The Next Hundred Years: An Internet Survey

By Julien Clinton Sprott

By any standard, the Internet and its currently popular manifestation, the World Wide Web, are radically changing the way information is exchanged. Whereas the printing press gave widespread access to information produced by a few, the Internet will soon give nearly everyone the ability to produce information and to disseminate it freely throughout the World. We can thus anticipate an enormous increase in the already overwhelming amount of available information. Without appropriate selection and evaluation, the quality of this information will decline as its quantity grows.

One way we can use the Internet to generate new information is through surveys. I will report here preliminary results of a survey posted on the World Wide Web in which I asked people to predict what the World would be like at the dawn of the twenty-second century. This study is hardly scientific because the responses were limited in number and depth and because the respondents were not a representative sample of society or even of Internet users. Nevertheless, it makes interesting reading, and it serves to illustrate how one can extract information from people on a global scale.

Since most educated people, especially readers of this book, will have Internet access in the very near future, I have included in this chapter links to Internet resources where you can obtain more detailed information. If and when this book becomes available in electronic form, it will thus already be hyperlinked to the appropriate sources.

Genesis of an idea

I owe the inspiration for this project to my imaginative colleague, Cliff Pickover, whose home page (http://sprott.physics.wisc.edu/pickover/home.htm) is on a World Wide Web server that I maintain in my office at the University of Wisconsin. Cliff is a Research Staff Member at the IBM T. J. Watson Research Center in Yorktown Heights, New York. He

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is also a prolific author of books on science, computers, mathematics, art, and science fiction. In October of 1996 he had the idea of requesting wishes from visitors to his home page. I helped him set up a form (http://sprott.physics.wisc.edu/pickover/wish.htm) for collecting these wishes and storing them in a file on my hard disk that he could access. The responses poured in, and within a few months he was approaching publishers with an idea for a book based on *The Wishing Project*.

Seeing how easily he accomplished this project, I shamelessly asked his permission to adapt the idea to the collection of future predictions. Thus *The Future Project* was born (http://sprott.physics.wisc.edu/future.htm). People were to imagine that like Rip Van Winkle they had just awoken from a long and sound sleep to discover that a hundred years had passed and it's the dawn of the twenty-second century. As they begin to explore this brave new world, they see that many things have changed -- technology, government, the environment, education, and the way people interact with one another and with their machines. I asked what they think will be the most interesting and surprising changes that will occur over the next hundred years. I provided a form for them to fill out, which in addition to their predictions, asked for their name or initials, e-mail address, city, state or country, gender, age, and occupation. I assured them that they would remain anonymous, identified at most by first names and last initials, and that I would not give their e-mail addresses to anyone.

One problem with posting something like this on the World Wide Web is that you have to advertise it. I did this by putting links to it from my home page (http://sprott.physics.wisc.edu/sprott.htm), which gets about a hundred accesses per week, and from my Fractal Gallery (http://sprott.physics.wisc.edu/fractals.htm), which gets about a thousand accesses per week. I also cross-linked it to *The Wishing Project*, which was getting about ten responses per week. I posted short announcements soliciting responses in about a dozen USENET newsgroups and listserver mailing lists dealing with the future, science fiction, society, technology, and culture. I also posted announcements in a few science and computer groups where I thought there would be people especially interested in the future. You can access on-line listings of newsgroups (http://www.liszt.com/news/) and publicly accessible mailing lists (http://www.NeoSoft.com/internet/paml/).

The idea of conducting a survey through the Internet is certainly not new. The Graphics, Visualization & Usability (GVU) Center at Georgia Tech's College of Computing has conducted extensive World Wide Web User Surveys (http://www.cc.gatech.edu/gvu/user_surveys/) twice a year since January of 1994. Anyone interested in information technology should read the Executive Summary of these surveys and the comments on the problems of conducting such surveys.

Summary of responses

During the period October of 1996 to March of 1997, I received 55 responses. This was considerably less than the approximate 250 responses that Pickover received during the same period for *The Wishing Project*. Apparently people find it easier or perhaps more fun to make a wish than to make a prediction. Maybe he was more successful in advertising his project, although anyone who visited one project was also apprised of the other by the cross-linking.

