The Journal of Mind and Behavior
Autumn 1995, Volume 16, Number 4
Pages 339–368
ISSN 0271–0137

The Internet and Research: Explanation and Resources

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Since the roots of the Internet lie in academia, educators and researchers have had the opportunity to engage in research over the Internet for some years now, though many have not been aware of its existence or the extent of available information until recently when the US government publicized its goal of furthering the global dissemination of information via the Internet. The article describes and explains (1) the origin and intent of the Internet, (2) its application for assisting in research, (3) the various tools for delving through the wealth of information available in what is termed cyberspace, (4) a listing of specific, recommended software applications, and (5) a listing of Internet-accessible resources of interest to researchers in the social and behavioral sciences and related fields.

The Internet has become the most widely discussed computer network in all forms of media, whether it be print, television, or radio. Frequently referred to as the *Information Superhighway*, it has been virtually acknowledged to be *the* information panacea for an increasingly knowledge-hungry populace. Its roots lie in both academia and in the military, originally conceived and designed in 1969 as an interconnected network of computer networks (hence the name Internet) with the primary goal of enabling geographically-distant scientists and researchers to share information (Dern, 1994; Gilster, 1993). Spurred by strong government and military interests, secondary goals were to allow further research into the use of computer networks and the development of a computer network capable of maintaining remote communications even throughout a nuclear attack. Today, the Internet has grown from four sites to more than 1.7 million host computers and approximately ten million users (Gilster, 1993). Researchers (academic,

Note: Internet addresses are in italics, except within references. For Internet addresses used as last "word" in a sentence, do not include the period when accessing the document. Requests for reprints should be sent to David A. Allie, Phoenix Systems, 25 Village Lane, Biddeford, Maine 04005–9334. E-mail: allied@biddeford.com

corporate or military) can now use the Internet to correspond with colleagues, transfer files, participate in discussion groups, subscribe to electronic journals and, most importantly, search on-line archives, catalogs and libraries. This article intends to help clarify the purpose of the various tools available and to offer a few starting points and resources for continuing research.

There *is* a wealth of information available that can be accessed, acquired, debated, and shared, simply by adapting and further honing one's research skills. Through the use of analogy and transfer, researchers can easily learn how to use and exploit the vast, rich resources on the Internet.

Electronic mail. E-mail is the computerized counterpart to regular postal mail and the telephone. Traditionally, researchers have relied upon the postal service for the exchange of information, as well as on the combination of telephones and answering machines for more urgent business. Both of these forms of communication, however, have disadvantages inherent in their use. With postal mail, there may be a delay of several days or possibly weeks before a response is received, the delay being a function of distance, time and the cost associated with the various mail transports (e.g. first-class or express). Economically, sending a message via e-mail is invariably cheaper than using postal mail, particularly since multi-page documents of virtually unlimited length can be transferred via e-mail in less than a minute.

As for the telephone, researchers must depend on a call coinciding with the callee's schedule or leave a message with an answering machine or secretary. The telephone does have the advantage of expediency and immediate gratification, but a disadvantage that the callee may not be prepared with an immediate response, thereby necessitating a second call at a later time. E-mail can compensate for these shortcomings. Once e-mail is sent, the message is frequently in the recipient's mailbox within seconds, ready for the reader to respond at his or her convenience, again with substantial cost savings. E-mail facilitates the quick exchange of ideas and information, with minimal disruption of schedules. In *The Big Dummy's Guide to the Internet*, Gaffin (1993) mentions several additional advantages to e-mail:

> You can subscribe to the electronic equivalent of magazines and newspapers. There is even electronic junk mail . . . . The other advantage is that once you master the basics, you'll be able to use e-mail to access databases and file libraries. You'll see how to do this later, along with learning how to transfer program and data files through e-mail. (p. 32)[1]

[1]This quote is from an article downloaded from the Internet and raises an issue of pagination, in that most documents available do not have their own set of margins or font sizes (virtually all text being in ASCII format), so the page number upon which any quote falls is a function of the margins and fonts set by the individual user. I recommend creating a standard of one inch margins (top, bottom, left, right) and use a fixed-space font at 10 point for generating references to Internet-based documents.

As valuable as personal e-mail is, it can be used in many other ways, just as the postal service can be relied on to deliver other items. Following is a short list of the ways in which e-mail can be used:

> 1) Send messages to a specific individual, 2) Send a message to many individuals simultaneously, 3) Send a message to a predefined list of users, 4) Send text files, 5) Send binary objects such as programs, graphics, "rich text" (word processed, fonted, etc), spreadsheets, even audio and video attachments, 6) Distribute "electronic magazines," 7) Broadcast announcements, and 8) Get alarm messages from network management systems or other computer monitoring programs. (Dern, 1994, pp 131–132)

In addition, it is possible to non-interactively (9) search text databases such as WAIS or BITNET archives, (10) search for programs and specific files, and (11) arrange for specific files (even non-text and/or binary files such as programs) to be mailed back. These last three uses become increasingly important if the researcher does not have the luxury of a local connection to the Internet. As powerful and functional as e-mail has become, it was not one of the intended uses of the Internet as first conceived. Accordingly, it is very important that the particular e-mail program used is powerful, flexible, and intuitive.

With the various ways in which e-mail can be used, it is important to know who has the information that is required and the corresponding e-mail addresses necessary for establishing the contact. There is no distinction between the Internet and "real life" because in both cases one needs to locate who has the information or product needed and the address. In one instance, one may talk with friends who may provide the name and address of a new magazine of interest, whereas, on the other hand, a colleague may mention an electronic journal that deals with a particular area of science. In both cases, once the name and address of the periodical is known, one can subscribe to it.[2]

Just as many individuals maintain paper-bound address books, it is now necessary to have an address book within the e-mail program (see Figure 1). The Internet, however, is only beginning to develop the counterpart of phone books, so the simplest way to find an address is to ask. Currently in existence are a few programs and services (accessible either as stand-alone programs, via Gopher or the World-Wide Web, both of which will be discussed later), including Whois, finger, Knowbot Information Service, Netfind, Usenet addresses server, AT&T Internet Toll-Free Directory and the NYNEX Business Directory. The document *FAQ: How to Find People's E-mail Addresses* (Lamb, 1994)[3] is an excellent primer on finding addresses, describes these

[2]A definite benefit of the Internet is that most electronic journals are free.

[3]This reference raises a second issue related to Internet-access documents, in that there is no standard for noting the source of any document. I recommend creating a standard consisting

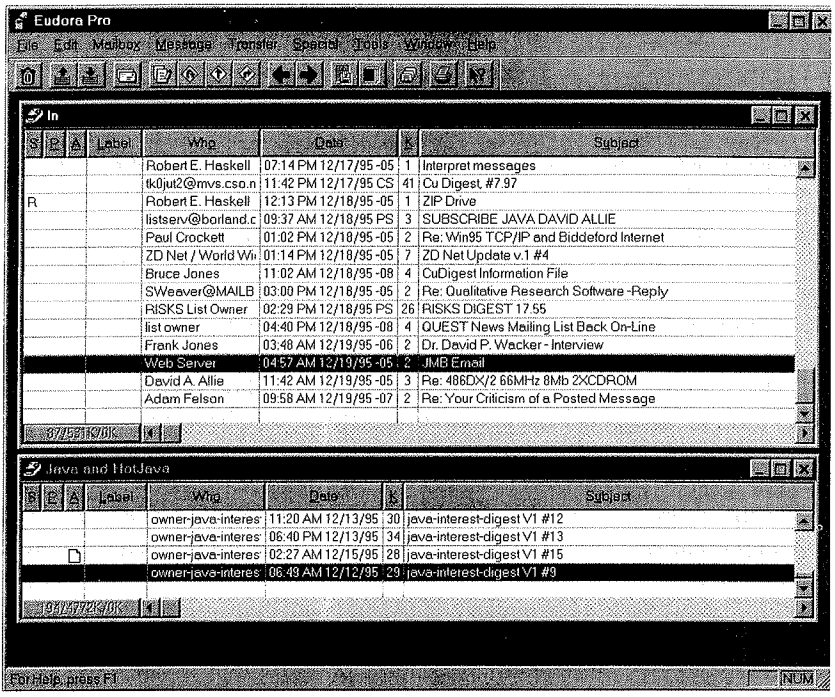

Figure 1: Eudora Pro 2.1.2. © 1991–1995 Qualcomm, Inc.

programs/services and more, and is available via e-mail, by addressing to mail-server@pit-manager.mit.edu with the message "send /usenet/news.newusers.questions/How_to_find_people's_E-mail_address" [without quotes].

Software for connecting to the Internet. There are a number of software packages available for connecting to the Internet, with many of them featuring *Microsoft Windows*-based applications.[4] The author has reviewed several of the commercial packages, as well as a few of the shareware and public-domain utilities. In general, the commercial packages offer the most stable, reliable, and highest levels of performance.[5]

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of author's name, date (most articles are dated, particularly those accessed via Usenet), title, author's organization (including city when available), and a pointer to where the document resides. Additionally, proper nouns such as Internet and World-Wide Web should retain their capitalization in all references.

[4]All copyrights belong to the developers and organizations responsible for the various pieces of software mentioned throughout this article.

[5]Since the Internet is such a vastly dynamic entity, the reader must keep in mind that hundreds of changes occur, conservatively speaking, in regards to the structure and content of the Internet. Therefore, some of the information contained herein, while up-to-date as of this writing, may be obsolete by the time this article is printed.

