The Internet Connection:
An Interview with Gopher Guru Eric Lease Morgan

by Paul B. Baker

How are libraries in North Carolina providing access to the Internet? Should you be providing this service? How can you make Internet information available in your reference department? This article examines the ways librarians are connecting to the Internet now, and looks toward the future of Internet access. Many libraries currently are using gopher as a porthole to the Internet.

Gopher is an Internet browser that offers an easy menu to the end user. When I first saw gopher, I realized that this was the breakthrough that would make the Internet user friendly. I thought at the time, "This is really significant. This is Internet for the people!"

Gopher is a wonderful way to browse the Internet. With gopher, you can poke around for hours on end and get a very good feel for what is out there. You can access databases throughout the world by making logical menu choices. One menu leads to another and another and finally to the desired information.

In order to understand how gopher works, it is important to understand the client/server concept. The bigger computers that hold a lot of information have installed gopher "server" software so that people can access their information. These big computers are the gopher "servers," and they usually belong to large universities or corporations. Most of us who just want to use the information become "clients" of those big "servers." Thus we use gopher "client" software to connect. Gopher client software lets us move smoothly from one gopher to another by choosing something like "other gophers" from the menu.

All of the gopher servers have put different resources in their menus. If the gopher you are viewing doesn't have what you want, you can move easily to one that does. You can literally get to "all the gophers in the world" by making menu selections. Gopher software makes the connections invisibly in the background.

Gopher was developed at the University of Minnesota, and that is where the original Master Gopher resides. You can get to the University of Minnesota's Gopher if you telnet to "**sunsite.unc.edu**," login as "gopher," and put in your terminal type as "vt100." (You can also dial in with a modem to UNC at 919-962-9911, choose SUNSITE services from the menu, login as "gopher," and put in your terminal type as "vt100.") Next, choose "Surf the Net! — Archie, Libraries, Gophers, FTP Sites" from the main menu, and then choose "Master Gopher at UMN." Here you will find information about the original gopher and about gopher in general. This is a good place to look for information about starting to provide gopher service. (It is important to mention here that gopher administrators frequently rearrange, or otherwise change their menus. Therefore, if something I suggest doesn't work, experiment a bit by making logical menu selections to get what you want.)

To find out what is going on with library gophers in North Carolina, I talked with Eric Lease Morgan, Systems Librarian of North Carolina State University in Raleigh. He was the first librarian to set up a gopher in this state. He is recognized throughout the world, not because he was the first librarian who got a gopher up and running in North Carolina, but because he organized his gopher menu from the perspective of a librarian. His "study carrel" arrangement by broad general subject headings was the first of its kind. He made it easier to access information in a given discipline by providing a simple menu choice such as "Music" or "Sociology." He recently has added World Wide Web to his Internet services at North Carolina State University, and is using Mosaic as the client which provides an interface to World Wide Web information. (I'll explain these new developments later in the article.)

Because of Eric's pioneering accomplishments and the recognition he has received, I arranged an interview with him to find answers to the questions I had about providing Internet service. When I arrived at his office, I found him to be an animated, dynamic young man. His office has a large window overlooking the NCSU campus. He is surrounded by pictures of his family, and an impressive looking Macintosh computer system. During the two-hour dialogue, which seemed like twenty minutes, there was nary a dull moment! Eric is a terrific teacher with an extraordinary ability to make difficult concepts absolutely clear. Here is my edited version of our conversation:

Paul: What factors caused you to decide to implement gopher?

Eric: I was a member of a group studying problems, including the "serials crisis." Journal prices were going through the roof. What could we as librarians do about this? At the same time I heard about many electronic journals. I also heard about WAIS and gopher. I thought maybe I could apply these technologies to systematically collecting electronic journals. Libraries could collect electronic journals, and archive

them, and index them with WAIS in order to search them. This would be an alternative to paying the high prices for paper journals. We could eliminate the publisher. I decided to set up a gopher because I was enraged. I was mad! I wanted to come up with a better solution — to collect ***electronic*** journals.