The responses ranged in length from a few words to a few pages. Some were very thoughtful; others were flippant. One person wrote a poem, and one provided the words to a song. The quotes that follow are excerpted from generally much longer responses, with only minor corrections in grammar and punctuation. The respondents' ages spanned an 11-year-old girl in Malaysia to a 75-year-old man in California. Respondents were about 70% male, in contrast to *The Wishing Project*, where the genders were more evenly divided. Perhaps men are more inclined to predict and women to wish. The geographical distribution mirrors the global distribution of Internet users, with about half from the United States. The United Kingdom (15%) and Canada (10%) were next most popular, and there were responses from Singapore, Germany, Russia, Malaysia, Brazil, Mexico, India, Australia, Israel, Italy, and New Zealand.

Hope and concern

Opinion is about equally divided on whether the future will be better than the present or worse. The prevailing sentiment is one of concern but hope. Many respondents worried about the problems currently confronting society such as crime, pollution, depletion of resources, political turmoil, and the social isolation of individuals. For example, Alan M., a 26-year-old unemployed MBA from Montreal, writes:

> "While I'd like to believe that the advances in technology will solve more problems than they create, I'm not so certain this will be the case. While it may be possible to navigate through the future without disaster, I think that we're going to face the most difficult problems in human history. One misplaced footstep in the coming century could easily spell disaster for mankind. This sounds rather bleak, but I believe it is the case. In the past, advances and societal change could usually be planned for and dealt with (despite the occasional revolution when change appeared too slowly for someone's liking). However, today the process of technological change far outpaces the ability of human beings to adapt to it. Our antiquated notions of

> government, law, and economy are being changed around us. This process is not going to slow and can only continue to accelerate. We are no longer guiding the course of human progress but are adapting to it as it happens."

Brad M., a 50-year-old Ph.D. in interpersonal communication and communication media theory from New York, is even more pessimistic:

> "I am not optimistic for the 21st Century, although resources (e.g., Habermas, Gregory Bateson, Husserlean Phenomenology, Gadamerean hermeneutics, Jacques Ellul, and many others) are available if those with the power to do something have any interest beyond capitalizing on junk bonds and cutting costs by cutting payrolls (and overworking those who aren't eliminated)."

By contrast, Jeremy G., a 38-year-old writer, artist and musician with a vital interest in spirituality and technology from the United Kingdom, was more optimistic:

> "I believe that we are on the cusp of remarkable transformations as a species. We will, in the near future, begin to access new dimensions on both the inner and outer planes, and have enhanced communication with other beings in the universe(s)."

Dean H., a 39-year-old systems programmer from Detroit, put it bluntly:

> "You have 2 choices -- a wasteland (possibly no life bigger than bacteria), or a paradise that is peopled by wise immortals who tell terrifying stories of the chaos of the mid-21st century."

Technological advances

People generally see continuing rapid technological development, although most did not attempt detailed predictions. Those who did either predicted relatively modest extrapolations of current technologies or somewhat fanciful new developments. Many respondents clearly had trouble thinking as far ahead as a hundred years, while others postulated developments that seem unlikely, given our present understanding of physical laws. Waldemar O., a 19-year-old astronomy student from Ontario said:

> "I think computers will be huge in the future. Space travel will become common, and people will be working on transporters (Star Trek). Physics will be taken to new levels of understanding, and we will see how strange but simple the universe is. Nature will get better with better technology, and maybe these things will happen if we don't nuke ourselves."

Mauricio C., a 25-year-old architecture student from Mexico, sees the century unfolding as follows:

> "By the early 2040's the new generations of Superhumans were being born, raising questions about its ethical value, and after much discussion it was ruled that any modification on the human race should not modify the human emotion. Therefore there could only be physical and neural improvements which didn't affect the human appearance and psyche. In the decade of the 2050's the Earth became completely unwired; all energy resources were obtained from the cosmos and distributed via satellite on microwaves, as well as all communications. By the 60's contact with extraterrestrials (now an obsolete word since humans also inhabit Mars and the Moon) was finally achieved, and an efficient method of communication was developed. The first expedition of humans in a non-human spaceship was sent as a diplomatic mission to another galaxy. In the 70's and 80's further developments in biology increased crop productivity more than 15,000%. Humans started considering the 'vitalization' of every non-gaseous planet in the Solar System. By the mid 80's an alliance was established with the extraterrestrials who became very interested in the agricultural technology in exchange for interstellar propulsion technology."

