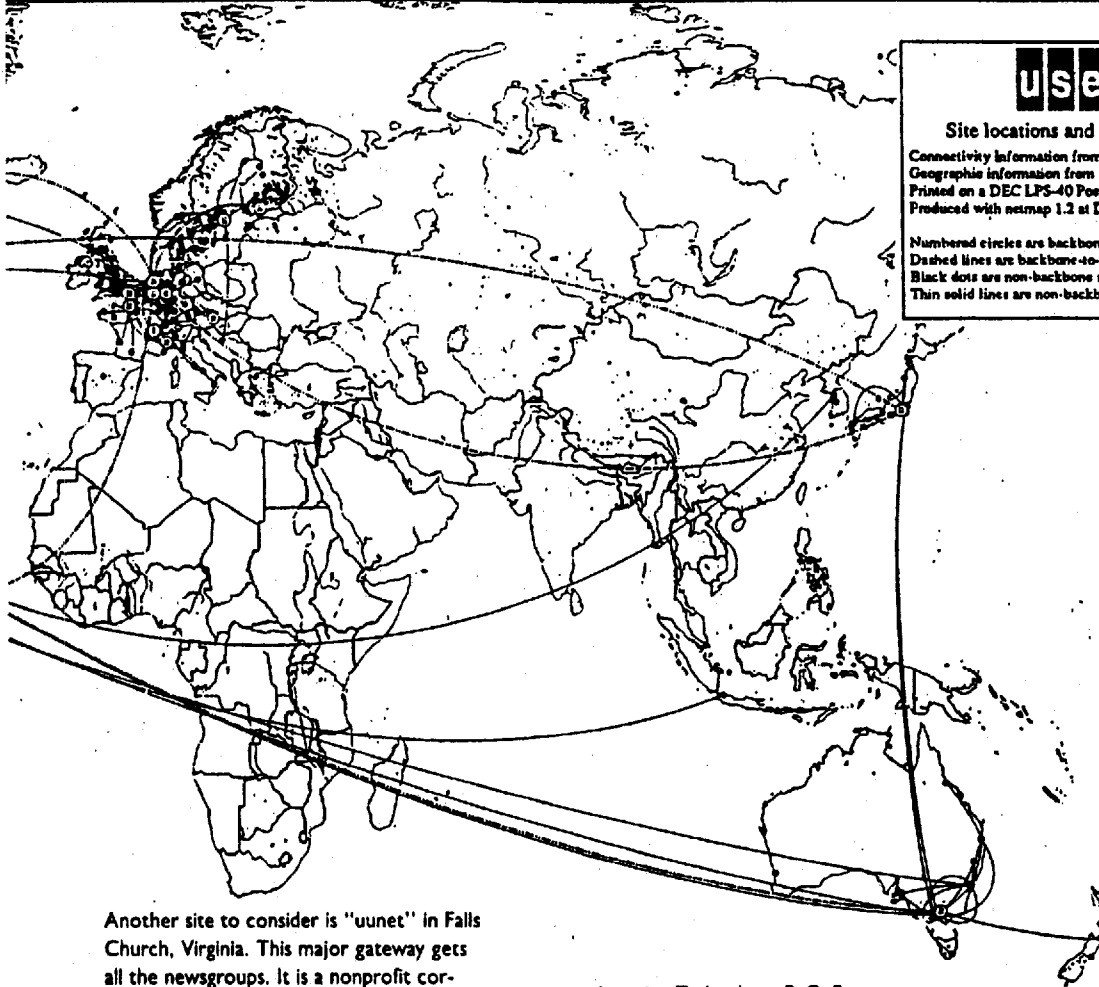
Usenet Public Access Sites

Telephone #	Sys-name	Location
201/846-2460	althea	New Brunswick NJ
212/879-9031	dasyal	NYC
213/376-3714	psu02	Rodondo Bch CA
214/247-2367	osdats	Dallas TX
214/741-2130	attcic	Dallas TX
215/348-9727	lgapl	Doylestown PA
312/272-5912	igloo	Northbrook IL
312/283-0559	chinaet	Chicago IL
312/301-2100	joliet	Joliet IL
312/566-8911	ddaw1	Mundelein IL
312/833-8126	vpnet	Villa Park IL
313/623-6309	nucleus	Clarkston MI
404/321-3020	jdyn	Atlanta GA
407/380-6228	rimvax	Orlando FL
408/247-4810	sharks	San Jose CA
408/723-0561	portal	Cupertino CA