A large portion of the public's exposure to online services has been limited to CompuServe, America Online, and Prodigy, and while each of these services provides high levels of content and support, they are quite different from the Internet. CompuServe, for example, is the largest online service which offers e-mail, bulletin boards for message posting/retrieval, product support and information, and a huge store of files (documents, programs, graphics) available for download. With an online service like CompuServe, though, everything is physically stored on a set of computers at one geographical location. In order to make files accessible to others, users must upload them to CompuServe's computers. Additionally, there are additional charges (beyond the basic membership rates) for accessing most forums or for sending e-mail outside of the CompuServe system.

In contrast, the Internet is a globally interconnected network of networks, connecting both stand-alone computers and entire academic/corporate networks into a matrix. There is no single entity or organization responsible for the maintenance and growth of the Internet. Text files, documents, programs, and graphics are all stored within each company's computers, thereby allowing for faster access. Naturally, each company takes the appropriate security steps to limit the outside access to distinct portions of their systems, yet still allowing for instant retrieval of information and software. And unlike the commercial services, there are no additional charges for sending e-mail and rarely are fees added for downloading information, though as the Internet becomes more commercialized, this may change and will represent a departure from the Internet's original focus on the free distribution of information.

The *Microsoft Network*, included in *Windows 95*, appears to bridge both the traditional online services and the Internet, providing services and features unique to both domains. The *Microsoft Network* should be an interesting service for further investigation as it matures and adds further content to its already impressive storehouse.

There are essentially three modes of connecting to the Internet for the individual, dial-up user. These include "canned" applications which aim toward meeting all of a user's needs for accessing the varying types of Internet information, whether it is Gopher, Telnet, FTP, WAIS, E-mail, Usenet, BITNET/Mailing Lists, Ejournals or the World-Wide Web. The most well-known and advertised of these is run by The Pipeline, based in New York City and managed by Performance Systems International. The second mode includes accessing the Internet *through* one of the commercial on-line services such as CompuServe or America Online. In this instance, the user gains anywhere from limited to full access of all that the Internet offers, but the connection is through an intermediary (the on-line service) which tends to provide less than optimal data transfer rates.

Furthermore, some of the available software for accessing the Internet through these first two modes is not as up-to-date or feature-rich as that obtained through a direct connection to the Internet. Part of the reason may reside in the fact that these pieces of software are being developed as a "canned" all-in-one application, whereas other software development companies have taken the approach of designing individuals applications for the different access tools.

The third way in which the individual dial-up user may access the Internet is via a SLIP/PPP account, which requires the installation of a separate TCP/IP Winsock and suite of application tools. This is admittedly *not* the simplest and quickest way to get online (herein the strengths of The Pipeline, CompuServe, and America Online) for *Windows 3.1* or Macintosh users, but will allow for considerably greater flexibility in the choice of application tools, the ability to choose *whose* tools will be used, even further performance advantages, and a wider selection of access providers with correspondingly closer telephone access nodes. *Windows 95* does include a very helpful *Internet Wizard* application which eases considerably the common difficulties associated with the configuration of SLIP/PPP software.

It is not necessary to use applications developed by the designer of an installed Winsock; there are several fine Winsock libraries and the choice should be based upon which one is the easiest to install, configure, and activate. One of the best public dial-up access providers is Performance Systems International (PSI), which offers an account program called Interramp. PSI appears to be truly customer and service-oriented, frequently enhancing the quality and types of services available as user requests increase. Their response time for replying to support questions and problems is exceptional, with most problems resolved within forty-eight hours.

PSI supports and recommends (as I do) the software applications developed by NetManage, Inc. and packaged in their *Internet Chameleon* software. In addition to the Winsock, their software suite includes application tools for e-mail, Gopher, Telnet, FTP, FTP Server, Archie, Usenet, Whois, Finger, Ping, and a Web browser. While all these applications are of high quality, there are a few minor shortcomings in the Usenet and Web browser, which may prompt the user to use one of the shareware or public domain offerings. The Usenet newsreader has a limitation in that it can currently handle only about 6,000 newsgroups, which becomes problematic considering that as of late December 1994 there were more than 11,600 publicly available newsgroups. Additionally, NetManage's *NewtNews* newsreader (as it is called) cannot handle sorting news articles by threads, an important capability allowing the user to follow not only the original article but all responses to it as well. A suggested replacement is *Free Agent*, which has none of these shortcomings, possesses a number of additional features, and performs exceptionally.

The *Windows 3.1*-based *Internet Chameleon* package does include a fine Gopher utility, though an even-higher quality and feature-laden replacement is *WS_Gopher*. *WS_Gopher* possesses a more intuitive interface, utilizing a series of movable, resizable windows (as opposed to a single, linearly structured window) for accessing various files and directories in gopher-space. Additionally, *WS_Gopher* has greater flexibility in that user preferences can be adjusted to meet personal desires, separate viewers can be designated by file type, and there is support for the newer Gopher+ protocols (enhancements which allow document/file viewing not solely in ASCII as has been the convention).

One utility that is lacking in the *Internet Chameleon* package is a WAIS program. Many researchers will find WAIS to be one of their most important Internet resources, since it allows for the retrieval not only of bibliographies and citations, but entire documents. Though there are few Windows-based WAIS programs available, one of the nicest shareware implementations is *EINET winWAIS*. The user interface is clean and simple, providing the ability to add the names and locations of document sources, create and save queries, and to quickly save any results to disk, all with minimal activity.

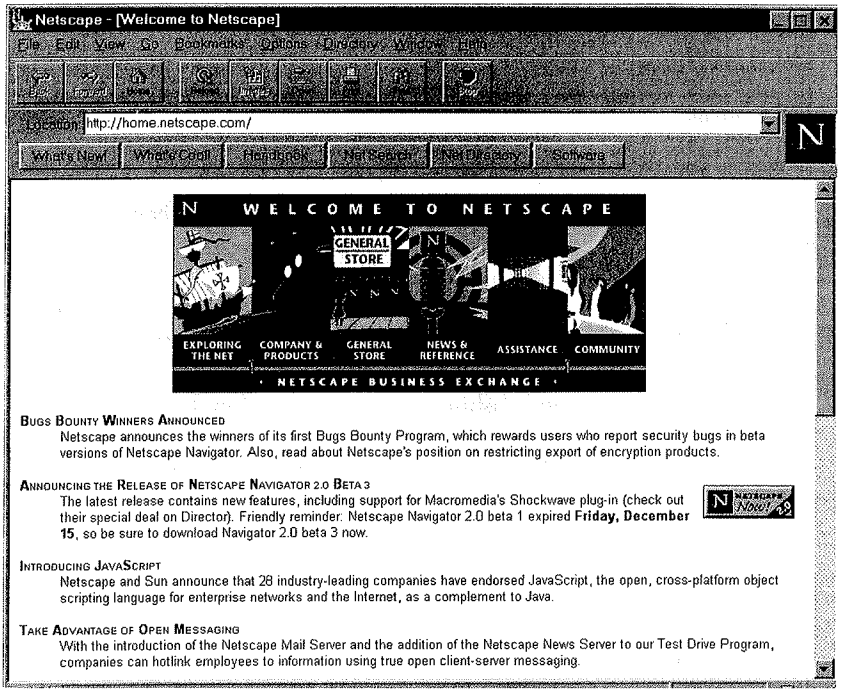

Figure 2: Netscape Navigator 2.0b3. © 1994–1996 Netscape Communications Corp.

Currently, the most popular and successful Web browser is the *Netscape Navigator*, designed by Netscape Communications (see Figure 2). While *Mosaic* (another Windows-based Web browser) has been in circulation longer, the user must more than occasionally deal with program bugs and a slower access rate. *Netscape* overcomes the limitations of *Mosaic*, primarily because it was designed with dial-up (modem) users in mind, as well as being a high-quality, commercially produced (yet still free at the time of this writing) browser (Tannenbaum, 1995; Valdés, 1995). *Netscape* is noticeably faster in retrieving documents, provides for document caching (it can store the most recently opened documents for **instant** review during any given session), includes a simple-to-use bookmark editor, and allows for an extensive configuration of user preferences.

It is quite true that configuring a SLIP/PPP account and the various pieces of software does require considerably more time and skill, initially, than products from commercial on-line services. However, the greater level of productivity that can result far outweighs the disadvantages. Following is a list of shareware and public domain SLIP/PPP software utilities.[6]

- Netscape Navigator
- Eudora
- Free Agent
- WS_Gopher
- EINET winWAIS
- WS_FTP
- WS_Archie
- WS_IRC
- Worlds Chat

The *Netscape Navigator* is available via the Web at *http://home.netscape.com/* and the remaining eight pieces of software can be obtained via the Web at *http://cwsapps.texas.net/* via the Consummate Winsock Apps List.

