Introduction

The following are excerpts from a symposium on the Internet held at the University of Pennsylvania on November 1, 1996. Terry Gross, host of National Public Radio’s Fresh Air, moderated the discussion by four panelists: Paul Evans Peters, executive director of the Coalition for Networked Information, a Washington-based organization which represents a partnership of libraries, universities, and other institutions interested in networked information resources and services; Paul Ginsparg, a physicist at the Los Alamos National Laboratories and creator of the pioneering e-print physics archive; James Gleick, a New York Times reporter and editor who writes a monthly column, “Fast Forward,” on technology and the future, and author of several books, including Chaos; and Sherry Turkle, a professor of Sociology at MIT and author of several books on the sociology of computers. Vice Provost and Director of Libraries Paul H. Mosher introduced Ms. Gross.

Paul Mosher: How many of you know what an environmental scan is? It’s when you seek to look outside of yourself to determine what the future will bring, where society, where learning, where the environment in which you live is going. Knowing that, you then can plan appropriately, taking into account not merely where you have been, but where you will be going, which is always an issue for us.

Today Terry Gross is going to conduct an environmental scan with four wonderful people who have thought very intensely about this new world in which we live and who examine it in their different perspectives. She will, in fact, introduce the issues that will be raised and draw them together, forming another kind of web or net from which I think we all have a great deal to learn.

Terry Gross: The truth is, I don’t even know the home page address of Fresh Air’s home page. I will confess that I am too busy to deal with our own home page, which is just one of the paradoxes of life in the age of the Internet which I would like to explore in this panel.

It is very appropriate that we should be talking about information, knowledge and the Internet here at the University. After all, it was University scholars who pioneered the use of the net. Now the net has grown to the largest collection of information in history and the largest information junk heap in history, and to make matters more confusing, although the net has been about free information in history, the net has grown to the largest collection of scholars who pioneered the use of the net. Now here at the University. After all, it was University about information, knowledge and the Internet to explore in this panel.

We’re going to hear the insights of four people who are using the net to provoke change in education and scholarship, or monitoring the social changes the Internet is creating.

A Proliferation of Information

I’m going to start with James Gleick. He writes about technology and the future in his New York Times Sunday Magazine column, “Fast Forward.” He has two books in the works which relate to what we’re talking about today. One book is about the fast pace of contemporary life which will be called The Directorate of Time, and another book is A Cultural History of the Telephone. Gleick is also the author of Chaos, about the new scientific theory, and Genius, a biography of physicist Richard Feynman. He has not only written about the Internet, back in 1993, he founded and headed a New York City Internet provider called Pipeliner which provided Internet access before the major on-line services did. He sold the company last year.

I want to start with your forthcoming book, The Directorate of Time, because it’s on the pace of modern life. I think one of the really great paradoxes is simultaneously we have access to the greatest information resource the world has ever known, and we’re all too busy to deal with it. I’d like you to address a little bit of that paradox, which I imagine is one of the things you were thinking about in writing your new book.

James Gleick: It is a paradox. It is dizzying. It’s really the essence of what happens when you start browsing the net. Some of us have already argued about whether browsing is really what you are doing. I use the Internet myself as a reporter all the time to get information and it’s scary how easy it is, how effective it is as a research tool. I used to have to call people up on the telephone and talk to them, and, like a lot of reporters, I have always found a little bit of shyness that you had to overcome to do that. On the Internet, you can find all this information without ever having to expose yourself.

TG: What are you finding, what do you look for there?

JG: Oh, the range of stuff is incredible. I guess to give a concrete example, I wrote a column earlier this year for the New York Times Magazine about using these new electronic devices, GPS receivers, to locate yourself in space. They are perfect navigational devices, and I wrote this column just after an American Airlines jet crashed in Cali, Colombia, because the pilot didn’t know exactly where he was. I was able to go to a camping goods store, and for about $200 I bought a hand-held receiver that gave me my position in three dimensions to within about 100 feet. This pilot, with hundreds of thousands of dollars worth of navigational equipment, crashed. I wanted to know some technical details about what kind of equipment was actually on that plane, what really caused the crash, the kind of stuff that would in the
due course of time come out in official reports. Any newspaper reporter knows that when you call the public relations department at an airline whose plane has just crashed, it's not necessarily a fault of information, and the same was true of Boeing, the manufacturer of the plane. On-line, I was able to find within minutes not just a lot of chatter in usernet news groups, but web pages where people had posted the navigational charts, annotated drawings, technical information, and a course. The catch to all of this is some of it was completely wrong.