408/997-9119	netcom	San Jose CA
412/431-8649	ehlektik	Pittsburg PA
415/332-6106	well	Sausalito CA
415/753-5265	wat	San Francisco CA
415/783-2543	sofcon	Hayward CA
416/453-0926	tolly	Brampton ON
416/461-2608	lmsoft	Toronto ON
416/654-8854	siebmf	Toronto ON
502/968-3401	disk	Louisville KY
503/234-0458	bucket	Portland OR
503/640-4262	ngora	POK OR
514/873-2137	lilink	Long Island NY
518/346-8033	sizub	upstate NY
602/941-2005	xroads	Phoenix AZ
603/880-8120	wbb-nh	Nashua NH
605/348-2738	left386	Rapid City SD
608/273-2657	madnix	Madison WI
612/473-2293	psu01	Minneapolis MN
613/896-8716	raider	Murfreesboro TN
616/457-1984	wybbe	Jenison MI
619/444-7006	psu01	El Cajon CA
703/281-7997	grebyn	Vienna VA
713/334-1204	suehat	Houston TX
713/438-3018	sugar	Houston TX
714/842-5851	comsach	Santa Ana CA
714/894-2246	stanton	Irvine CA
801/943-7947	i-core	Salt Lake City UT
802/863-3614	tal	Burlington VT
919/493-7111	wolves	Durham NC

The WELL\* is a Usenet site, and has at least three features which recommend it as a good choice for access. First, there is an online conference devoted to using Usenet effectively. When you enter the WELL, type "g usenet" to get there. It has a library of basic references, you can ask questions without feeling stupid, get answers from the staff gurus, and read the answers to others who are elsewhere on the learning curve. The second attraction is that the WELL gets nearly all of the active newsgroups, mainstream and otherwise. The third is that the cost is low (\$8/month and \$3/hour, plus communications-link charges).

\*The WELL, 27 Gate Five Road, Sausalito, CA 94965; 415/332-4335.



**usenet**

**Site locations and news exchange paths**

Connectivity information from mod.map data December 1986  
 Geographic information from CIA World Base II data  
 Printed on a DEC LPS-40 PostScript printer  
 Produced with netmap 1.2 at DEC Western Research Lab

Numbered circles are backbone sites: **⊙**  
 Dashed lines are backbone-to-backbone links: **- - - - -**  
 Black dots are non-backbone sites: **•**  
 Thin solid lines are non-backbone and partial links: **—**

- 13 hafro
- 14 hao
- 17 hplab
- 18 i2unix
- 19 ihnp4
- 20 inria
- 21 kddlab
- 22 linux
- 23 lll-crg
- 24 lll-lee
- 25 mcnc
- 26 mcvax
- 27 metfr
- 28 munnari
- 29 nbiro
- 30 panet
- 31 philab
- 32 prib2
- 33 qantel
- 34 rutgers
- 35 seismo
- 36 tohtronix
- 37 tuvie
- 38 ubc-vic
- 39 ukc
- 40 ulysses
- 41 unido
- 42 utsee
- 43 uv-beaver
- 44 westath

Another site to consider is "uunet" in Falls Church, Virginia. This major gateway gets all the newsgroups. It is a nonprofit corporation founded by USENIX, the UNIX users' association, to improve access and provide news-feeds to other sites on contract. Prices depend on all sorts of variables (how many news-feeds you want, how you connect to uunet, etc.), but the base rate is \$35/month, plus communications charges. uunet is reachable through the Compuserve Packet network or via Tymenet, and they can open accounts for you at either. To take a news-feed from uunet, your computer must have the suite of UNIX programs called "uucp," or one of the substitutes designed for non-UNIX machines. For a free information kit, contact uunet at 3110 Fairfield Park Drive, Suite 570, Falls Church, VA 22042-4239 (voice phone 703/876-5050).