The recommendations in this article focus on the use of *Microsoft Windows* applications.[7] If the user is solely interested in using the Internet for e-mail, then there are lower-cost alternatives. The International Internet Association (IIA), based in Washington, D.C., offers free Internet accounts to any and all individuals who express an interest. These basic accounts access a character-based UNIX system, in which all input is through the keyboard. If it is assumed that e-mail is the only usage, then the amount of

[6]The reader is asked to keep in mind that these are just a few locations from which these programs can be downloaded. Pointers to all software recommended by this author can be retrieved via the author's Web site at *http://www.biddeford.com/phoenix/*

[7]As of this final revision, the focus on software is for *Microsoft Windows 3.1* and *Microsoft Windows for Workgroups 3.11*. *Windows 95* has only been released days ago; further information on *Win95* specific programs will become available via the author's Web site by the time of publication.

material necessary to be learned to access the Internet is minimal. However, anyone with an interest in using the Internet as a research tool and wishing to make use of the myriad other services (Usenet, FTP, Gopher, WAIS, the World-Wide Web, etc.), should seriously consider obtaining a *Windows*-based SLIP/PPP account, since the learning curve is considerably smaller.

Usenet. Usenet is the electronic counterpart to the "bulletin board, supermarket tabloid, classified ads, cable TV, magazine rack, giant wall of Post-It notes, and collective unconscious" (Dern, 1994, p. 195). Imagine a gigantic bulletin board, subdivided into topical areas of interest, wherein anyone can post and read messages at any time. This is Usenet (for overviews see Kantor, 1994; Sanchez, 1994; Savetz, 1994; Taylor, 1994). It has been speculated that Usenet is where most Internet users spend the second largest amount of their time (after e-mail), perusing the various newsgroups in the process of gathering ever more information of both a professional and personal nature. Individual Usenet messages are arranged into thousands — more than 12,500 as of August 1995 — of thematic groups called newsgroups. These messages can be globally read and shared and there are frequent overlaps between the Usenet postings and electronic mailing lists. Usenet provides a means for (1) the asking and answering of questions, (2) participation in topical discussions, (3) finding resources and references, and (4) obtaining information and programs. Gaffin (1993) further elaborates:

> Imagine a conversation carried out over a period of hours and days, as if people were leaving messages and responses on a bulletin board. Or imagine the electronic equivalent of a radio talk show where everybody can put their two cents in and no one is ever on hold . . . . Unlike e-mail, which is "one-to-one," Usenet is "many-to-many" . . . . Usenet is the international meeting place, where people gather to meet their friends, discuss the day's events, keep up with computer trends or talk about whatever's on their mind. Jumping into a Usenet discussion can be a liberating experience. Nobody knows what you look or sound like, how old you are, what your background is. You're judged solely on your words, your ability to make a point. (p. 44)

With more than 12,500 newsgroups, it can at times be difficult and time-consuming to find a newsgroup that meets your information retrieval needs. Fortunately, there are ways in which to minimize the initial newsgroup selection process. A more traditional, paper-bound, publication, *The Internet Directory* (Braun, 1994), is one excellent resource, providing brief descriptions of approximately 2,700 newsgroups. The limitation to this text, like any text on the Internet, is its timeliness and potential for obsolescence, as all paper-bound books will necessarily be lacking in the most current information. It is possible to obtain current lists by subscribing to one of these newsgroups: *news.answers*, *news.groups*, *news.lists*, *news.announce.newusers*, or *news.announce.newgroups* and searching for the following documents: "List of Active Newsgroups" (parts 1 and 2), and "Alternative Newsgroup

Hierarchies" (parts 1 and 2). The newsgroups are divided into a number of major topic areas, including:

- alt — groups on various topics, serious and not
- bionet — groups of interest to professional biologists
- bit — groups that are redistributions of BITNET mailing lists
- biz — groups where businesses are allowed to post information on their products
- clari — groups from the clariNet company (news-related)
- comp — groups on computer-related topics
- courts — groups on the happenings in courts of law
- ddn — groups on military info from the Defense Data Network
- eunet — groups from Europe
- gnu — groups from the GNU Software Foundation
- hepnet — groups from high-energy and nuclear physics research sites
- ieee — groups from the IEEE engineering association
- info — groups gatewayed from mailing lists
- k12 — groups related to K-12 education
- misc — groups on all sorts of miscellaneous topics
- news — groups on Usenet nets itself
- rec — groups on recreational topics
- relcom — groups from the former Soviet Union
- sci — groups for scholarly discussion on various scientific topics
- soc — groups on all things social
- talk — groups where unending discussion is inevitable
- u3b — groups on AT&T's 3B computers
- vmsnet — groups of interest to users of VMS computers

Within each major group are numerous subgroups, each focusing on a specific topic. To receive news and participate in discussions, a user must "subscribe" to a newsgroup (the details of how to subscribe vary, depending upon the software being used to connect to the Internet). Once one has subscribed, which is an immediate process, a user may view and save any of the messages posted, ask questions, or contribute to ongoing discussions (see Figure 3). Many newsgroups will include a document similarly entitled *FAQ: Frequently Asked Questions* which every subscribed user should take the time to read. FAQs offer a more detailed description of the newsgroup and of the types of information which are appropriate within. Network etiquette recommends reading through the FAQs and messages posted until one is comfortable with the nature of the discussions.

There are several newsgroups which all users should follow at least periodically, including the following:

- *news.announce.newusers* — explanatory postings for new users
- *news.newusers.questions* — questions and answers for users new to the Usenet
- *news.announce.important* — general announcements of interest to all
- *news.answers* — a repository for periodic Usenet articles
- *comp.risks* — risks to the public from computers and users
- *alt.internet.services* — questions and answers regarding what's available on the Internet

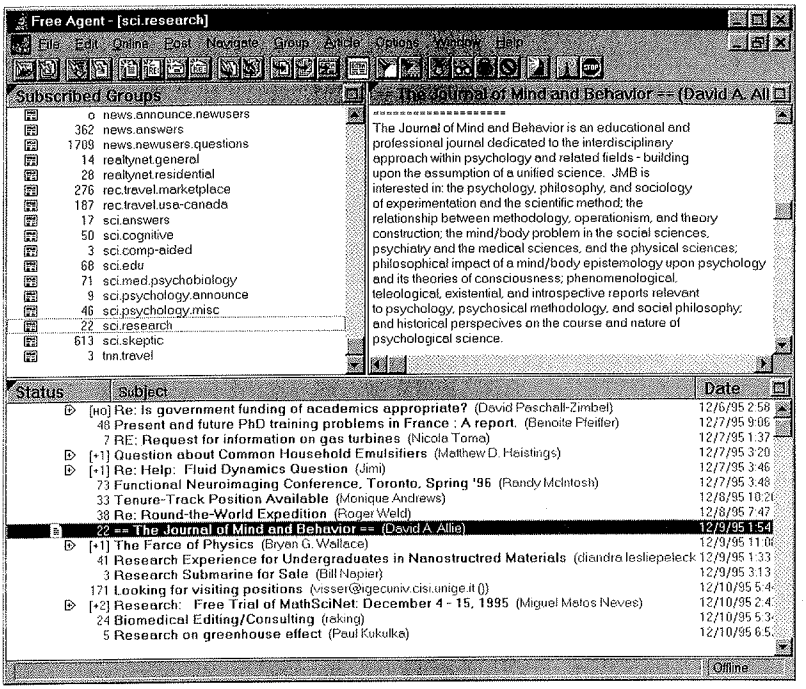

Figure 3: Free Agent 1.0. © 1995 Forte, Inc.

Each of these newsgroups contains a considerable amount of information as to what is available on Usenet and the Internet, as well as general information relating to "netiquette" (network etiquette). The latter is quite important, particularly for users who are unfamiliar with networking and the Internet, since the FAQs relating to netiquette elaborate on textual copyrights and licensing and are critical to establishing and maintaining harmonious relationships on Usenet and the Internet. As such, it is highly recommended that researchers and authors, in particular, peruse the periodically posted messages *A Primer on How to Work with the Usenet Community*, *Rules for Posting to Usenet*, *Hints on Writing Style for Usenet*, and *Emily Postnews Answers Your Questions on Netiquette*. All four of these articles can be found in *news.announce.newusers*. Several newsgroups which may be of interest to those in the fields of psychology and sociology include:

- *alt.sci.sociology* — people are really interesting when you watch them
- *bionet.sci-reousces* — information about funding agencies
- *bit.listserv.history* — history list
- *bit.listserv.ioob-l* — industrial psychology
- *bit.listserv.l-hcap* — handicap list
- *bit.listserv.psycgrad* — psychology grad student discussion

- *bit.listserv.sos-data* — social science data list
- *clari.tw.science* — general science stories
- *info.nsf.grants* — NSF grant notes
- *sci.answers* — a repository for periodic Usenet articles
- *sci.anthropology* — all aspects of studying humankind
- *sci.bio.technology* — any topic relating to biotechnology
- *sci.cognitive* — perception, memory, judgement, and reasoning
- *sci.edu* — the science of education
- *sci.logic* — math, philosophy and the computational aspects thereof
- *sci.math.num-analysis* — statistics discussion
- *sci.med* — medicine and its related products and regulations
- *sci.psychology.announce* — topics related to psychology and listing of related groups
- *sci.psychology.journals.psycoloquy* — refereed psychology journal and newsletter
- *sci.psychology.research* — psychology-related research
- *sci.research* — research methods, funding, ethics and whatever

This list is a *subset* of all the newsgroups which may be of interest to researchers/authors and which may serve as a starting point for further exploration of Usenet.