TG: Okay, that's exactly what I wanted to ask you. You write for The New York Times and newspapers are edited. There are people whose job it is to make sure that everything that you or any other reporter puts in is true. I mean, that your writing has to pass through several layers before we read it in the paper. On the Internet, there are some sites that are highly edited, like The New York Times site, but a lot of the information on the web is not edited, is unreliable, it's wrong.

What's your journalist's perspective on the lack of editing on the net?

JG: Well, my journalist's perspective is an arrogant and elitist perspective; that is, I would like to think that what I'm getting paid to do as a professional journalist is what you're talking about, is to act as a filter, to use my judgment about what's right and what's not right, and what's important and what's not important. As a reporter, I have to sift this stuff out and, of course, call people up on the phone and interview them, and go through a process of vetting the story that people don't necessarily go through before they post 200 choice words through a usernet news group. The fact is, we live in a world of a lot of people with varying degrees of expertise on a lot of different subjects, and I think it's incredibly valuable for people to be able to exchange their opinions in a quick and informal way, even if they are not always right. The fact is, The New York Times isn't always right.

Did I hear laughter?

Access, Reliability and Peer Review

TG: Now, I want to ask some of these questions to Paul Ginsparg. He is a theoretical physicist at Los Alamos, who is now researching information loss in quantum black holes. He is the founder of a physics bulletin board which is transforming the idea of scholastic publishing from a small paper journal to a global database. On-line, I was able to find within minutes not just a lot of chatter in usernet news groups, but web pages where people had posted the navigational charts, annotated drawings, technical information, and a course. The catch to all of this is some of it was completely wrong.

Paul Ginsparg: The difference is that we've cut out most of the intermediaries; we've decided to abstract what we do in the process of communicating research information to one another and recognize that in the paper distribution scheme there were many inefficiencies. We had to go through a publisher, we had to have our handwritten manuscript prior to word processing, convert it into some nice format, somebody bound it into volumes, shipped it out to lots of libraries and then we went to the library or had a subscription and read it. And what we realized in our community, actually starting in the mid-80s, quite a while before this caught on generally, is that we were all using the same word processor. We were all communicating primarily by e-mail by around 1985, and by the late 80s we began to realize that there was no "value added" in the conventional scheme other than to delay our own form of communication.

TG: James Gleick is approaching the Internet from a journalist's perspective where information is edited and so on. You're taking the editing out of scholastic publication by removing the peer review process. Anyone who sends you a physics paper, you put it up on-line, right?

PG: Well, not quite, actually. We have filters.

TG: Okay, what filters do you think should be preserved in scholarly publishing now, and what filters are you getting rid of now that you're publishing through the Internet?

PG: Well, the first point that I'd like to make regarding this is to a certain extent peer review is vastly over-rated as a filter.

Perhaps 60 years ago it was possible to read the Physical Review once a month and be abreast of all of physics from cover to cover. No one researcher can read any one journal, any fraction of any one journal, much less the entire literature in one's own field. We are already applying a variety of selection criteria for our reading and, if we are already doing our own filtering, the prime thing we need is just immediate access to it.

What we're really saying about the peer review process, I'm not in the least saying that I'm opposed to it as a matter of principle what I'm saying is that, as currently implemented, it's too coarse a filter to be of any real use to us. In other words—Jim already claimed to be elitist, so I'm not setting a new precedent here—I would say that it's insufficiently fine a filter for my elitist tastes, and, under those circumstances, I would rather have all of the information and make the decisions for myself.

The current peer review process, which I frequently hear portrayed as essential and sacrosanct, most people don't realize how recent a phenomenon it is. Largely implemented just since World War II, it is neither necessary to, nor a guarantee of, good science. And what I would like to see is a much, much better system of overlays, once we have a global database to which everybody has access, removing the barriers of having to walk to another building in the rain to find a volume in a library. What we would like to see is some real intellectual value added as an overlay that is not just a bottleneck to the flow in order to save space on library shelves, but a real guide.