Because Usenet has grown so vast and so time-consuming to sort through, Anterior Technology has started an article filtration service. Their editors eliminate what they consider junk, and the refined product is marketed as the "In Moderation Network." This is a controversial venture which many Usenetters think violates the spirit and ideals of the net. However, it may be practical as a time-saver, if you're only interested in "serious" newsgroups, not the ones where emotional, unresolvable or outrageous discussions prevail. For more information,

contact Anterior Technology, P. O. Box 1206, Menlo Park, CA 94026-1206; 415/328-5615.

Once you have access to Usenet, you have to learn to use at least one of the interfaces. The manuals can be found at the sites where they are installed. However, they are invariably written in hacker-ese, and may not be enough to get you through your first session unassisted. It helps to watch someone else go through a session before attempting it solo, and if you can find a more experienced person to coach you through your first encounter, that's even better. Again, it's not that the interfaces are difficult. It's just that they'll present you with unfamiliar options, and the on-screen "help" may not be adequate.

For self-tutoring, a book called *UNIX Communications* explains how to use Usenet in clear, easy-to-follow steps. It covers the most popular interfaces, netnews, electronic mail, "uucp" file transfers and the basics of posting articles. It got me started, and I still rummage through it for new insights. (*UNIX Communications*, by Bart Anderson, Bryan Costales, and Harry Henderson: © 1987; 542 pp. \$26.95 from Howard W. Sams & Co., 4300 W. 62nd Street, Indianapolis, IN 46268.)

Once you actually get into Usenet, you'll find additional resources there to fine-tune and expand your skills. Subscribe to these newsgroups, and pretty soon you'll be teaching your friends how to use Usenet:

- news.newusers.questions*: Questions/answers for beginners
- news.announce.newusers*: Guidance, explanations of USENET policies
- news.groups*: News about newsgroups
- news.misc*: Discussions of USENET itself

A shareware program called UFGATE enables IBM-compatibles to exchange files, electronic mail and newsgroup articles with USENET — in effect turning a PC with access into a "leaf site." UFGATE is free to noncommercial users. There's a \$35 registration fee for those wanting support, a manual and updates; registration is \$195 for commercial sites. UFGATE can be downloaded directly from the Late Night Software BBS (415/695-0759), or ordered on diskette from Late Night Software, c/o Tim Pozar, 671 28th Street, San Francisco, CA 94131 (voice phone 415/695-7727). ■

## The Matrix.

After you've successfully taken one trip, you grab the atlas and study it for ideas and possibilities for the next one. This is an atlas of the world of telecommunication networks. It's a great reference book for those who have dipped into one on-line community, and wonder what else is out there.

This 631-page volume may become one of the holy books of the telecommunications world — especially for those who think the people using the technology are more interesting than the workings of the physical networks that link them together. This is not to say that it is not a technical book; it is. But the focus is more on the interesting interactions among hobbyists, the scientific research community, and the virtual communities that are being reinforced by this technology.

The Matrix is described as "a worldwide metanetwork of connected computer networks and conferencing systems . . . [that] affects the personal and social lives of millions of users and even influences national and international politics." The book surveys in comprehensive detail existing worldwide networks such as Usenet, Internet, all the regional and national networks on each continent (263 pages), and all the commercial networks such as The WELL and others. I highly recommend this work.

—Steve Cisler

### The Matrix

John S. Quarterman, 1989; 600 pp.

**\$49.95** postpaid from Digital Press/Sales, 12 Crosby Drive, mail stop BUO/E94, Bedford, MA 01730; 800/343-8321 (or Whole Earth Access).