Brad M., the 50-year-old Ph.D. in interpersonal communication and communication media theory from New York, sees serious problems with the new technologies:

> "The dependence on ultra-complex technologies will need to be reduced, so that the breakdown of a computer system nobody can understand does not result in inability to provide basic necessities of life (e.g., food) to large numbers of people. The most likely scenario is probably (to use a post-modernist word) bricolage: most things falling apart in a haphazard way and some things being recombined in a jerry-built way which keep falling apart and

patched back together, with most people living in insecurity and probably at lower standards of living than the last 40 years."

Information and society

Not surprisingly, this sample of Internet users sees radical changes in information technology, with many societal implications. Alan M., the 26-year-old unemployed MBA from Montreal, predicts:

> "Virtual worlds will captivate many. Entertainment will become a driving force in many people's lives. Physical discomfort will be exchanged for 'windows into cyberspace.' While this may seem farfetched, this is already happening as many people choose to live in cramped quarters, yet spring for a 24-inch television set with stereo sound and a hi-fi VCR. As virtual worlds become more appealing than the physical, many will be drawn to live, work, and entertain themselves from within the attractive confines of cyberspace. While today's city inhabitants hardly know their immediate neighbors (unthinkable years ago), tomorrow's city inhabitants will hardly know the people they share the same house or apartment with. Those who can afford it will have access to more worldly experience through the eyes of cyberspace than anyone today can imagine. Tomorrow's non-conformists will be those people who embrace the physical world and choose to live within it."

Alan L., a 25-year-old senior computing officer from London, considers the way information and entertainment will be dispensed:

> "The development of better display technology and forthcoming network computing, coupled with ever-improving data communication into both the home and work place, will lead to the more-or-less inevitable integration of phone, voice-mail, email, Internet, WWW, TV, video, hi-fi, etc. This development will provide the necessary platform for true multi-media information systems. This mass integration of hardware into one consumer-friendly box will lead to the establishment, I hope, of concise standards for the required range of deliverable features. This will help ease the burden on the coming generation of multi-media engineers, because the standardization will enable them to concentrate on working with the information and not get caught up in the issues of binding the types of information onto the various types of

> proprietary dedicated hardware. This final abstraction of the information from the physical display and processing hardware will aid true portability of the information constructs and services that are created."

Patrish, a newspaper worker in Virginia, offers a jocular look at the future of newspapers:

> "I have to believe they will be around in their present form for years to come. Here's why: You can't clip out a computer TV show you like and stick it to your refrigerator with little magnets. Watching the computer screen makes you fat and lazy (this has been scientifically demonstrated). However, if you subscribe to a newspaper, you must, at the very least, step outside and get it off your porch. You can swat flies with a rolled up newspaper. Just try rolling up your computer. Your computer won't soak up spilled coffee nearly as well as the newspaper. You can take a few sheets of newsprint and fold it into a hat. Old-time printers knew how to do this, anyhow. To my regret, I never learned. You can buy one of those cute ads that say 'Be kind to Bernice; she's 40 today.' If there's a power failure you can't watch your computer by candlelight. Finally, when you get angry at something you read in the news, you can wad the paper in a ball and throw it. This will make you feel better."

S. Anand, a 22-year-old male software engineer from India, nicely captured the recurring theme that our interactions will be more virtual:

> "My aerial path is filled with advertisements of the 3-D kind -- stuff that I feel and smell as I pass through it. I like this perfume so much I'd like my girlfriend to look at it. I call her (not too loudly, though). She pops up, not physically, of course -- just an image. But I can't tell the difference. She smells it and approves of it. I nod at the ad, and the perfume pops into her hand. That reminds me: I've got to credit some goodwill into the bank. Maybe I'll give away my next dream free. I compose dreams. You might call me a director, but dreams aren't movies. You can't feel a movie within yourself. You can change the course of a dream. Many of my dreams are about feelings. I live in a 4'x4' cubicle. That's OK, because I'm actually in virtual space."

Ben J., a 19-year-old music and art lover from Australia, sees continued growth of the Internet:

> "Besides making faster computers, I hope they will start to experiment with brainwave-computer interactions -- if not controlling them, then recording them and playing them back. In the immediate future the Internet will go through the roof (even more so than it has already). It will probably replace TV, phones, the post, banking, etc., most of life really. Links carrying hundreds of megabytes per second will be running into every household in the civilized(?) world, thus giving us no reason to leave the house anymore."