If I, for example, as a physicist, have no entry to literature and biochemistry [and I don't know where to start], I'd like to see an overlay that stated, "if you read only one paper from this period, read this one. Here is the good background information. Here is what it leads to. Here is the most important paper in the field."

TG: You describe the bulletin board that you are doing as empowering researchers because now people from around the world can access...

PG: It is technically an archive rather than a bulletin board.

TG: Thank you. Okay, so we have the issue that it empowers people, they can get the access to it...

PG: And also reach out; they can get their information out without having it delayed. There are all these classic examples of papers that are the most creative and breaking the boundaries which are frequently delayed the most through the conventional process because the referees just don't understand it.

TG: What about the flip side of that? Do you ever feel like you've been burned; that you put something into the archive which was false? Which was misleading? Which was maybe even a hoax? Is there anybody that takes responsibility or vouchers for any of the information that's in the archive, and is that an issue to you?

PG: We have two distinct notions here. One is the raw archive which is very clearly labeled "Take your chances," and on top of the raw archive will be the additional structure that is provided by the current journal system, though, as I say, not done particularly well. It is a one-time, all-or-nothing binary decision and it occurs in print, and the quality of the printed [word]—not every-thing that appears in those nicely bound journals in your library is correct. So there are many inefficiencies in the process. I would argue to the contrary that once you have these much more fluid systems of overlaying to a raw database, things can be retroactively moved around. There is a paper that wasn't known to be false at the time which was later seen to be falsified, and it can be
moved down in the hierarchy so some unwitting student 10 years from now isn't misled by it.

TG: So your archive is providing speed, value and access.

PG: And flexibility.

Educational Opportunities On-Line

TG: Let me introduce Paul Evan Peters. Let me ask you, Paul, how do you think networks are changing the nature of education and educational institutions?

Paul Evan Peters: Well, there is more to learn than we have learned. In the first instance [the Internet] provides wider and more diverse access to educational opportunities. Although in the United States we have made a lot of progress, particularly in this century, in providing mass access to higher education and other levels of education, we have never really fully created as much opportunity as there is need. So, right off the bat, you can create a delivery system for educational opportunity in a virtual world that is more accessible by a more diverse group of people than ever before.

Quality is a bit of a looser issue in the education sector than the other sectors we have been pursuing. But I would say that I have reason to believe that this environment will help us focus on quality, and it may even allow us to extend quality by tailoring educational opportunities with specifics in very small groups of individuals, perhaps even to the preparation, skills, and interests of an individual.

Cost is another aspect of education that is on everyone's mind. It's very difficult to make a case that the absolute cost of the educational enterprise goes down through the use of network-based delivery; rather than brick and mortar-based delivery strategies, although there still are people who will make that case. But what I think is undebatable is that the unit cost of providing education goes down as a reflection of this first widening and diversification of access.

TG: Tell me one of the most innovative uses of the Internet you are seeing now by an educational institution or a library.

PP: Well, there are so many. The first one that came to mind, just because it is something I had been working on the last week, is an educational opportunity where you have some archaeologists in Egypt involved in a dig and there are elementary school students who are able to follow their progress on a week-by-week basis. They have real-time access to the site as these archaeologists go through their research program. They are able to make certain materials, including background materials, available as real time, and it gives students

not only a sense of what the information content of the accomplishments of these educators, it gives them a sense of the decisions, the judgments, and all this can be done on such a wider scale now.

I know of other cases where there are certain kinds of scientific work where you can't pay people to do the work, like doing really careful models of water quality in a specific river. The one I have in mind is the Rouge River in Michigan. You really can't pay people to do the kind of complete sampling along the river, and yet many children have been mobilized, high school by high school, grade school, by grade school, to do these kinds of water quality samples. It is a very intensive way to post the data to a network environment which connects them to a research team that is university-based or government laboratory-based. These data allow better models of the environment, and so forth. There are literally hundreds of examples of that sort now available in the Internet environment which show these elements of dynamic contact to the discovery experience so that students at all levels, and adults, too, get the impressions that knowledge is alive and growing; rather than static, to be received. That's a very important educational message that we could not get across as widely or as successfully as we can now.