Mailing lists and BITNET. Both mailing and BITNET lists combine the characteristics of e-mail and Usenet. Topical discussions on virtually any subject can be distributed to all subscribed members of the list. Yet, at the same time, these topical lists are considerably more than "the sum of their parts." There is a potential for the creation and development of a new communications form. Gaffin (1993) considers its potential further:

> We should begin to think of mailing lists . . . as just the first generation of new forms of information and communications media. The digital media of computer networks, by virtue of their design and the enabling technology upon which they ride, are fundamentally different from the now dominant mass media of television, radio, newspapers and magazines. Digital communications media are inherently capable of being more interactive, more participatory, more egalitarian, more decentralized, and less hierarchical. (p. 3)

Mailing lists (and their BITNET counterparts, which as the name suggests, originate in the separate BITNET network) are classified into one of three categories: unmoderated, moderated, or digest. In unmoderated lists, any posted message is automatically distributed to all list members. In a moderated list, an individual(s) acts as moderator, filtering all messages and redistributing only those that are relevant and appropriate to the list topic. A potential disadvantage of these first two classifications is the receipt of a high number of e-mail messages, perhaps on a daily basis; subscribers to both unmoderated and moderated mailing lists may receive a few messages or hundreds per day, dependent upon the specific mailing list. Such an occurrence can easily take over a half-hour — daily — for a mail program to download all these messages into a local mailbox. The third type of list is offered in digest form. A moderator accepts and filters all list messages, perhaps adding

editorial comment, and redistributing it as a single document. Digest lists tend to be circulated less frequently, oftentimes on a weekly basis. One of the best known mailing lists (which is also available through Usenet) is the *RISKS-LIST: RISKS-FORUM Digest*, moderated by Peter G. Neumann. The *RISKS-LIST* is a moderated newsgroup on the topic of its title, concerning problems with computer security, privacy, integrity, reliability, availability, human safety, financial fraud, etc. (Neumann, 1994). A few other lists which may be of interest include:[8]

- ABILITY. Journal for the study and advancement of the academically, artistically and athletically able. *listserv@asuvm.inre.asu.edu.*
- ABLE-L. Forum for the discussion and submission of messages and articles to ABILITY. *listserv@asuvm.inre.asu.edu.*
- ADDICT-L. Academic and scholarly discussion of addiction-related topics. Focus is on sexual, co-addiction, eating etc . . . . Not intended for alcohol/drug addiction discussion. *listserv@kentvm.kent.edu.*
- APASD-L. APA Research Funding Network; psychology-related research and funding opportunities. *listserv@vtvm1.cc.vt.edu.*
- BIBSOFT. Discussion of software for citations and bibliographies. *listserv@indycms.iupui.edu.*
- BIOTECH. BIOTECH is a bulletin board dedicated to the free exchange of ideas and data concerning biotechnology. All topics and announcements concerning biotechnology are welcome. *listserv@umdd.umd.edu.*
- CFS-FILE. Chronic Fatigue Syndrome medical files — an extensive database of medical files on CFS and related illnesses. *listserv@sjuvm.stjohns.edu.*
- COMSOC-L. Computers and Society ARPA Digest, includes discussion of the social influence of computers and computer-related technologies. *listserv@american.edu.*
- CRIC-L. Discussion on the semiotics of culture. *listserv@vm.ucs.ualberta.ca.*
- CRTNET. A magazine about communications research and theory. *listserv@psuvm.psu.edu.*
- DATANET. Discussion on Israeli social sciences with a focus upon empirical research. *listserv@taunivm.tau.ac.il.*
- EDSTYLE. The learning styles and research list. *listserv@stjohns.edu.*
- FACINTL. The purpose of the FACINTL list is to provide an internationally focused bulletin board. The contents will include funding opportunities, calls for papers, relevant seminars and conferences as well as provide a foundation for the exchange of scholarly ideas. *listserv@psuvm.psu.edu.*
- HOPOS-L. A forum for discussion of the history of the philosophy of science. *listserv@ukcc.uky.edu.*
- HTECH-L. Discussion on the history of technology. *listserv@sivm.si.edu.*
- MIA-L. McGill Information Access, includes a discussion of information resources available at McGill University libraries. *listserv@vm1.mcgill.edu.*
- NUVUPSY. The list for discussion of sociological, political and existential issues in psychology. *listserv@sjuvm.stjohns.edu.*
- PSYC. PSYCOLOQUY. A refereed electronic journal of peer discussion on psychology, cognitive science, behavioral biology and neuroscience. *listserv@pucc.princeton.edu.*

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[8]The description for each of these mailing and/or BITNET lists was obtained from the original listserv by sending a message, addressed to the appropriate listserv, with the message body "review *listname*" (without quotes) where *listname* is the corresponding list name. As such, copyright belongs to each organization responsible for the mailing/BITNET list.

- PSYCHE-D. Psyche-D is a moderated discussion list which operates in support of the electronic journal Psyche-L. It is maintained to encourage discussion of issues arising in the interdisciplinary study of consciousness. *listserv@nki.bitnet.*
- PSYCHE-L. Psyche-L is a refereed electronic journal dedicated to supporting the interdisciplinary exploration of the nature of consciousness and its relation to the brain. Psyche-L publishes original material relevant to that exploration from the perspectives afforded by the disciplines of cognitive science, philosophy, psychology, neuroscience, artificial intelligence and anthropology. *listserv@nki.bitnet.*
- PSYSTS-L. A discussion of statistical techniques, with particular emphasis on structural equation modeling, factor analysis, and configural frequency analysis, and for new users of statistics in psychology to field their questions. *listserv@mizzou1.missouri.edu.*
- QUALRS-L. Discussion on qualitative research for the human sciences. *listserv@uga.cc.uga.edu.*
- RATION-L. Hebrew University Center for Rationality, includes academic discussions of theories of rational behavior. *listserv@taunivm.tau.ac.il.*
- RED-NET. Discussions on research in education and didactics. *listserv@icineca.cineca.it.*
- RISKS. Forum on risks to the public in computers and related systems. *listserv@vm.marist.edu.*
- SCR-L. Study of cognitive rehabilitation, including professional and personal discussion of traumatic brain injury and rehabilitation issues. *listserv@mizzou1.missouri.edu.*
- SOS-DATA. Discussion on any topic related to social science data. *listserv@gibbs.oit.unc.edu.*
- STLHE-L. Forum for teaching and learning in higher education. *listserv@unb.ca.*
- TECHTR. Discussion of technology transfer, licensing, and patent issues as they relate to an academic institution. Also included are discourses on the NSF and NIH guidelines relating to conflict of interest and commitment. *listserv@arizvm1.ccit.arizona.edu.*
- USENET-ORACLE. The Usenet Oracle, an active, cooperative effort for creative humor, answers any questions posed to it. *oracle-request@cs.indiana.edu* (with e-mail subject of "subscribe").
- WAC-L. Writing Across the Curriculum, discussion and exchange of ideas for college-level administrators, faculty, and staff about cross-disciplinary writing. *listserv@vmd.cso.uiuc.edu.*
- WALKERS-IN-DARKNESS. Walkers-in-Darkness is intended for sufferers from depression and/or bipolar disorder, and affected friends. This includes both "novices" and those who have learned to cope. It is not a place to get data for research, or for journalism. *walkers-request@world.std.com.*
- WISP-L. Women in Scholarly Publishing Discussion List. *listserv@iubvm.bitnet.*

Subscribing to mailing lists is quite simple and performed via e-mail. The Usenet newsgroup *news.lists* periodically posts a series of articles listing the names, subscription addresses, and brief descriptions of current Usenet newsgroups. The articles, entitled *Publicly Accessible Mailing Lists*, are currently updated by Stephanie da Silva (*arielle@taronga.com*) and consist of fourteen separate articles with descriptions in alphabetical order by list name. Typically, the subscription process involves only an e-mail message addressed in the format *listserv@domain.name* where *domain.name* is replaced with the organization responsible for maintaining the list. Secondly, the body of the message will be a one-line entry in the format *subscribe listname firstname lastname*, where *list-*

name is replaced with the name of the mailing list and *firstname lastname* are replaced with the subscriber's real first and last names. For example, PSYC is a "refereed electronic journal of peer discussion on psychology, cognitive science, neuroscience and behavioral science, linguistics and philosophy" (Braun, 1994, p. 148). Subscribing to PSYC involves sending an e-mail message to *listserv@pucc.princeton.edu* with the message *subscribe psyc firstname lastname*, once again replacing *firstname* and *lastname* as appropriate.

File transfer. One of the major uses of the Internet is the transfer of files between computers at different locations utilizing what is referred to as FTP (file transfer protocol) [Kehoe, 1993]. The capability to transfer files of either a research and military nature was a major reason for the development of the ARPAnet, the progenitor of today's Internet. FTP (frequently referred to as Anonymous FTP due to the relative anonymity of users accessing remote systems and files) provides a means of quickly exchanging and obtaining up-to-date information, as well as granting the ability to download a tremendous amount and variety of commercial, public-domain or shareware software. Current societal trends have fostered an attitude and atmosphere of immediacy and FTP most often fulfills this need. FTP circumvents some of the problems inherent in traditional postal or hand delivery, namely expediency and efficacy in that the "middle man" can be eliminated in the transfer of files from a remote host to a user's personal computer. Collaborating researchers can now easily and securely share even the largest data sets, statistical analyses, bibliographies, and texts.

The essential concept of file transfer is quite simple, regardless of whether the user has access to a rudimentary command-line prompt typical of most UNIX shell accounts or an advanced graphical user interface such as *Microsoft Windows*. UNIX shell accounts appear and operate in much the same manner as does a DOS prompt. The primary noticeable difference to most users is semantic; commands and procedures are manually typed and executed from a command line. In either case, the process involves four steps:

1. Obtain the names for the remote computer, directory, file and login parameters.
2. Connect to the remote computer using the FTP program.
3. Change to the directory where the file is located.
4. Copy the file to your system.