Paul: After you made the decision to use gopher, what were the steps you took to get it set up and running?

Eric: I read a USENET newsgroup called **comp.infosystem.gopher**. I read it religiously every day. I used it as my support group. I FTP'd the necessary software from Minnesota, put it on my UNIX computer, uncompressed it, read the instructions, compiled the baby, and did it. It worked. When it didn't work, I consulted the newsgroup for help. I got the first version up in two weeks. The single most helpful thing was the newsgroup and communicating with them using e-mail.

Paul: Can anyone set up a gopher? Should they? What is needed to do so?

Eric: Yes, you have to have the appropriate hardware, software, and time. You can set it up on almost any kind of machine — Macintosh, UNIX, DOS, etc. Whether a library should set one up depends on who they are serving. If you mainly serve children who can't yet read, a gopher server may not be useful. But if you are in an academic library and you realize there is a lot of information on the Internet that you can't get in printed form, then a gopher is a great way to collect and organize this information and make it available to your clients. Here the answer would be "Yes, you should create a gopher server if possible." Many would want to set it up on a large computer, but if your population is small, then a lesser computer would work.

If you want to provide service outside your library, then you really need an Internet connection. Once only education and government had simple access to the Internet. Now more and more commercial providers are offering a way to hook on. If you don't have an Internet connection, you can connect to an existing gopher using a modem. The problem with this is that you are relying on them to provide the sort of information that you need. It is feasible to connect to our services, and once you get to our gopher, you can get to any other. The problem is that you won't have control over how all this information is organized. It is sort of like having a library without books and depending entirely on interlibrary loan. It is certainly better than nothing, which would be having no access to books.

Paul: What were the biggest problems or obstacles that you encountered?

Eric: At first, it was the learning curve to get it going. I knew very little UNIX. I did not know how to program in C, and the thing is written in C. I did not know how to compile and that sort of stuff. That was a challenge. But I just read the instructions.

The next challenge was to organize the material. I had to come up with an organizational scheme to classify the things I found out there. I had to come up with a model that would make the most sense to the people I am serving here at NCSU. If people in other places want to use my service, that's fine, but when I set it up, I was thinking about the people here outside my window.

The next part was maintaining it. This is ongoing. I put things that I liked from other places in my server, and then these other places sometimes reorganize and change the links that I used to connect to them. I have to then go in and "fix" these broken links. This is like library work, weeding the collection, shifting shelves, mending books. It's the same idea. This is ongoing.

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Another obstacle was teaching other librarians how to use it. You can't telnet directly to our gopher address and use it. You have to install gopher client software to go this route. I feel comfortable with computers. They are dumb boxes, but I can make them hop. I am very comfortable with them. Trying to teach other people a little bit about UNIX so they can maintain a gopher server is difficult because there is not a lot of enthusiasm. Some people consider it a chore. I don't really know a lot about my computer, but I can make it go. I'm like the race car driver. I don't know how to fix it, but I can drive real fast!

Paul: Who uses your gopher? What are the ways they can access it? (For example, the library gopher at UNC-Chapel Hill has been added to the online catalog menu. It can be accessed from any terminal in the library. Of course, many students have modems at home and can access it through dial-in to the university computer.)

Eric: Who uses it? Everybody. There were 872,000 connections last year. (For these statistics, each menu selection counts as a "connection." Therefore obtaining one piece of information might count as four or five connections, if the user moved through four or five menu choices to get to the information.) About 12 percent of users are here on campus, and 95 percent of that 12 percent campus use comes from the library terminals. OhioLink, a consortium of libraries in Ohio, is second at 10 percent. They have us on their top menu. They are our single heaviest user. Next is Delphi, a commercial service which sells connections to the Internet, at 5 percent. The Library of Congress is next at 4 percent. About 70 percent of users are others who connect less than 1 percent of the time, but this can still be a lot when you consider more than 872,000 connections. Last year, the average was one connection every 37 seconds. In June 1994, there was one connection every 14 seconds. Overall, more than half of the use is by educational institutions. About 10 percent are commercial institutions. Less than 10 per cent are network institutions. About 25 percent are "other," and many of these are from outside the country.