Libraries in an Electronic Age

TG: Your background is in libraries. Do you think we will continue to have libraries now that we have so much information available electronically?

PP: I will step out to say that we will have more libraries, but they will have quite a different character. I can remember when librarians were very concerned about this question, as publishers have been very concerned about this question. I think it's important to note that the key concept of the library of the future is as an institution that is focused on the user—not to the exclusion of the rare and possibly endangered expressions of human intellect and discovery that need to be captured.

I'm not saying that libraries don't continue to be repositories of last resort for these expressions of the human intellect, but I'm saying the average library program or the usual library program will be much more focused on helping users acquire the skills [and] exercise the skills. [I did an exhibit] in the New York Public Library, and one of the things that pleased me most about the public's response to the guided tour of the Worldwide Web is how often people said that they had never had such good access to the Worldwide Web because we have it sitting on an ethernet on a dedicated server. This is a much higher level of contact with this environment than you can get. So, I think [of] libraries as access vehicles, too. The point here is that it now becomes a very user-centered enterprise, so the institutions—be they educational,

cultural, informational—are now very user-oriented. This frequently means that they bring certain technologies under command for the benefit of the user, which is quite different than bringing them under control for the benefit of the supplier.

If this were taking place in a MUD, we wouldn't be here. We'd each be home at our machine, our laptop or our desktop machine, logged on through our modem to another machine which would contain software which would give each of us in our home space the illusion that we were in a space together and that space would be described either through text or through graphics as a large room enclosed with brick with blue seats and there is a stage and on the stage are sitting five people, each with a microphone, etc., etc., and our words, as you've heard them, as Terry has asked the questions and as we have responded, would be scrolling down, and we could talk to each other by giving various commands. You in the audience could talk amongst yourselves without our hearing you, which is an advantage in some ways over what you have here. We could talk amongst ourselves without anyone else hearing us. In other words, we could have conversations and engage in relationships in this space.

Additionally, since real estate in cyberspace is pretty inexpensive, there will be able to leave this room and go to virtual offices that each of us had built adjacent to this common space. Business applications come to mind because if you add a white board to that space, we could start to negotiate, we could give classes, we could conduct meetings. So, clearly, these kinds of spaces are going...
to be persisting because of their utility in both an academic context and a business context. We could all decide, for example, if this conversation goes well, to meet here in the MUD, in the virtual U. of P., half next week to continue some aspects of the conversation, something that would be more difficult to do off-line.

In other words, it creates a space in which you can move around, communicate, have relationships, and what is most particular about the ones that I am studying, is that these environments are created where people log on to them and create an identity for themselves. I could log on as a man. I could log on as a much older woman. I could log on as a much younger woman. Create an identity, a name, characterizations, and then have relationships with other people in these spaces who have similarly described themselves, and that's the basic premise. What distinguishes some MUDs, and I think the most interesting MUDs, is that you get identity effects, you get identity changes of a more profound nature when they become like Chee, you know, the bar in the sitcom, that is where everyone knows your name, or at least your virtual name. So that when you log on to one of these spaces, and in fact, can expect to meet 20, 30, 40 people who are sort of all there, too, who have seen you before, who you've known for 6 months, who expect to see you tomorrow when you log on. You begin to get the kinds of friendships and identity play that I find so compelling.

TG: You've met and spoken with people who have logged on as people of the opposite gender. In fact, you have logged on as a man to see what that's like. What's the motivation behind doing that? Why are people changing their identities or their genders when they log on?

ST: Well, there can be several motivations. One motivation for a lot of people is curiosity. In my case, I was logging on to a multi-user domain in which there were many genders. Someone seeing "ST" assumed I was a man. It just sort of became very clear that as a man I found that I had certain kinds of freedoms that I had not experienced as a woman.

Which leads to the second motivation, active curiosity. I think there is a kind of consciousness-raising that can happen when you have the experience of logging on as another gender. For example, many women say that they have troubles with assertiveness. I don't particularly have troubles with speaking my piece or standing up for myself, but as a man, I found it was much easier to say, "Excuse me, I'm busy. I'm working on something here" without feeling that I somehow was interfering in politeness or accessibility.