Depending on the operating system the user is working through, the fourth step may transfer the file to either the host computer (the user is connected to) or the user's personal computer itself. It is unfortunate that while FTP is an extremely powerful application, the process can be difficult, requiring painstaking attention to detail and, as a result, can be quite time-consuming. In the event that a user does not know the name of the file he or she is looking for, or may not be aware of whether any such file exists, there is a related tool called *archie* that can help to search for and locate a file.

The electronic text, *The Big Dummy's Guide to the Internet* (Gaffin, 1993), contains an excellent chapter on Anonymous FTP and is highly recommended to those hoping to gain a solid understanding of the concept and process of FTP. Here are a number of archives and files available on the Internet:

- *Accessing On-Line Bibliographic Databases* (Barron and Mahe, 1993). A series of documents with detailed instructions on how to access the computerized library and database systems of many universities around the world. FTP to: *ftp.utdallas.edu*. Look in: */pub/staff/billy/libguide/*.
- *Anonymous FTP: Frequently Asked Questions (FAQ) List* (Rovers, 1994), a primer on the use of FTP and listing of FTP archives. FTP to: *oak.oakland.edu*. Look for: */SimTel/msdos/info/ftp-list.zip*.
- Educational Listserv Lists, a guide to mailing lists relating to all aspects of education, arranged by subject area. FTP to: *nic.umass.edu*. Look for: */pub/ednet/educatrs.lst*.
- Educational Newsgroups, a guide to education-related Usenet newsgroups, cataloged by subject area. FTP to: *nic.umass.edu*. Look for: */pub/ednet/edusenet.gde*.
- Electronic Books at Wiretap, a large index of full-length electronic books (upon which copyrights have expired). FTP to: *ftp.spies.com*. Look for: */Books/**.
- Electronic Publishing. Articles about publishing an electronic journal or paper, including ISSN and copyright information, a resource guide, and the function of the Library of Congress. FTP to: *ftp.spies.com*. Look for: */Library/Article/Publish/**.
- *Freud's Occult Studies* (Drayer, 1993), a paper on Freud's research into the paranormal. FTP to: *ftp.spies.com*. Look for: */Library/Fringe/Occult/freud.occ*.
- National Center for Supercomputing Applications Software Archive. The NCSA is dedicated to high performance computing and communications resources for the national research community. The archive contains many software packages as well as general information produced at NCSA. FTP to: *ftp.ncsa.uiuc.edu*.
- Resource Guides. Resource guides of Internet-available materials in the fields of diversity, linguistics, mysticism, philosophy, psychology, religious studies and history. FTP to: *una.hh.lib.umich.edu*. Look for: */inetdirs/humanities/**.
- StatLib. StatLib is an archive of statistical software, datasets, and general information containing macros for statistical packages, complete statistical systems, subroutine libraries, and an extensive collection of useful datasets. FTP to: *lib.stat.cmu.edu*.
- Washington University of St. Louis FTP Archive, the largest archive in the US. FTP to: *wuarchive.wustl.edu*.

It is possible to retrieve large documents and programs via e-mail, using a process called *FTPMail* (for an overview see Rovers, 1994; Schedler, 1993, 1994). In order to successfully use *FTPMail*, it is necessary to know exactly where the documents can be located, including host name, directory, and filename. Using any e-mail program, address a message to: *ftpmail@decwrl.dec.com*. It is not necessary to enter text for the subject unless preferred. The body of the message will be in the following general format:

connect *hostname*
binary
uuencode
chdir *directory*
get *filename*
quit

A notification message from *ftpmail@decwrl.dec.com* will be received within a day, acknowledging receipt of the request and indicating approximately how long it will be before the file will be delivered to your e-mail mailbox (generally not longer than 48 hours). Once received, the file will then need to be decoded, using uudecode, converting it back into its original form, ready for use. An example should help to clarify this process: Freud wrote a short paper summarizing his occult studies. Address an e-mail message to *ftpmail@decwrl.dec.com*, enter a subject of Freud's Occult Studies (though the subject is optional), and enter the following for the message:

```
connect ftp.spies.com
binary
uuencode
chdir /Library/Fringe/Occult
get freud.occ
quit
```

Note that in this example, identical upper and lower-case letters are used as shown exactly in the information listed in the FTP section of this article. Since many search programs on the Internet are, by default, case-sensitive (particularly with FTP, directory, and filenames), care must be taken when reading and creating a search pattern. In terms of the address, *ftpmail@decwrl.dec.com* maintains a special program dedicated to processing FTP requests via e-mail. The first line in this example establishes a connection between *decwrl.dec.com* and *ftp.spies.com*, the server where the paper is located. The next line tells the *FTPMail* program that the file to be retrieved is a binary (rich text), rather than an ASCII (plain text), file. In actuality, there is no way of knowing beforehand if the paper is in a plain text format or a word processing document. The probability is very high that it is simply an ASCII file (in which case a substitution of the word "ascii" for "binary" would be appropriate), but entering "binary" errs on the side of caution. The third line tells the program to convert the binary file into an ASCII format suitable for transmission back as an e-mail message, since Internet protocols require all e-mail messages to be in ASCII format. The next line changes the directory to */Library/Fringe/Occult*. In the fifth line, the command is given to get the actual paper and the final line quits the FTP session. Shortly after sending off the e-mail, a message will be received from *ftpmail@decwrl.dec.com*, indicating approximately how long it will be before the file will be downloaded to the mailbox. Generally, the article will arrive within two days. Upon first glance, the message/file will appear to be a series of random letters and symbols. However, this is simply what is referred to as an uuencoded file. The uudecode function built into most e-mail software will decode the message back into a readable article, saving it to one's hard drive at will. In the absence of a uudecode function in e-mail software, there are uuencode/uudecode utility programs available that can convert the files (FTP to *tasman.cc. utas.edu.au* and look for */pc/win31/util/decode/wincode.zip* for a *Windows*-compatible decoder).

Remote login. Essentially, Telnet provides the ability to connect to and operate another computer from your own system. Numerous universities, worldwide, make their Campus Wide Information Systems available, allowing the user to search — for free — for student/faculty addresses and access online library card catalogs. There are also an increasing number of public and commercial (occasionally fee-based) databases or sites such as the National Gallery of Art in Washington, Current Events in the CIA World Fact Book, US Environmental Protection Agency, US Food and Drug Administration, Supreme Court Decisions, WAIS Archives, Dialog, and BRS. Researchers and writers will be primarily interested in the vast wealth of resources available through online library catalogs. Telnet will let you "pretend" that you are actually sitting in the Library of Congress or in a library at Harvard University, searching through their catalogs at will.

The primary disadvantage to Telnet is that while it allows the user to access other computers and programs available therein (Gaffin, 1993), there is considerably less standardization (when compared to the other Internet utilities) amongst the interfaces through which the user must interact with the remote computer. However, there are some fundamental Telnet procedures which are similar from site to site, and many library catalogs use the same structure for accessing their catalogs, allowing searches by author, title, and subject, as well as providing the means for adjusting search parameters. The user must know the address of the system to which connection is desired. This is no different from having to know the address for any other Internet-based service. It is good to learn what escape character will exit a system in an emergency (frequently the Control–Right Bracket key sequence denoted as "^]"). The user should also peruse the documents *Internet-Accessible Library Catalogs and Databases* (St. George and Larsen, 1992a, 1992b, 1992c,), an excellent resource listing more than 100 US and international libraries. "Each listing gives a brief description of the resource and instructions on how to access it, as well as places to contact for more information" (St. George and Larsen, 1992a, p. 1). Obviously, the user should be familiar with his or her own version of the Telnet software, particularly with regards to screen capture which will record (and save to a file on disk) all information typed and displayed during any selected Telnet session.

It is highly recommended that the user begin by becoming intimately familiar with just a single online catalog in order to become comfortable with the manner in which online card catalogs function. Two superb first choices are the Harvard University Online Library System (HOLLIS) and the Colorado Alliance of Research Libraries (CARL). Access information for a number of interesting Telnet sites are as follows:

- Occidental College's Automated Library System (OASYS). "The Occidental College library contains approximately 500,000 volumes, and holds an extensive video library and subscribes to thousands of periodicals and government publications" (St. George and Larsen, 1992c). Telnet to: *OASys.lib.oxy.edu*. Use *VT-100* emulation. For more information, e-mail to: *infoserve@oxy.edu*.
- University of California Melvyl Catalog (MELVYL). "The MELVYL catalog is the online union catalog of monographs and serials (periodicals) held by the nine University of California campuses and affiliated libraries" (Armour–Polly, 1992). Telnet to: *melvyl.ucop.edu*. Use *VT-100 emulation*. For more information, e-mail to: *engle@cmsa.berkeley.edu*.
- Colorado Alliance of Research Libraries (CARL). CARL includes access to a number of academic and research libraries. Telnet to: *pac.carl.org*. For more information, e-mail to: *help@carl.org*.
- Yale University (ORBIS). "ORBIS is the Online Research and Bibliographic Information System of the Yale University Libraries. Its Public Access Catalog is available to all library patrons for bibliographic searching. Orbis contains over 1,000,000 titles of materials cataloged from 1977 to the present including books, journals, manuscript and archival collections, maps, musical scores, sound recordings, and other formats. Items ordered after mid-July 1989 are also included. Remote access to Orbis is available between the hours of 8:00 AM and 12 midnight, 7 days per week" (St. George and Larsen, 1992c). Telnet to: *orbis.yale.edu*. When prompted, press the *ENTER* key to connect to ORBIS. Use *TN3270* emulation.
- University of Maine System Library Catalog (URSUS). "URSUS is the union catalog of the University of Maine System Libraries, using the Innovative Interfaces software (INNOPAC). The URSUS database currently contains more than 700,000 bibliographic records, representing approximately 75% of the total holdings" (St George and Larsen, 1992c). Telnet to: *ursus.maine.edu*. Type *ursus* at the login prompt. Use *VT-100* emulation. For more information, e-mail to: *lutz@maine.maine.edu*.
- Boston University (TOMUS). "Boston University's online Catalog (TOMUS) provides access to over one and a half million volumes and two and a half million microforms. The collection represents a majority of holdings for all libraries on campus" (St. George and Larsen, 1992b). Telnet to: *library.bu.edu*. Use *VT-100* emulation. For more information, e-mail to: *dbp@bu-it.bu.edu*.
- Colby College Library. "The Colby College Library Catalog uses Innovative Interfaces software (INNOPAC) to provide access to the collections of the three campus libraries, the AV Center, and the Computer Center (over 250,000 titles). The online holdings of books and periodicals are complete, documents are selectively cataloged, and manuscripts are not cataloged on the system" (St. George and Larsen, 1992b). Telnet to: *library.colby.edu*. Type *library* at the login prompt.
- Harvard University Online Library System (HOLLIS). Telnet to: *hollis.harvard.edu*. Use *VT-100* or *TN3270* emulation. If the next screen you see begins "Mitek Server . . . " press ENTER or RETURN. The next screen will begin "HARVARD UNIVERSITY / OFFICE FOR INFORMATION TECHNOLOGY." Type "hollis" after the prompt and press ENTER: ==> hollis. "Welcome to HOLLIS" should display. For more information, e-mail to: *library@harvarda.harvard.edu*.
- Massachusetts Institute of Technology. Telnet to: *library.mit.edu*.
- New York Public Library. Telnet to: *nyplgate.nypl.org*. Enter *nypl* at the login prompt. Enter *nypl* at the password prompt.

Wide Area Information Service (WAIS). Dern (1994) gives one of the best descriptions of WAIS currently available:

> WAIS . . . offers a solution to a problem common to any large pool of on-line information, namely, finding something, particularly when you're not sure where it is or exactly what you're looking for — which is about as precise a description of the distribution of information across the Internet as you can get . . . . On the Internet, it's even more complicated. The information can be in any number of locations, within the researcher's computer's hard disk, an organization's shared file servers, or on any of thousands of other sites on the Internet . . . . What's more, the computers involved may be different types of systems, created by different programs, and perhaps of different data types and formats. (pp. 346–347)

WAIS was developed with the goal of allowing the end-user to access not merely bibliographical and abstract data, but entire libraries' *content* from a user's personal computer. The user simply types in a keyword and the WAIS program takes care of searching multiple databases, ultimately providing the user with a menu of documents ranked in terms of relevancy (the WAIS program itself determines relevancy, based on the frequency of the term(s) appearing in the documents). Currently, the identification and selection of databases to be searched, for any given query, can be problematic as the documents and citations may exist in other databases. What complicates the issue is that some database titles do not lend themselves toward easy identification of their contents. Research is being conducted to determine new methods that will allow the WAIS program itself to either select databases for searching or to search all available databases.

WAIS was originally designed to be accessed via Telnet (discussed above), but can just as easily be accessed and searched via e-mail. This latter strategy is this author's preference and should be considered seriously by those researchers and/or writers having to assume the financial cost of their own Internet connections since it provides for search and retrieval of information resources with a minimum of online time. WAIS-by-e-mail is addressed to *waismail@quake.think.com*. The body of the message will be in the following format: *search <source name> keywords* where *<source-name>* stands for the name of the source file, always indicated by a .src extension. An example should help illustrate further: this author is also currently engaged in research in the transfer of learning and the development of computer competencies. As a starting point, I selected to search the sources of the National Science Foundation and sent the following e-mail:

> Address: waismail@quake.think.com
> Subject: WAIS transfer
> Message: search nsf-pubs transfer learning

A list of WAIS "hits" will be returned via e-mail, from which I selected a document to retrieve. A portion of the list is shown in Figure 4:

```
Searching: nsf-pubs
Keywords: transfer learning

Result # 1 Score:1000 lines:  0 bytes: 707597 Date:    0 Type: TEXT
Headline: [nsf93133] NSF 93-133 - Summary of Awards
DocID: 0 -707597 /home/ftp/CISE/dirawds/nsf93133:@stis.nsf.gov:210%TEXT

Result # 2 Score: 715 lines:  0 bytes: 342275 Date:    0 Type: TEXT
Headline: [nsf9370 ] NSF 93-70 - Beyond National Standards and Goals: Excellence in Math. & Science Ed., K-16
DocID: 0 -342275 /home/ftp/EHR/reports/nsf9370:@stis.nsf.gov:210%TEXT

Result # 3 Score: 389 lines:  0 bytes: 825600 Date:    0 Type: TEXT
Headline: [nsf9255 ] NSF 92-55 Directory of Awards, Engineering Directorate
DocID: 0 -825600 /home/ftp/ENG/dirawds/nsf9255:@stis.nsf.gov:210%TEXT

Result # 4 Score: 337 lines:  0 bytes: 142503 Date:    0 Type: TEXT
Headline: [nsf9412b] NSF 94-12 - 2nd National Conference on Diversity in the Scientific and Technological Workforce (Part 2)
DocID: 0 -142503 /home/ftp/EHR/reports/nsf9412b:@stis.nsf.gov:210%TEXT

Result # 5 Score: 272 lines:  0 bytes: 876852 Date:    0 Type: TEXT
Headline: [nsf9365 ] NSF 93-65 Engineering Directorate Directory of Awards
DocID: 0 -876852 /home/ftp/ENG/dirawds/nsf9365:@stis.nsf.gov:210%TEXT

Result # 6 Score: 267 lines:  0 bytes:  73418 Date:    0 Type: TEXT
Headline: [nsf9294 ] NSF 92-94 - Decade of Achievement - Educational Leadership in Mathematics, Science and Engineering
DocID: 0 -73418 /home/ftp/EHR/reports/nsf9294:@stis.nsf.gov:210%TEXT
```

Figure 4: WAIS search results via e-mail.

From this list, the author submitted a second e-mail message:

Address: waismail@quake.think.com
Subject: WAIS transfer learning DOC
Message: DocID: 0 -142503 /home/ftp/EHR/reports/nsf9412b:@stis.nsf.gov:210%TEXT

This second mesesage retrieves the document #4 entitled *NSF 94-12–2nd National Conference on Diversity in the Scientific and Technological Workforce (Part 2)* [National Science Foundation, 1994]. Clearly, WAIS offers many advantages for searching and accessing full-text articles and bibliographies. Databases which may be of interest to the researcher/writer community include:

- *aarnet-resource-guide.src*. The AARNet Resource Guide, which includes detailed listings on archives, computer resources, directories, libraries, gateways, and network members of AARNet, the Australian Academic and Research Network. Contact address: *archie.au*.
- *academic_email_conf.src*. Information on newsgroups and other electronic conferences, including the Directory of Scholarly Electronic Conferences (ACADLIST) collected by Diane K. Kovacs and a list of Usenet newsgroups with one-line summaries about each group. Contact address: *anders@munin.ub2.lu.se*.
- *ANU-Asian-Religions.src*. A collection of bibliographic references to selected (primarily Buddhist) Asian religions, including Taoism, Chinese Buddhism, Tibetan Buddhism, Zen Buddhism, and shamanism. Contact address: *wais@coombs.anu.edu.au*.
- *ANU-Coombspapers-Index.src*. An annotated index to the Coombspapers Social Sciences Research Data Bank built at the Australian National University, Canberra. This index is updated approximately twice a month. Contact address: *wais@coombs.anu.edu.au*.
- *ANU-SocSci-Netlore.src*. A collection of documents, notes, hints, solutions, addresses, and other net-lore dealing with the information resources, e-mail and networking procedures of significance to academic researchers in the fields of social

sciences, the arts and the humanities. The database is continuously updated approximately every two weeks. Contact address: *wais@coombs.anu.edu.au*.