To access our gopher, once you have a real connection to the Internet, you need to retrieve a gopher client. What client you finally select depends on the computer system you are using. Examples are *Turbogopher, HGOPHER, UNIX Cursus client*; there are bunches of them. Pick one of these pieces of software, put it on your computer, and somewhere in the configuration, it will ask you where you want to go. Then you can point your gopher to **dewey.lib.ncsu.edu** on port 70. That is the best way to get here. Alternatively, if you do not have a gopher client, you can telnet to the NCSU library's information system (**library.ncsu.edu**) and you can navigate the menus and in there somewhere is our gopher. If you dial in to someone else's gopher, you probably will be using the VT-100 client, and there is usually available (but not always) the "O" command. You can press O and it says "What other gopher do you want to go to?" You put in "**dewey.lib.ncsu. edu**" and you are here. Or if that doesn't work, you can find us in "Other Gophers" in someone else's menu. (You only need the client software if you have a true Internet connection. If you are dialing in or using telnet, you are using someone else's client software which is already in place on the other machine.)

Paul: Some gopher menus offer clear choices that lead easily to desired information. Others are confusing. They may provide cryptic choices, making it hard to

search for information. How would you describe the menu for your particular gopher server?

Eric: When I first started looking around, I noticed the organizational schemes in use at the time were not interesting to me as a librarian. They were more of a general campus interest, like class schedules. I was into collecting academic information. Existing menus had choices like "neat stuff" or "cool things" or "general" or "other." These can waste a lot of time. I wanted to create a "Library Without Walls." I decided not to use something like Dewey Decimal or Library of Congress classification schemes, because they can put people off with somewhat negative images about libraries. No one really understands those systems besides librarians.

So what would people understand? I thought of used bookstores and how they put materials under broad general subject categories, like "Music." I decided to use categories like that. At the same time, I was playing with this thing called a "MUD," meaning Multi-User Dungeon. It's kind of like a game but not really. There is a MUD at MCNC and you could telnet to it. It was like a virtual reality. You could go left, go right, go up, go down and look around and see things. They had this idea they called a "study carrel." You had to pick a study carrel based on the first letter of your last name, so I went down to the M's. You could create your own virtual space. I created a space with only a table, a chair, and a flower. The flower wilts as you approach it, and as you go away the flower comes back to life. Then I added a computer in the space. As you walk up to the computer, it asks you questions about your information needs. You answer the questions. It gives you the answers and you go away satisfied.

Based on the fact that I wanted to organize things by subject, rather than "cool things" or "other," and based on my playing around with this MUD, I got this idea of study carrels. I made up what I call the "used bookstore model." I created broad categories to name my study carrels as I found resources. I would say, "Here is an Internet resource. I think it has some useful information for me and my clients, so I'm going to create a link to it. I'll put it in the Sociology study carrel because it relates to sociology." I more or less cataloged. It was not a straightforward process. I was influenced by bunches of stuff I encountered along the way. You take this good part from over here and that good part from over there and mold it into something new. That's what learning and scholarly activity is all about, taking parts of other people's ideas and making a new idea. The study carrel structure is an open architecture, and I can add more study carrels if I need them as new things come along. You have to be careful though; you can't just add them randomly. It is a frustrating thing for users if they open a study carrel called "Western History" and they say, "Oh, that's exactly what I want!" Then they open it and it has only one thing there. That is really frustrating to people. There must be enough resources in there. That was my collection management policy. I had to wait until there was what I call a critical mass of items — four.

Paul: What distinguishes your gopher from others?

Eric: Our gopher is popular. It has a library feel to it. It's structured like a library, as opposed to a campus department or a campus-wide information system. There's a "reference desk," just like in libraries. There are "study carrels" like there are in libraries. There's the "stacks" like there are in libraries. Even though I call it the used bookstore model, it ends up looking like a library anyway.

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Paul: What special resources have you added to your gopher menu?