## BMUG/Mac Support

As computers gradually worm their way into our homes, offices, and lifestyles, we discover that to fully utilize them requires computer support. It's like finding out that babies are followed by diapers and day care.

Whether you're getting into a love affair with the machine or just optimizing an investment, computer support begins with reading the literature. Since computer developments, like other hi-tech ephemera, have a minimal half life, a monthly magazine is a must if you want to stay on top of the scene. If you have a Macintosh there's a choice of two — *MacWorld* and *MacUser*. I subscribe to each and had hoped eventually to eliminate the lesser, but so far it's a dead heat. They are both good at surveying the Mac scene in general, and they are both toothless watchdogs when it comes to biting the advertisers who feed them. Take your pick.

After magazines come user groups. Here's where you get the straight poop that the revenue-hungry magazines don't pass on. For Mac users these are Macintosh User Groups, or MUGs, and there are hundreds in the US and Canada. (Apple even has a toll-free number for anyone wanting to track down their local MUG; it's 800/538-9696, ext. 500.)

BMUG, a crew of Mac fanatics in Berkeley, is probably the best known. They came together as a crew of struggling students in 1984, a few milliseconds after the Mac 128 materialized. Now flash forward from struggling students and dinky 128s to the present — a 6,500-member, worldwide organization that twice a year puts out a two-pound,



### BMUG Newsletter

Randall P. Simon, Production Manager

**\$40/year** (2 issues) from BMUG Inc., 1442A Walnut Street, Berkeley, CA 94709; 415/549-2684.

440-page "newsletter" with a press run of 11,000. BMUG is obviously doing something right.

BMUG combines folksy openness that's part of the Mac aura with high-energy enthusiasm to produce a noncommercial, nonprofit operation thriving on its own energy. Their philosophy is embodied in their motto, "We're in the business of giving away information." In an era when the location of a few pixels on a computer screen can produce a multi-million-dollar corporate lawsuit, BMUG's happy-go-lucky consumer advocacy is pure delight.

BMUG grosses a half million a year from membership fees and software sales, which goes to support its own BBS, a telephone helpline for members, and a paid staff. Weekly meetings have featured some of the major names in the industry as speakers. There are a dozen special-interest groups (SIGs) that focus on topics from music and desktop publishing to telecommunications and CAD/CAM, and for beginners there's a BasicMac SIG. —Dick Fugett

## 3-D Catalog

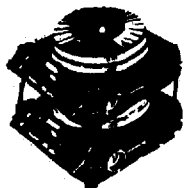
Hey, look at this! It's a catalog of nearly every kind of 3-D stereo gadget that's available. They've got those funky red-and-blue cardboard glasses for 3-D movies, several makes of View-Masters that take circular disks of travel snapshots (you can make your own), and modern stereo picture viewing equipment. And books, supplies, and special devices to let you take 3-D photographs with 35mm film. Get a polarizing kit for a pair of projectors and put on a slide show that nobody will sleep through.

—Kevin Kelly

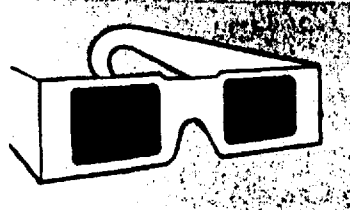
### 3-D Catalog

Catalog free from Reel 3-D Enterprises, Inc., P. O. Box 2368, Culver City, CA 90231; 213/837-2368.

## POLARIZING FILTERS FOR 3-D PROJECTION



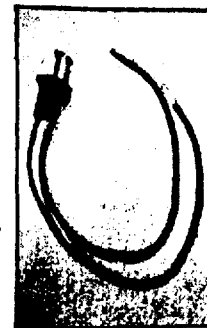
3" x 3" square polarizers with polarization at standard (45°) angle to edge. Thick (.030") plastic. Set of 2. Stock No. 7503 **\$14.95** (0.1 lb.)