- *bit.listserv.pacs-l.src*. Index of the PACS-L mailing list. Contact address: *anders@munin.ub2.lu.se*.
- *current.cites.src*. Database of the Current Cites Journal. Contact address: *holbrook@cic.net*.
- *dynamic-archie.src*. This WAIS server performs Archie searches, using the server from the WAIS prototype at the University of Colorado in Boulder. To use this WAIS server, supply a keyword for an Archie search. A list of Archie servers will be returned as relevant documents. Choose one of the Archie servers to retrieve the results from an Archie query. Contact address: *hardy@cs.colorado.edu*.
- *elec_journ_newslett.src*. Information about electronic journals and newsletters, the primary source being Michael Strangelove's "Directory of Electronic Journals and Newsletters." Contact address: *anders@munin.ub2.lu.se*.
- *ERIC-archive.src*. ERIC (Education Resources Information Center) Digests: short reports (1,000–1,500 words or one or two pages) on topics of prime current interest in education targeted specifically at teachers and administrators. Contact address: *info@sura.net*.
- *journalism/periodicals.src*. Archive of the Index to Journalism Periodicals, which contains 20,000 citations to articles from about forty trade, professional, and academic journals related to journalism and mass communication. The index is maintained by the Graduate School of Journalism at the University of Western Ontario. Contact address: *peter@julian.uwo.ca*.
- *MacPsych.src*. Software archive for the mailing/discussion list MacPsych. Also the software archive for Macintosh-related articles published in the journal "Behavior Research Methods, Instruments, and Computers." Contact address: *macpsych-request@stolaf.edu*.
- *nsf-pubs.src*. Contains the publications of the National Science Foundation. Contact address: *stis@nsf.gov*.
- *reports-abstracts.src*. References to technical reports of various origins. Contact address: *reitherm@informatik.uni-kl.de*.
- *the-scientist.src*. The Scientist: a biweekly newspaper for research scientists and managers in academia, industry, and government. Focuses on life sciences and biotechnology. Contact address: *root@ds.internic.net*.
- *zipcodes.src*. WAIS index of USA zip code database. Contact address: *wais@quake.think.com*.

There is a WAIS program now available, *EINET winWAIS*, that allows the user to perform WAIS searches interactively while online. This application is a far departure from performing WAIS searches via Telnet, and is better than WAIS-by-e-mail, in that an easy-to-use user interface simplifies the selection of sources and entering of keyword(s).

Gopher. Gopher was originally conceived and designed at the University of Minnesota as "a simple and extensible way of presenting a variety of Internet services to novice/naive users . . . without [having to endure] a steep training curve" (Dern, 1994, p. 311). It allows the user to relatively easily locate information not only on the host system, but on virtually any system connected to the Internet, "burrowing" and "tunneling" through the Internet; regardless of where the user starts, he or she can move from one site to another quickly. Gopher is one of the most widely-known Internet navigation tools, providing access to a large majority of all available informa-

tion and using a common menu-type format in which choices are made simply by selecting an item from a Gopher menu. Each selection may lead to either another Gopher menu, a readable document, or a file (document, program, graphic) that can be downloaded. The strength of Gopher lies in its ability to combine other tools (archie, FTP, veronica, Telnet, WAIS, etc.) into its structure, relieving the user from having to interact with these different tools as separate program entities. Traditionally, the user searching for a specific program would have to go through the following steps:

1. Use archie to search for and locate the desired program.
2. Use FTP to move to the file's site-location and download it to the host computer (the computer that the user is logged into, not necessarily the user's personal computer).
3. Use a telecommunications program to download the software from the host to the personal computer.

In this manner, the user would have to interact with a minimum of three different programs, each possibly having their own varied command and/or menu structure. The process is much simpler when run through a "Gopher," since the archie command will simply be another menu item that, in turn, will generate another Gopher menu listing the file(s) found. And finally, selecting the file will begin a download of information of software, occasionally direct to the user's personal computer. The combination of tools into one interface shortens the learning curve considerably, allowing the user to focus on the *item*, rather than on the process of *obtaining* it. Several Gopher sites which might be interesting starting points include the following:

- Academic Jobs. The Academic Position Network is an online system for placing and reviewing open academic position announcements. Gopher to: *staff.tc.umn.edu 11111*.
- Bibliographic Retrieval Service (BRS). Gopher to: *brs.com*.
- Billy Barron's "Accessing On-Line Bibliographic Databases" includes details of how to access hundreds of online bibliographic databases and libraries around the world. Gopher to: *yaleinfo.yale.edu 7000*. Look under: *Libraries*.
- Bryn Mawr Classical Review. Gopher to: *gopher.lib.Virginia.EDU:70/11/alpha/bmcr*.
- Chronicle of Higher Education. Information about job openings, best-selling books on campuses, and news articles from the Chronicle of Higher Education in its free online service "Academe This Week." Gopher to: *chronicle.merit.edu*.
- Coombspapers Social Sciences Research Data Bank, an electronic repository of the social science and humanities papers, offprints, departmental publications, bibliographies, directories, abstracts of theses, and other material. Gopher to: *coombs.anu.edu.au*. Look under: *Coombspapers Soc.Sci.Research Data Bank*.
- Electronic Books. A selection of on-line books whose copyright has expired. Gopher to: *gopher.uiuc.edu*. Look under: */Libraries and Reference Information/Electronic books, ref works, journals (from U of Minnesota)/Electronic Books/*.
- Electronic Journals. A selection of on-line journals. Gopher to: *gopher.uiuc.edu*. Look under: */Libraries and Reference Information/Electronic books, ref works, journals (from U of Minnesota)/Electronic Journal collection from CICnet/*.
- Freud's Occult Studies, a paper on Freud's research into the paranormal. Gopher to: *wiretap.spies.com*. Look under *Wiretap Online Library, Fringes of Reason, Occult and Paranormal, Freud's Studies of the Occult*.

- Los Alamos Physics Papers. Gopher to: *mentor.lanl.gov 70*.
- Medlars medical database. Gopher to: *medlars.nlm.nih.gov*.
- National Institute of Health, includes announcements, information for researchers, a molecular biology database, library and literature resources, the NIH phone book. Gopher to: *gopher.nih.gov*.
- National Science Foundation. Gopher to: *stis.nsf.gov*. Look under: *Other U.S. Government Gopher Servers*.
- NCSA Gopher NCSA is the National Center for Supercomputing Applications at the University of Illinois. Gopher to: *gopher.ncsa.uiuc.edu 70*.
- Original University of Minnesota Gopher. Gopher to: *gopher.micro.umn.edu 70*.
- Pipeline Gopher. Gopher to: *gopher.pipeline.com 70*.
- PSYCOLOQUY, a regularly published collection of articles from all areas of psychology. This resource is sponsored by the American Psychological Association. Gopher to: *gopher.virginia.edu*. Look under: *Library Services, University Library GWIS Collections, Alphabetic Organization, Psycholoquy*.
- Research Libraries Information Network (RLIN) maintains a series of online databases and card catalogs. Gopher to: *rlg.stanford.edu 70* or *rlin.stanford.edu 70*.
- The JANET Network includes long- and short-term information on the JANET network, the UK's joint academic network. Gopher to: *news.janet.ac.uk*.
- The Library of Congress. Gopher to: *locis.loc.gov*.
- The Online Bookstore provides electronic versions of a number of books (fee-based). Gopher to: *world.std.com*.
- The Psycgrad Project is dedicated to providing graduate students with information about psychology and graduate studies in psychology. Gopher to: *panda1.uottawa.ca 4010*.
- The Scientist. Online version of current issues of The Scientist, a biweekly tabloid newspaper for science professionals. Gopher to: *hobbes.jax.org*. Look under: *The Scientist – Newsletter*.
- University of Colorado has 200,000 titles on business, electrical engineering, and psychology. Gopher to: *arlo.colorado.edu*. Login as: ARLO.
- University of Nottingham maintains a repository of numerous technical reports covering a large variety of academic fields, collected from hundreds of institutions, companies and universities. Gopher to: *trellis.cs.nott.ac.uk*. Look under: *Technical Reports and Publications Archives*.
- University of Ottawa maintains a repository of psychology-related data. Gopher to: *panda1.uottawa.ca 4010*.
- US Census Information. Gopher to: *bigcat.missouri.edu*. Look under: *Reference Center*.
- US CIA World Fact Book. Gopher to: *info.umd.edu 70*.
- US Federal Government Information, categorized by source. Gopher to: *gopher.micro.umn.edu*. Look under: *Libraries, Information from the US Federal Government*.
- World Health Organization. Gopher to: *gopher.who.ch*.

The World-Wide Web. The World-Wide Web, developed at CERN, the European Laboratory for Particle Physics, brings hypertext and hypermedia to the Internet. In traditional hypertext, the linear progression of text from paragraph-to-paragraph and page-to-page is enhanced by the creation of hypertext links which connect separate but related sections and topics, thereby making it possible to jump throughout entire documents and files based on links which symbolically reflect their interrelationships. For example, a mouse-click in a document on dream psychology might lead to a biography of Freud or an excerpt from his *The Interpretation of Dreams*.

Hypermedia is simply an extension in which communication forms other than textual are linked into documents. In the previous example on dream psychology, hypertext links could also lead to an audio tape recording of Milton Erickson, or a video clip of an experiment on sleep research. Boutell (1994) elaborates on the benefits of hypertext:

> The advantage of hypertext is that in a hypertext document, if you want more information about a particular subject mentioned, you can usually "just click on it" to read further detail. In fact, documents can be and often are linked to other documents by completely different authors — much like footnoting, but you can get the referenced document instantly! (p. 5)

One of the finest features of the Web is its ability to handle links not only between textual documents but to also include graphics, sound, and video clips. A second, and equally important feature, is in its ability to not only handle native documents designed for the Web, but the capability of accessing Usenet, retrieving files via anonymous FTP, accessing remote computers via Telnet, and browsing through Gopher menus — all without having to exit the Web browser. There are a small number of graphical Web browsers, including *Mosaic* and *Netscape*, which are quite competent at maneuvering through virtually all of the vast resources available on the Internet, regardless of their format. Gilster (1993, p. 327) further emphasizes the ease-of-use concept: "There's a *very important* principle here; the easier a resource tool becomes to use, the more powerful it is for the broadest category of users. In the case of the World-Wide Web, the interface is simplicity itself [italics added]." Moving through the Web is extremely simple and mastering the commands and procedures requires little time, thereby allowing the user to quickly maneuver through and retrieve information from the Internet.