An anonymous 21-year-old cyberculture hacker sees a more grim future of the Internet:

> "The future is an information war. When the Internet takes over the world, only the computer freaks can control how much the system knows about them; but the normal people will be manipulated, tracked, and monitored by the system. Maybe we fall into a dark era when violence is common and nobody is safe. We are not far from such a thing."

Nancy P., a 29-year-old teacher and photographer from London, also sees dangers in the information revolution:

> "In the western world, the separation of place of work from place of residence has fueled the dependency on gadgetry. But in order for technology to work in society it must be both necessary and socially acceptable. The danger of the Internet is that it's growing so quickly and it remains in the hands of those with economic power that society hasn't been able to test drive it to see if it works."

Since this survey coincided with the first successful cloning of a mammal, several respondents commented on the consequences. Scott G., a 31-year-old software designer from Tennessee, writes:

> "Cloning of human beings will take a frightening turn as the technology of cloning is now simple and foolproof. The secondary research into brain/thought duplication from one body to another becomes reality. The legal problems become nightmares as people constantly upgrade themselves to new or even different bodies. Individual rights and inheritance laws become moot as laws are constantly being rewritten. People can no longer distinguish

between a brain-transferred individual (full rights), a duplicate (questionable rights), or stolen material (goods or cattle). Black-market copies of brain patterns become the hot new slave-market trade. Clone rights of even those who are legitimate heirs are still a legal gray area. Therefore, within the 22nd century legalized slavery (cloning) becomes almost impossible to control or regulate due to the ease with which clones can be recreated from limited equipment and expertise."

James J., a 16-year-old computer hobbyist from Italy, adds:

> "Human society will lose its hierarchical structure, courtesy of many-to-many information distribution, of which the Internet is only the start. Genetics and biology in general will be the 'big science' of the 21st century, just as physics has been this century. I also expect some answers to the thorny question of conscience, courtesy of neuroscience, and the confirmation that, while brains are computers, computers are not brains!"

Other predictions

Respondents addressed a variety of other issues including the environment, government, business, the economy, education, and religion. Soo Ching L., a 26-year-old male information-service analyst from Singapore, says:

> "The globalisation of identity will result in the fusion of cultures. This will cause individuals, towns, states, and countries to exert their own identity even more intensely. Huge nations with multiple cultures like China, India, and even the USA will break up (albeit very likely to be bloody) into smaller entities. For all you know there will no longer be the concept of 'country', 'nation', etc. Individuals may exert their own identities to that extent."

Bob M., a 39-year-old systems manager from the United Kingdom, sees changes in the environment and economy:

> "The countryside reverted to a greener model, with small villages, hamlets and isolated homesteads connected electronically, and serviced by large, mostly automated depots which deliver goods ordered 'on line'. As the infrastructure of cities is no longer required, so the overall work load decreases, enabling

people to spend more time developing their own skills, as artists, or artisans, or by growing their own produce. A new economy based upon barter developed."

Matthias, a 31-year-old chemical engineer from Berlin, sees growth but diversity in religion:

"Different religious sects will become very attractive. There will be a large diversity of communities, individualistic beliefs, Christian sects, and others I cannot think of yet. Anyway, in the 21st century there will be a comeback of spirituality."

Alice K., a 36-year-old Internet junkie from Ohio, paints a bleak picture:

"The environment will be a mess. Everyone will have to wear hats and sunscreen in order to go outside because of damage to the ozone layer. Littering will be a felony, recycling mandatory. (We will finally have figured out the consequences of soiling our own nest.) The government will be pretty much the same as it is today. I don't think anything would happen in 100 years to change that. The economy will still be a disaster. Unless there is some threat to the planet that would unite the human race, I think there would still be fighting amongst groups of people. Basically I can't see anything short of alien invasion, the often-predicted end of the world, or nuclear war ending the strife that seems to be the hallmark of our race. It goes without saying that technology will be more advanced than can be imagined. I think there will be a whole subset of people who live in a virtual world. It will be a much more complete and total escape from reality than it is now. It will contribute to the isolation of individuals."