Eric: I have very few unique items in my server. Very few. Most of the things that we have point to other people's. I have just created this big bibliography. It's like I don't really have this "book"; it's over there in another library someplace. Most of the things I have are really somewhere else, except when it comes to things like guides to our library. These are lists of our NCSU library resources. You can see what sociology reference books you may want to use if you come here. Those lists are text files that are unique to our server.

Another thing that is unique to us goes back to the reason I did this in the first place: collecting electronic serials. That was my whole point. This other stuff about collecting Internet resources came along as I was putting it all together. I was teaching Internet classes. Every time I went to class, I was carrying all these big books with me, like *Hitchhiker's Guide to the Internet* and *Internet Resource Guide*. Huge things! People would say to me, "Do you know a good resource for um-um-um-um?" I'd say, "I've heard of that; let me look in my guide." I'd pull it out and hunt and say, "Here's the number." I literally had a big black book of Internet addresses — like a little black book of telephone numbers. And then I thought "Wait a minute. Whoa, I'm not going to be able to remember all these numbers after a while. I'm going to write them down and put them in my gopher server."

The only unique thing so far is my collection of electronic journals. This was the whole point of my starting the gopher in the first place.

I created a gopher server that worked. And then I created a WAIS server. WAIS is a program that indexes data. It works on the client/server model just the same way gopher does. You have one program, the server, that holds the data. You've got another program, the client, that queries the server. WAIS indexes data. Indexes are what librarians are all about. Our card catalog is an index. You have, for example, *Library Literature*, which is an index to library-related magazines–journals.

WAIS creates indexes to whatever you want. I collect electronic journals which are text files. If you have a big pile of these journals, how do you find a particular article on a particular subject in that great big pile? You need an index. You need a way to search the thing. You can browse. You can look at one article and then another, but this could take forever. You need a way to search. WAIS allows you to do this. I collected these electronic journals and put them in a "pile." So here's a whole bunch of text files. Now I indexed them using WAIS. The index is based on the whole text of the journals, not just abstracts. You use the WAIS software on your computer to find all the articles that contain the word *NREN*. The WAIS server looks at its index and says, "Look, these five things have the word *NREN*." You say, "O.K. I would like to look at number four." The WAIS server then goes and gets number four and gives it back to you.

WAIS counts the number of times the word or words you requested appears in each document it retrieves. If you look for the word *DOG*, it will search its index and come back with a list of all the things that have the word *DOG* in them. The articles at the top contain the word *DOG* more times than the ones at the bottom. They assume that the ones that contain the

word more often are going to be more relevant to you. This is called relevance searching. Early WAIS software did not do Boolean searching, but the relevance searching provided valuable information. The newer WAIS software can do full Boolean searching, and it still ranks the results so that the documents with the highest number of hits still appear at the top. You can now form sophisticated Boolean searches such as *CAT and DOG not MICE*. You can use truncation. You can search for phrases such as *TEDDY BEAR*. The point here is that relevance searching has a lot of value, and we as librarians are not paying attention to that because we have been stuck on Boolean searching since the early seventies. That's when we really got into using DIALOG. We librarians need to explore this new way of searching — relevance searching.

But back to the question of what distinguishes our gopher and what special resources we have. My whole point was to collect electronic journals. I decided to be very specific. I only collected library and information science related titles. Right now, there are about twelve of these. Only three or so are scholarly. The rest are like newsletters. I started making these accessible through our gopher server, and just recently I started putting the current issues on our new World Wide Web server.

Author's Commentary

Here I need briefly to introduce "World Wide Web." World Wide Web (also called WWW) is another way to provide access to Internet information. Eric Morgan predicts that World Wide Web will replace gopher in two or three years.

World Wide Web is similar in many ways to gopher. It does even more and provides a better looking interface for the user. Using World Wide Web, you can look at a formatted document, select (or "click on") a highlighted word or phrase, and then the software connects you to a link somewhere else on the Internet. That link provides more information about the word you just selected, a footnote if you will. The additional information may be in the form of text, a picture, a sound file, or a movie.