Frequent comparisons are made between Gopher, WAIS, and the World-Wide Web and "while all three of these information presentation systems are client-server based, they differ in terms of their model of data. In Gopher, the presented information can be either a menu, a document, an index or a Telnet connection. In WAIS, everything is an index and everything that is returned from the index is a document. In WWW, everything is a (possibly) hypertext document which may be searchable" (Boutell, 1994, p. 6). The World-Wide Web has unquestionably become the Internet tool of preference for the average user; advanced users may revert to some of the other tools when they know **exactly** where they are going, what they want, and when that access tool proves itself faster (though this last point is becoming less of an issue). However, Allison (1995) strongly suggests that graphical browsers for the World-Wide Web will be the means for accessing data and information in the future:

> The Net is the world's McLuhanesque nervous system in the age of information, and the Web points to the future. The Web allows us to quickly access, view and download all kinds of information, anywhere in the world by clicking on links. (unreferenced comp.infosystems.www posting, p. 1)

The key, as with using any other Internet access tool, is having an address. Web documents are accessed by their URLs (Uniform Resource Locator) which "is a draft standard for specifying an object on the Internet, such as a file or newsgroup" (Boutell, 1994, p. 5). A single URL/Web document can be the starting point to a literal — and figurative — world of information. To date, there is still no standardized catalog or menu of starting points, yet the closest things are the *WWW Virtual Library* and *Yahoo!* Accessed at *http://www.w3.org/hypertext/DataSources/bySubject/Overview.html* and *http://www.yahoo.com/*, these URLs are an excellent place to locate resources on a particular subject. Additional URLs of interest include the following:[9]

- *http://www.cs.colorado.edu/home/mcbryan/WWWW.html.* The World-Wide Web Worm, as this URL is named, is a WWW search tool that builds its index based on page titles and URL contents only. This is somewhat less inclusive, but pages it finds are more likely to be an exact match with your needs.
- *http://fuzine.mt.cs.cmu.edu/mlm/lycos-home.html.* Lycos, as this URL is named, is a WWW search tool that is another web-indexing robot, which includes the ability to submit the URLs of your own documents by hand, ensuring that they are available for searching.
- *http://www.yahoo.com/.* Yahoo! is a hierarchical subject-oriented guide for the World-Wide Web and Internet. Yahoo! lists sites and categorizes them into appropriate subject categories.
- *http://home.netscape.com/.* Netscape Communications Home Page.
- *http://home.netscape.com/comprod/mirror/index.html.* Netscape Navigator Download Page.
- *http://home.netscape.com/escapes/whats_new.html.* Netscape What's New Page.
- *http://home.netscape.com/escapes/whats_cool.html.* Netscape What's Cool Page.
- *http://www.ncsa.uiuc.edu/SDG/Software/Mosaic/NCSAMosaicHome.html.* NCSA Home Page.
- *http://www.ncsa.uiuc.edu/SDG/Software/Mosaic/StartingPoints.html.* NCSA Starting Points.
- *http://www.ncsa.uiuc.edu/SDG/Software/Mosaic/Docs/whats-new.html.* NCSA What's New.
- *http://venable.com/vbh.html.* Legal Newsletters.
- *http://coombs.anu.edu.au/WWWVL-SocSci.html.* Social Sciences via WWW Virtual Library.
- *http://www.odci.gov/cia.* CIA Home Page.
- *http://www.interramp.com/support/surfing/surfing.html.* Surfing the Internet via PSI.
- *http://www.asu.edu/aff/aera/home.html.* American Educational Research Association.
- *http://www.hanover.edu/psych/APS/aps.html.* American Psychological Society.

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[9]Additional pointers to psychology, sociology and philosophy-related information on the Internet can be found through JMB's own Web site which will seek to maintain a current listing of the sites with relevant, high-quality information. Please feel free to e-mail this author at *allied@biddeford.com* with any information regarding other sites which should be considered for inclusion in the lists.

- *http://www.cog.brown.edu/pointers/cognitive.html*. Cognitive Science at Brown University.
- *http://lcweb.loc.gov/homepage/lchp.html*. Library of Congress Home Page.
- *http://www.mrc-bbc.ox.ac.uk*. MRC Research Centre in Brain and Behavior.
- *http://www.usm.maine.edu*. University of Southern Maine.
- *http://www.lib.uwaterloo.ca/society/webpages.html*. Web Pages of Scholarly Societies.
- *http://kramer.ume.maine.edu/cit/citpage.htm*. University of Maine at Orono.
- *http://web.mit.edu/*. MIT Home Page.
- *http://nimrod.mit.edu/*. MIT Libraries.
- *http://nimrod.mit.edu/common/ejournals.html*. MIT Libraries Ejournal Collection.
- *http://www-sloan.mit.edu/SloanHome.html*. MIT Sloan School of Management.
- *http://www.ncsa.uiuc.edu/SDG/Experimental/anu-art-history/home.html*. ANU Art History Exhibit.
- *http://www.ncsa.uiuc.edu/SDG/Experimental/vatican.exhibit/Vatican.exhibit.html*. Vatican Exhibit: Rome Reborn.
- *http://hypatia.gsfc.nasa.gov/NASA_homepage.html*. NASA Information Services.
- *http://www.law.cornell.edu/constitution/constitution.overview.html*. US Constitution — Table of Articles.
- *http://www.nsf.gov/*. National Science Foundation.
- *http://www.delorme.com/*. MapAccess at Delorme Mapping.
- *http://www.wimsey.com/teletimes/teletimes_home_page.html*. TeleTimes.
- *http://www.mecklerweb.com/demo.html*. Internet World.
- *http://www.jou.ufl.edu/commres/webjou.htm*. Web Newspaper List.
- *http://woodstock.stanford.edu:2000/*. Stanford Netnews Filtering Service.
- *http://www.mojones.com/motherjones.html*. Mother Jones.
- *http://www.cs.cmu.edu:8001/Web/booktitles.html*. Books On-Line, Listed by Title.
- *http://the-tech.mit.edu/Shakespeare.html*. Shakespeare Home Page.
- *http://www.teleport.com/~vincer/starter.html*. Vince Ruggiano's Educational Resources.
- *http://cwis.usc.edu/dept/raiders/*. The Mercury Project: Discover what lies beneath the sands of Mercury (Los Angeles) by piloting a pneumatic mining robot.
- *http://george.lbl.gov/ITG.hm.pg.docs/dissect/info.html*. Frog Dissection.
- *http://pubweb.parc.xerox.com/map*. Xerox PARC World Map Viewer.
- *http://www.apa.org/*. American Psychological Association PsychNET.
- *http://matia.stanford.edu/cogsci/journals.html*. Listing of Cognitive Science Journals.
- *http://www.utu.fi/~jounsmed/asc/hyp.html*. Hypnosis.
- *http://www.lib.uwaterloo.ca/society/psychol_soc.html*. Resources of Scholarly Societies.
- *http://web.bu.edu/LIBRARY/Religion/contents.html*. Religion and Philosophy Resources.
- *http://darkwing.uoregon.edu/~huayi/SOCPSY.HTML*. Sociology and Psychology Resources.
- *http://www.willamette.edu/~tjones/Language-Page.html*. Human Languages.
- *http://www.umassd.edu/cybered/distlearninghome.html*. CyberEd: Internet-Based Learning.
- *http://hawaii.cogsci.uiuc.edu/invent/invention.html*. Psychology of Invention.
- *http://www.si.edu/*. The Smithsonian Institute.
- *http://www.adobe.com/Software.html*. Adobe Acrobat Reader Software.

The World-Wide Web has become the most significant development on the Internet. There has been considerable activity in the conversion of existing resources and the development of new materials suitable for display and review on the Web. Point-and-click simplicity, coupled with sophisticated search engines and advanced electronic publishing software, has resulted in providing the Internet reader/researcher with enormous quantities of information. Furthermore, as a result of ongoing enhancements to the Internet

and the Web, the user is no longer merely a passive reader in that s/he can both read and interact with available data.

In conclusion, the Internet has always possessed the potential for being an important research tool. Increased governmental and public awareness and interest in the Internet has helped to further drive the development of newer and higher-quality access and search programs. Wide-scale commercialization of the Internet is inevitable. However, its roots in academia are strong and deeply entrenched. The extent to which electronic information becomes accepted as a valid and valued media source will be a key factor in determining the future success of performing and conducting further research via the Internet.[10]

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[10]JMB has formally entered the Internet with the establishment of a set of World-Wide Web documents available from *http://kramer.ume.maine.edu/~jmb/*. JMB wishes to welcome David Allie, Liaison for Computer Technology, as a member of the JMB staff. Mr. Allie has created and will maintain a series of WWW pages dedicated to presenting *The Journal of Mind and Behavior*. JMB has sought to create a series of Web pages for its readership, in the hope of furthering the cause of the global dissemination of knowledge and as a general research tool. Included will be general information about the journal, article submissions and reviews, subscriptions, a listing of the editorial staff, e-mail addresses for all authors wishing to be listed, and the abstracts from all past and current JMB publications.

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