TG: I find that when I log on as a man, I am offered a lot less help on-line than I get if I log on as a woman, which leads me to ask the question, "Has being offered all this help all these years made me think of myself as someone who needs help?" which I think is a very persistent question for women. Many men say that when they log on as a woman, and begin to get the sort of "You busy?" "Want to talk?" "Love your virtual outfit." They develop a more healthy respect for the many forms that sexual harassment can take. That sexual harassment isn't necessarily a touch or an obscene gesture. It's sometimes just constantly being made aware of you as somebody who is being seen and known and kind of razzed a little. So I think that sometimes obviously the purposes are sexual experimentation; the purposes have more to do with an erotic life; but I think there is this other side to what gender-bending on the Internet is about, which is about curiosity and consciousness-raising and then using the opportunities the computer offers us as a kind of mirror of our lives.

TG: It's sort of like a different aspect of education through the Internet. We've been talking about using the Internet for information access, but you're talking about learning about yourself through changing your identity or not changing your identity on the Internet.

ST: What happens is that we've grown up in a psychological culture where we think of identity in terms of the integration of a one. And that is both presented as how it is and also as the model of how it should be. That the more of a one there is, the more sort of okay you are and successful you are. I think that what playing out different aspects of self on the Internet creates is a sense of a psychological maturity that has to do with flexible transitions between aspects of the self and discovering different aspects of yourself on-line and learning how not to be a split personality, but rather how to think about being flexible among them and seeing yourself more as a multiplicity than a one.

TG: People around you won't let you change because they are so sure they know who you are and you can't change at all.

ST: I studied with a great teacher Eric Erickson was a psychologist at Harvard when I was studying there, and he was a student of questions about identity. He used to write about adolescence as a time of moratorium, a time of "time out." When in our culture it was usually associated with the college years, you had a chance precisely to experiment with these many aspects of self, to have a kind of consequence-free time, and he wrote about how important that was in the development of a healthy identity. I think you could say that where we are now, the college years are not a time out. College is pre-professional. AIDs has made the notion of consequence-free sexual experimentation an impossibility. We interrogate our political candidates about what they were doing in 11th grade, and there is a sense in which this time for a time out has closed down. I think that what you see on the Internet is many people seeking out this moratorium space to have that permission, which, as you say, is often denied us.

Filtering: Organizing the Internet

TG: I want to open up the discussion to more about the organization of all this information we have access to. Is anyone on the panel happy with how the information on the net is organized? Can you get to what you or the institutions you are working with needs to get at in an easy way?

ST: I'm fascinated by one development, which is the personal home page, which people use to say here is the other information on the web that I would like to look at that I've gone through and sifted through. That is a really fascinating new development in terms of the organization of information that you, in fact, can...
identify 5, 10, 15, 20 people on the net who have become your sort of trusted advisors.

TG: Have any of you had any experiences having your name or your work hyperlinked by somebody to a page that you really disliked or distrusted, and all of a sudden intellectually you are being linked with something that you find either heinous or just distorting, and you don’t want to be linked to them?

JG: I don’t want my books sold in the New Age section of bookstores, but sometimes they are, and in a way that’s life. I would say you’re raising an important point and you’re almost providing the answer when you talk about hyperlinks. To me there is an enormous difference between a link to something that I have put on-line and just taking the material, and in the case of my writing, both things happen on the net. People do link to my page. People do take stuff I’ve written and keyboard it in and put it on their page. So to me there is a world of difference, because the link is to a place where the control is mine and if I want to take the material away, or correct a spelling mistake, that’s my choice. If they type the material, it’s a form of theft. To the end user it may look exactly the same, but it’s an enormous difference.

PP: I agree with what my fellow panelists have said, but I think it’s important to keep in mind that the Internet is a very large place and there are lots of different sorts of people and communities there. So on this question of “can you find anything,” I really think there are a lot of different answers, depending on where you are.

TG: You’re the library guy, so your background is in organizing systems of information retrieval.