Once you view this link, you can easily move back to the original document. World Wide Web can connect to the other World Wide Web servers and all the gopher servers too. World Wide Web adds a new way to make Hypertext documents accessible. Multimedia links provide new and more exciting ways to view information. World Wide Web is already being implemented in many academic institutions. Even though it is a different protocol, it provides a path to existing gophers.

Mosaic has become the most popular client software for using World Wide Web. Mosaic is a browser interface for World Wide Web. When people talk about Mosaic, they are really talking about World Wide Web. (Mosaic is to World Wide Web as Turbogopher or HGopher are to gopher servers.)

Lynx is yet another WWW browser program that permits using WWW in situations where the user is not equipped to receive all the picture and multimedia options (for example, when dialing in with a modem). Lynx makes the textual material available and provides the Hypertext linking feature of World Wide Web.

Eric: I had a gopher server and I also had a WAIS server. I indexed my electronic journals with WAIS and I provided access to them through my gopher. I also have a list you can browse and get the latest issue, or you can look for an article in any issue. But, if you want to search the entire collection of *PACS Review* for the word *NREN*, you can do that as well. WAIS would present a list of articles containing NREN. This is really the only unique thing about our server. I have collected electronic serials that deal with libraries. But there was an unexpected surprise. I have indexed each of the serials, so you can search each one individually. And then I thought, "I've got the whole collection, so why don't I index the whole thing?" So I indexed the whole pile and created a new index. Now you can search the whole pile for articles that contain the word *NREN*, and it finds them all! It's just exactly like *Library Literature*.

What we should now do as libraries, in my opinion, is collect electronic journals in other disciplines, for example zoology and medicine. We won't get rid of the standard library indexes and abstracts, but we won't have to rely on them for indexing purposes. We can create information instead of just buying it from other people. Now that I have collected library titles and demonstrated that I can do this effectively, I am branching out and collecting other electronic titles. I invented this guy named "Mr. Serials" who lives on my UNIX computer. He subscribes to these things and when he gets new mail, he files it away. Everything gets reindexed automatically every day at 2:30 in the morning. In May of this year, I decided to add current issues of the serials only to our World Wide Web server. With the advent of Mosaic and Lynx, I started maintaining a World Wide Web interface to this collection and stopped maintaining the gopher interface. Compared to gopher, Mosaic provides superior presentation capabilities. The earlier journals are still there on gopher, but the recent ones are only available through our newer World Wide Web service.

Paul: Please share your views on the future of Internet access using gopher at NCSU. What changes do you think you will implement in the future?

Eric: Gopher is going to die. It's becoming old hat. It's sort of embarrassing to say that, because it's been so cool for a couple of years. The next wave is going to be World Wide Web. World Wide Web is older than gopher. It started out in Switzerland. It can do everything gopher can and more. With Gopher, everything is a menu and everything looks pretty much the same. With World Wide Web, you can

format your page — what the person sees on the screen. You can indent things and have bullets and numbered items. The real idea behind World Wide Web is this. Scholarly papers have footnotes. I read along and come to a footnote. I select or click on that footnote and it goes off somewhere else and gets and displays the footnote. When I'm done reading the footnote, I come back. It's a Hypertext sort of idea. With a World Wide Web browser (probably Mosaic, since it is by far the most popular), you can access all the gopher servers and all the other World Wide Web servers. You can telnet around and do all sorts of other Internet things. World Wide Web is much more capable than gopher, and it's a lot easier to maintain, too.

As history progresses, we change more quickly. Look how quickly styles of music, for example, come and go now. The same thing is going to happen in computer land. We once had ways of doing things and they lasted a long time. Technology is changing rapidly. We're changing so much faster than we used to. FTP came along and we used that for a long time. Then Gopher came along and it improved FTP and telnet. That was great. Gopher was a big flash in the pan for a couple of years, and it will probably continue for a while.