Karin G., a 49-year-old journalist from Australia, sees great changes and problems:

"Looking forward just one hundred years, we will find all present day trends taken to their extremes. Nations will fragment and reform along cultural and technological divides: some subsets will be pantheistic Luddites, while others will exist in hyperspace, insulated from raging violent hordes. Environmental and population excess will create 'no-go' areas, which the wealthy won't even fly over. Other pockets, deep within jungles or hidden in mountains, will protect themselves with purifying rituals and chemical-free products. The oil

crisis will have come and gone; cars will have evolved, and new, cleaner ways of using coal will be developed for those who can't access the technology for solar. Africa will be decimated, but Siberia will flourish as the peak of the greenhouse effect is reached. A new form of world governance will seek agreement on a few vital and strategic environmental or political issues. There will be no meetings, only video conferencing among this highly enlightened elite. At the other end of the spectrum, barbarian religious fanatics will ruthlessly oppress great masses."

Greg W., a 43-year-old system administrator from North Carolina, says:

> "The 'one-world state' is in place, and no cash exists -- nor are you limited by your 'wages'. Certain items are 'luxuries' and can only be obtained if you have excess credit, and you contribute one day a week to community service to earn the basic credit. Smart cards provide the identification and accounting functions. Education is a life-long process, after 'high school' (they don't call it that anymore); education is done in two-year increments, with practical experience in the year(s) between."

Troy L., a 23-year-old engineering student from Ohio, sees a violent future:

> "I think that in the few years following the end of the millennium there will be unprecedented changes in the world. Small countries fighting to gain control of limited natural resources will be using nuclear devices and chemical warfare. Any moderately backed terrorist will be able to obtain devices and products to kill thousands or even millions at the touch of a switch. The Gulf War and the Oklahoma City bombing will pale in comparison to the future destruction we will see on our TV screens. There will be a rise in random and serial killings, possibly due to generation X's hopeless and hypersensitively negative outlook on life."

K. R., a 35-year-old woman from Canada, sees the World at a juncture and says hopefully:

> "In the future I see a world of computer-generated commerce, and hope this would get rid of all the wars, hate and poverty. I see either peace or total destruction and rebirth. And maybe in the future we will have actually learned

to learn from the past, and not repeat some of the horrors we humans seem so good at repeating."

Closing thoughts

While I cannot claim any special abilities to predict the future beyond a training in physics and a long interest in technology and its consequences, I agree with many of the sentiments expressed by those who responded to the survey. I believe that electronic entertainment and the flow of information will dominate life in the next century. Many people will live much of their lives in physical isolation, even while the World becomes increasingly crowded. We will routinely don headgear that will expose us to a wide spectrum of sensory experiences. Most of these experiences will be mindless and passive entertainment, much as television is today, although displayed with such realism, that it will be hard to distinguish from reality. This assault of our senses will further deaden us to the consequences of our actions and make us even more accepting of violence and inhumanity.

On the other hand, improved world-wide communications will permit social and even sensual interactions uninhibited by physical separation. Easy availability of educational materials will enable the small minority who are so inclined to achieve unprecedented intellectual growth. This will further widen the gap between the educated and the uneducated, and as a consequence also the economic gap, since knowledge usually engenders wealth.

I am more skeptical about other technological advances. Progress in biotechnology and medicine will lead to the cure of many diseases, but there will be new strains to conquer, and immortality seems unlikely. Overpopulation will continue to deplete our resources and degrade the environment. Limited but vicious wars will continue to occur as people compete for the dwindling resources and struggle for survival.

After a lapse of thirty years since landing on the Moon with no return mission in sight, I can easily imagine that another hundred years could lapse before humans venture to the planets. Although the technology will exist, the cost is huge, and governments seem increasingly reluctant to fund such exploratory projects. I think we will find evidence of extraterrestrial intelligence during the next century, but I doubt that a meeting or even a conversation with them will occur during that time because of the large distances involved. Time travel, teleportation, faster-than-light travel, and anti-gravity machines seem even less likely since they violate our current understanding of physical laws.

Human nature will not radically change, but new technologies, especially information delivery and electronic entertainment, will alter our lives and the lives of our descendants in astounding ways. Our challenge is to harness these technologies and use them wisely to make the World a happier and more interesting place in which to live.