### CARDBOARD FRAME POLARIZED 3-D GLASSES

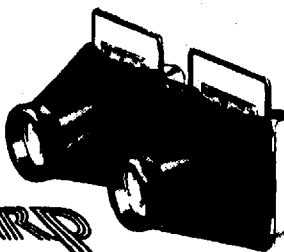
When low cost is the main consideration these offer quality polarizers in cardboard frames. Styles subject to change without notice. Stock No. 7002.....\$2.45/Sp. (0.2 lb.) 50 to 99 pairs.....\$3.45 each (0.4 lb. per 10) 100 to 199 pairs.....\$4.40 each (0.4 lb. per 10)

## TWIN CAMERA RELEASE



- Simultaneously fires two cameras
- Mechanical type, standard tapered threads
- Has synchronization adjustment
- Allows up to 20" separation
- Precision made in West Germany

Stock No. 8404.....\$34.95 (0.3 lb.)



**PINSHARD  
3DVIEWER  
196**

## The Data Informer

*Extremely pricey newsletter for extremely addicted information junkies. Great tips for mining the national wealth of knowledge buried in the bureaucratic mazes of that Ultimate Information Processing Unit: the large-scale chip of Washington, DC. Here are some excerpts from a single issue.* —Kevin Kelly

### Does Your Bank Violate the Privacy of Your Business?

Under the fair credit and financial privacy laws your bank cannot give financial information about your account without your approval. However, this law does not cover your business or commercial accounts. As a result, most banks provide financial information on the amount of your average daily balance, amount of loans etc. to organizations like Dun and Bradstreet without customer's approval. What is strange is that there is a law which prevents banks from divulging this information to government agencies but not to private organizations. It is estimated that about 80% of the banks participate in this practice. To stop this invasion of privacy, tell your banker to take you off the list.

### Opportunities in Reading Freedom of Information Act Letters

The greatest aspect of the Freedom of Information Act (FOIA) is the fact that all Freedom of Information Act request letters are available under the Freedom of Information Act. This means that you can go to your favorite federal office and request to see copies of all FOIA request letters. The problem with finding information in Washington is that you don't know what to ask for because you don't know what is available. Reading these letters provides great information clues and shopping lists on what others have spent weeks, days or even years in trying to uncover.

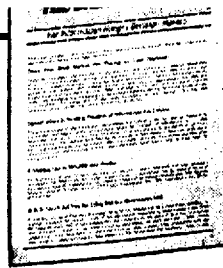
### Get Tomorrow's Wall Street Journal Headlines Today

By calling recorded messages in Washington, DC you can get the same information by 10 o'clock in the morning that will appear in tomorrow's "Wall Street Journal". This is where business reporters get the news. The recording is available 24 hours a day.

US Department of Commerce:  
202-393-4100  
Bureau of Labor Statistics:  
202-523-9658  
Federal Reserve Board:  
202-452-3206

### Is the Government Treating You Unfairly? Uncle Sam Will Sue Itself For You

It is an amazing fact but true. A special division, within the Office of Advocacy at the US Small Business Administration, will actually take the government to court if your business is not getting a fair deal,



## The Data Informer

Matthew Lesko, Editor

**\$128/year** (12 issues) from Information USA, Inc., P. O. Box 15700, Chevy Chase, MD 20815; 301/657-1200.

and this litigation is all done FREE. This office recently helped a small electronics manufacturer in California which lost a contract worth a few million dollars because of some bureaucratic bungling. This office not only did all the legal wrestling for the company FREE and got the manufacturer a government contract, but it succeeded in winning a bigger contract than the firm originally had. Contact: Office of Chief Counsel, US Small Business Administration, 1441 L St NW, Washington, DC 20416, 202-653-6533 or toll-free at 800-368-5855.