And now the big flash in the pan is World Wide Web because it can do gopher and it can do telnet and FTP. It can do everything we could do before — and more. I predict that fewer gopher servers will be created and more World Wide Web servers will be created. Gopher is going to fade away in about two to three years, as far as new installations go. However, I think that gopher servers will be around coexisting with World Wide Web for a long time, maybe ten years.

We still will use the strengths of gopher, which include simple lists. When we have an Internet resource that is a simple list, then we will use gopher. If we have something that is more textual and descriptive, we'll use World Wide Web. The way I see it, for the short term we'll have World Wide Web as our front end. There will be items behind there that will include things like gopher or telnet or FTP or OPACs. These will hang out in the background, behind World Wide Web, but will be readily available.

Paul: What should libraries in North Carolina be doing to provide Internet access to their clients? Are we doing as much as we should, or do we need to do more?

Eric: I believe other libraries should take a more aggressive approach to using computers to provide library service. I am a systems librarian and therefore biased. What do libraries do? What are we about? Libraries are about information. We're not about books, magazines, videotapes and microfiche. We're about information. For a long time, libraries were associated with those things because information was contained in a book or one of the other formats.

Libraries collect information — that's collection management. Then we organize it — that's cataloging. Then we store it. Then we disseminate it, give it away, through channels which include circulation and interlibrary loan and reference.

If we as libraries demonstrate that we can use our computers to provide the same services a publisher provides, then we can eliminate the publishers.

We also evaluate information. We might say we don't, but we do — all the time.

Computers are great tools for doing all these things. You can archive information on your hard disk. You can subdivide your hard disk into directories. You have just organized your information. You can turn your computer on and let other people come in and get your information. That's dissemination. You also have programs such as spreadsheets and database managers and querying programs. That's evaluating information.

Computers are great tools for doing the same things that libraries do. Therefore I believe that next to a librarian's mind and a librarian's peers, the computer is a librarian's primary tool. Librarians should be aggressively exploring ways to use computers to provide library services. These might include things like gopher and World Wide Web servers. We librarians have already started doing this in some ways, such as with our OPACs.

Recent literature says the journal crisis is not going to go away. We still are basically up the 'crick.' Some people believe if we can eliminate the publishers, we can fix the problem. Some believe if we can improve the scholarly communications process, we can fix the problem. If we as libraries demonstrate that we can use our computers to provide the same services a publisher provides, then we can eliminate the publishers. I hope that other libraries explore these things as well.

As librarians, we don't pursue new things. For example, we have not explored relevance feedback. We think Boolean is the only way, but that's not true. We are stuck thinking that libraries are about books. They are not about books or videotapes or computer files either. They are about information. This has been true forever. If we internalize this, then we will have a different view of what we are supposed to be doing, and as a result, we will provide different service.

If librarians have access to a true Internet connection, they should create a menu for their users. On the menu will be a list of books they own, library hours, guides to the library, and an Internet porthole. That porthole might be a gopher client or a World Wide Web client such as Mosaic. They probably won't need to make a server. They can probably get client software and put that on the main menu for their institution. If possible, go with World Wide Web from the beginning. While gopher provides tremendous powers for collecting, organizing, and disseminating information, it pales when compared to the Hypertext Transfer Protocol of World Wide Web. We started a World Wide Web server here at NCSU at the beginning of 1994.

Yes, librarians who are planning to offer Internet services should start right out with World Wide Web, using Mosaic for the client software. This, of course, is contingent on whether they have a true connection to the Internet and can obtain adequate equipment. Right now, for some librarians, this is not the case. If not, they should start providing access with gopher, but it would be helpful to learn about World Wide Web, which is rapidly becoming the system of choice.

Conclusion:

Eric Morgan says libraries should be providing a way to get out to the Internet. Librarians who are not currently providing service should get connected. If resources are limited, it is simple and inexpensive to connect with a modem. When a library uses a modem, it is easy to connect to someone else's gopher. From there, the library can get to all of the 1,800 or so gophers that currently are available.

Eric is unconditionally enthusiastic about the Information Highway. He affirms a conviction that librarians should give it full support. The role of libraries is to furnish information. ***Information*** is the meaningful element — not the format.