PP: I have a lot of experience with that, and I think most of it helps me in the future, but I’m trying to unlearn a lot of that, too, because it is a new environment and we should be looking for new ways to do this. But I rarely have trouble finding what I’m looking for and I’m very happy that the Internet is there, because I don’t know what I’m looking for. The usual problem I have is which technical solutions are on the way, is that the way of addressing is not as firm as the international standard book number, meaning the universal resource locator. That may not even appear within the same quarter, let alone the same year. All this gets gathered together in the Internet environment. What I’m trying to say is cataloging and anticipation of future use is something I’m trying to unlearn. What I’m trying to learn is how to, without being intrusive in the least, to capture the experience people have with information and to make that available to later inquirers who may not be on the leading edge of a certain field. The thing we’re trying to learn in librarianship, or trying to unlearn, is the rational anticipatory.

Copyrights and Webworks

TG: If we go into a library and we want to copy an article or a page of a book, we take the magazine or the book to the Xerox, we copy it, we pay our dime for each page and we leave. But Jim, you were saying you don’t mind being hyperlinked to other people’s pages, but you do mind when somebody takes some of your writing, they take your words and put it on another site. That’s how you make your living. You are a professional writer. What’s the difference between somebody taking your words and moving them to another web site or Xerographing an article you wrote?

JG: There’s no difference. They’re both against the law. And you’re raising a really important point, that I may have a different perspective on from the rest of the people on the panel because I’m the only person on the panel who’s not connected with the university, therefore, whose work is not subsidized. I’m a strong believer in some kind of system that makes it economically possible for people to write and make money.

I believe that a lot of writing is produced that is valuable because there is a system in place to provide financial support to the author. That is, I’m working on a book. My publisher has enough confidence that it will be able to sell a certain number of copies of the book that it’s able to stake me to a certain amount of work, research, years spent studying a subject. Without the subsidy of a university, copyright protection is the only thing that makes this house of cards stand up. The Internet is definitely a threat to that. It’s an issue that libraries are certainly grappling with, and I think that libraries and writers are not necessary friends on this issue. It’s the mission of a library to make stuff available to as many people as possible in as convenient a form as possible. I’m a consumer of information, and I’m certainly in favor of that. On the other hand, there have to be protections in place for people whose writing is worth something and who need to make money from it.

PG: Well, I think it’s very clear that there are two very different forms of publishing going on that have historically been considered the same because both are ink on paper. What that doesn’t take into account is that there will be an enormous shift that goes on in the Internet world, depending on the mission of the author. What we would call scholarly publishing is what Jim called subsidized, where writing is not in order to obtain direct remuneration for our efforts, but in order to get information out, in order to advance our careers. It’s being publicly funded. We have an obligation to make it available for free and, as scholars, unlike Jim, who can be paid for each eyeball that sees it, we’re almost ready to pay people to read what we write. Typically, our audience might be that small. And this is precisely the realm to which the Internet free distribution system is so ideally optimized. It is where we don’t need all of the intermediaries. We don’t want people using copyright against us as authors, whereas, as a commercial author, Jim actually wants it. He doesn’t want to have to develop the infrastructure himself to rent out any bootleg distribution. He wants some middle person to make sure everybody is paying, to make sure the ReCurng is there.

TG: Can the Internet accommodate both systems?

PG: Absolutely.

ST: I really think so. There are some mini-experiments going on where books are both published on the Internet and in print form, and it seems to be that the people want “the book” as well as access to the information on-line. One colleague, Kevin Kelly, actually did the experiment of putting on his home page his book. Out of
Control available in digital form. He has the following note: "If you are about to download this book, I have some information for you. I have already downloaded it and printed it and added four-color illustrations and bound it, and I can make it available to you." He gives a very discounted price and it is called a book. And, in fact, he says, "But if you would like to download it, here is how; and here is the most effective way." Many people just sort of laugh and say, I'd much rather save myself the trouble of doing all this work, clogging up my disk, claiming the time, and, yeah, I'll just make a copy of your book. I think that's the last thing you look at it is to say that the Internet is a perfect means for getting out an author's first ideas or works in progress or having the work there as a reference, much as it would be in a library, but that people will still want the book and will just want the author's presence and expertise.