### A \$1,500 Market Study For Free

Many of the high priced market studies, like those of Frost and Sullivan or Predictcasts, carry copyrights, and as a result are available free from the Library of Congress. The Library receives two copies of all copyrighted material and usually adds these reports to its collection. The problem is that these companies are aware that people use the Library of Congress to see these studies and, as a result, they often wait to the last possible legal moment before filing their copyright. The Library is basically set up for visiting researchers, so the easiest way to see these is to visit the library in person. However, these studies are also available through an inter-library loan arranged through your local library. The telephone reference section at the

## CompuAdd Computer Tool Kit

Sooner or later you will need one or more screwdrivers if you work with computers and their various add-ons, cables, and attachments. When you do need them, I've found this tool kit proves very handy. You will find tool kits of all prices and complexity but this one meets my

Library of Congress (10 First Street, SE, Washington, DC 20540, 202-287-5522), or your congressman's office (call the Capitol Hill Switchboard at 202-224-3121) can likely supply you with a list of the Library's holdings on a given topic.

### The 7-Phone Call Rule

In our world of free information and experts, I have developed a theory that anyone can find a free expert on any topic within an average of 7 telephone calls. The difference between those who get their information and those who do not is that the winners know that in the first 5 or 6 telephone calls they will get the runaround, unknowledgeable experts and maybe even talk to the same person twice. Those who don't believe in the 7-phone call rule give up after one or two calls and wind up losers.

### Protect Your Invention for Only \$6.00

Before you spend thousands on lawyers or consultants to protect your idea or invention, for six bucks Uncle Sam will safeguard your idea for two years if you put it down on paper with drawings and photos and send it in. For details on this Disclosure Statement contact: Commissioner of Patents and Trademarks, Patent and Trademark Office, Department of Commerce, Washington, DC 20231, 703-557-3225.

### Country Experts Are the Place to Start for Overseas Opportunities

If you are looking for information on a market, company or most any other aspect of commercial life in a particular country, your best point of departure is to contact the appropriate country desk officer at the US Department of Commerce. These experts often have the information you need right at their fingertips or they can refer you to other country specialists. Contact: US Foreign and Commercial Services, International Trade Administration, US Department of Commerce, Room 2810, Washington, DC 20230, 202-377-8220.

needs for lowest cost (in case I lose it), yet contains all the essentials for the novice technician. The nice case keeps it all together so I can find the tools when I need them. Milton Sandy, Jr.

### Computer Tool Kit

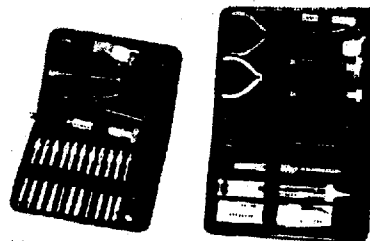
Catalog free from CompuAdd Corporation, P. O. Box 200777, Austin, TX 78720-0777; 800/627-1967.

Basic Tool Kit includes chip inserter, extractor, 3-claw holder, tweezers, four screwdrivers, four nutdrivers, and Torx screwdriver in a vinyl case. 41131 - \$14

Soldering Tool Kit includes chip inserter, extractor, anti-static wrist strap, coiled ground cord, soldering iron, desoldering tool, solder tools, pliers, and clippers in a vinyl case. 41132 - \$24.99 (Reg \$35)

Advanced Tool Kit includes chip inserter, chip and square chip extractors, anti-static wrist strap, multiple screwdriver with six extensions, two nutdrivers, and two Torx screwdrivers in a vinyl case. 41133 - \$38

Troubleshooting Tool Kit includes chip inserter, chip and square chip extractors, anti-static wrist strap, multiple screwdriver with six extensions, two nutdrivers, two Torx screwdrivers, a logic probe, a logic pulser, and a 3-piece tweezer set in a vinyl case. 41134 - \$69 (Reg. \$89)



197

**SPECIAL INAUGURAL REPRINT ISSUE: INFORMATION ENVIRONMENT TOOLS  
AND IDEAS Whole Earth Review Dedicated to the Incoming Administration 20 January  
1996 - Link Page**

[Previous](#)      [Hello, Central: Phone Conferencing Tips \(Winter 1989\)](#)

[Next](#)      [Ethnobotany: The Search for Vanishing Knowledge \(Fall 1989\)](#)

**[Return to Electronic Index Page](#)**