**TG:** I think the Internet is really raising the question, what information is free and what information comes with a price? If you go to the library, the information there is free. You borrow the book, you read it in the library. That's okay. If you go to the bookstore or the newstand, the information comes with a price. On the Internet right now, most of the information is free, although more and more places are starting to charge a subscription type of fee for information. But to prepare for this panel I read your home pages. Most of you have free pages of one sort or another. Now, CableSherry, Zuckel and Jim Gleick. Both of you write books. You both have articles that I can download on-line, and, of course, I'm thinking "don't these guys want to publish this in anthologies and then force me to pay for it? Why are they giving it away now?" Because usually people who have a lot of articles put it together in an anthology, and you have to buy it in a book store. Tell me how you decide what information you want to give away and what you're going to charge for.

**PG:** I wouldn't want anyone to think that I'm not as worried as Jim is about his [copyright], but I also wouldn't want anyone to think that it's against the law for an individual to use a photocopy to make a copy of a journal article. That is a debatable question, but the law does not prohibit that and there is a doctrine known as "Fair Use." And it is a difficult doctrine and I'm sure that there's more that could be said about it, but I just wanted to say at least that much.

Secondly, when I imagine the Internet, I don't imagine that it's always going to be the same as it is today. And let me remind you that probably well over one out of every four people on the Internet remember an Internet before the Worldwide Web. This is a reflection of how long the Worldwide Web has been a happening thing, which is roughly two years, and how rapidly the Internet population is increasing. So, I'm saying the Internet continues to evolve at a rate such that we can provide you with the frequently, and I think the way it's changing between now and two years from now is precisely in the direction of providing much more satisfactory technical measures for protecting intellectual property through encryption and authentication. There is an entire industry forming up for which the rallying cry is that we can provide you with the publisher, you, the author, with technology to protect you in the coming war in cyberspace.

**TG:** What would protect Jim Gleick's home page from being copied by somebody else?

**PG:** It's very difficult to protect a home page, but that's the point I'm making. You shouldn't think the web is a kind of technology for protecting intellectual technical measures for protecting intellectual property. The big bang in cyberspace that contained the Internet, that enabled such things as we're talking about, happened between 1985 and 1987, barely ten years ago. The IBM PC was introduced to the commercial marketplace in 1982. So I'm just saying that if you look at a Worldwide Web and how we all use it, it's very difficult to protect. But if you was really concerned about that, he could protect it now. He could require every person who wanted access to certain parts of his Worldwide Web where the jewels were kept to register themselves with him. He would issue them a password and an I.D., and if they downloaded it, they could download it in what IBM calls a "cytophobe," which has a timer, and at the end of 60 days, the key that's stored there no longer works and it eats itself. These technologies are available now. They are not widely deployed because of the reasons we've explained.

People are involved in a rapid proof-of-concept period. And during the proof-of-concept period, people are pitting the knowledge they get from experimenting in this environment against the strategies they will use to make money later. And may I also speak up for the advertisers, some of which have been attracted by us for our home pages, but which are very active participants in this commercial end-user Internet right now. That's a different way of acquiring the funds to make the provision of certain kinds of opportunities available through advertising. So, again, I'll always speak up for the complexity of the case, and the Internet is a very complex place and will become more complex, thank goodness.

**TG:** Some of you actually have articles online, so tell me how you decide what you're going to give away and what you're going to charge for.

**PG:** I think that Sherry is being very polite, and I'll say again, if a professor photocopies five chapters of your book and distributes it to his class, that's against the law.

**TG:** What's Playing on the Celestial Jukebox?
for a minute. And I think those capabilities are well targeted and ahead of us. That threshold for doing non-text encounters on the Internet would get as low as the current threshold for text encounters, which is pretty low.

ST: I’d like us to move beyond the stage of being excited by the global possibilities of the Internet like, “Oh my God, there’s somebody in Australia who has my identical stamp collection,” you know, that kind of thrill of this global sense of connection. It’s more wiring up of our local communities. I live in a local community in Boston that’s less of a community or a neighborhood than kind of a physical place. I live in Back Bay, and it doesn’t have a community center particularly. It has lots of hotels and a Starbucks and doesn’t have a Cheers, and I’d like to have that neighborhood on-line so that I, who have a 5-year-old girl, could know who else is in that neighborhood has children of her age, insofar as they wanted to identify themselves and talk about their interests. In other words, really moving away from global models to the creating of virtual communities of the physical communities that we live in. And I’d like to keep talking about splitting the virtual and the real and start to talk about splitting the virtual and the physical to make a new “real” that integrates our local physical presences with our virtual presences.

JG: I think a huge barrier that has not yet fallen is a barrier that stands between public information and us. I’ve been talking about protecting information that belongs to us, but as citizens, we have all paid for a massive amount of extremely valuable information that is in the possession of the government. Everything from maps to photos from outer space to the full database of patents throughout history to financial filings before the Securities and Exchange Commission to birth certificate records at your local city hall to live proceedings from city council meetings. All of this stuff exists in some form or other, often in computer forms. Very little of it is available now on-line. I guess I want to reverse now everything I said about copyright. There are a lot of cases where this material is protected by private companies who have cataloged it or by government agencies who haven’t got a small budget to put it on-line. There’s a lot of valuable stuff there that belongs to us. It could give us the tools of knowledge if this material was made available.

TG: What are the odds of that?

JG: Oh, 100%. But you didn’t give me an end date.

TG: When do you think it would happen?

JG: It’s starting to happen and it will be happening at an accelerating pace over the next decade, I would guess. The old stuff will be the hardest of all. Stuff that’s not in computers and is on paper will take longest, of course.

TG: What would you like to say?

PG: I’m very much in agreement with this notion of localization. I’ve always been vexed by the fact that I have an Internet node right in my home and I can get up in the morning, have my coffee, find out what physics seminars are going on in Geneva, but I can’t find out what the road construction is about at the base of my driveway. There is a lot of public information, communication with public officials which people would prefer to suppress. It’s not in their interest to get a lot of public input on that, and so the localized information, I think, it will also come.

The other thing I’d like to see is something that is not as popular, but something that people would understand, which is an increased stratification to mirror the kind of isolation that we get for social and geographic reasons. For example, we’re sitting in this auditorium. We don’t have to worry about disruptions from people in the street, people from the exterior. We can have in our universe these research libraries, seminars, and some would have to worry about it. Right now there’s a misperception that everything on the Internet should be free, everything on the Internet should be wide open and anybody can do what they like with it. It’s connected to this notion of hacking, breaking into computers. Somebody would not dream of walking up to your house and throwing a brick through your window. That would somehow regard it as fine and nothing wrong with it to try to break into your computer and disrupt it, cause it to reboot itself. So there’s a certain mentality, a certain social decorum that is very well understood in the physical world that hasn’t yet made its way to the Internet. It sounds like a very unpopular notion, but ultimately we realize that a lot of these social and academic constructs are there for a very good reason and it’s just a misconception that the Internet should break all of those down and that would be a positive development.

TG: I’d like everybody to leave us with one concluding thought.

PP: Well, the thing that matters to me most is that we haven’t already talked about is reason and it’s just a misconception that the Internet is helping many people use experiences and relationships to really work through issues of concern to them, to have learning experiences and personal experiences that are really allowing them to both express and reflect on themselves. A lot of people think that we have moved from a psychoanalytical culture to a computer culture. You know, that “Farewell, dead, long live artificial intelligence.” Argument. But, I think that the people who make the most of their lives on the screen, the people who make the most of their experiences on the Internet, are the ones who approach these experiences in the spirit of self-reflection. I think that it’s time to see all participation in this computer culture and psychoanalytic, i.e., reflective, culture as a kind of joint citizenship, and I’m hoping that that is the way we will see these technologies in the future.

JG: A lot of the mystification about the Internet, I think, comes from the fact that we’ve applied a label to it, the Internet or the web or whatever, it isn’t really a thing. There’s no thing there. If you think in terms of a fundamental unit, the atom, or the coin, being one human being, one of the world’s five billion human beings talking to another, one connection, then really what we’re seeing—and what we’ve got to plan for and watch as it unfolds—is an unbeliavable, unprecedented explosion in the number of coins.
IN MEMORY
OF PAUL EVAN PETERS
1947-1996

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