

Faith In The Future: Science, Technology, Culture & Coping

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Preamble

Before I get started, I owe you all an apology. The title of this lecture series was described to me, and I quote, as "Faith in the Future: the Sheridan A. Simon Distinguished Alumni Lectures." Given that title, I stand before you as a kind of "poster child" for deceptive advertising.

First: Although I do qualify as an "alumnus" (they actually call them, "former students" at the University of Texas -- where dead languages are less respected), I like to think that I'm not nearly old enough, nor well traveled enough, to be considered by anyone to be "distinguished." I have been told, however, that the combination of my gray hair and spare tire allow me to serve as a reasonable approximation.

Second: The term "Lecture" implies that I will be speaking with some kind of academic rigor. I am no academic. There will be no rhetorical footnotes to consider all the possible challenges to my assertions and the ramifications of my probably being wrong. No one should be taking notes. Remember, I come from Texas. In the land that produced Ross Perot, we're never short of opinions, whether or not they make sense to anybody else. Consequently, believe whatever I say at your own risk.

Introduction

When I was asked to speak tonight, my first response was to be floored. I was, and am truly honored. Sheridan has profoundly affected many of us in this room through his teaching and his friendship. To have the opportunity to sort of thank him here and now is a great privilege. But in all honesty, it's also a great burden. Just what the hell am I supposed to say? Face it: this is a scary talk to give.

After a little fretting, I settled into a theme that I believe best encompasses the contribution Sheridan made to my life, and really, to the lives of many of his friends here with us tonight. That theme arises from the rest of the title of this series: "Faith in the Future."

I started by asking myself: what does Sheridan believe about the future? As a teacher of science and math, as a writer of science fiction, I know that Sheridan has developed something of a picture of the future. As a veteran of many talks with Sheridan -- both in and out of many classes and (remember, I was a student in a different era) over many beers -- I have picked up a few clues as to Sheridan's opinions regarding these issues. One

important clue will direct me to the subject of my talk.

During my senior year, some outfit around here sponsored an "aspiring writers" series over in the library. In one meeting, Sheridan read a science fiction work-in-progress. He recently reminded me that its title was *Gift*. I won't recount the story here, but it was about people in difficult circumstances trying to deal with technology they didn't understand. In his story, the consequence of technology outside of his characters' comprehension was tragic.

I remembered a fascinating thing about the discussion that followed. Many of the aspiring writers who did not come from scientific or technical backgrounds argued from an interpretation of Sheridan's story that runs something like this:

Technology which advances faster than people is evil.

The relatively large number of physics majors, astronomy students, and other friends of Sheridan in the crowd (most of them were there to see what this whole different side of Sheridan was like) came to a different conclusion, which I will describe in the following way:

People not trying to understand the technology that drives their lives is dangerous.

These may appear to be subtle differences in interpretation, but they are not. These are two kinds of conclusions about how to cope in a world, like ours, where rapid, confusing scientific and technological change is the norm. Now, I believe that I know which of these interpretations Sheridan meant. But today, to you, and to Sheridan, I would like to talk about what I have come to believe about coping with scientific and technological change.

To accomplish my goal, I would like to establish, more or less, three observations -- premises really -- about scientific and technological progress in our world, and about cultural, personal, and political responses to that progress. Once I have sketched out my view of how this part of the world works, I will spend a few minutes talking about "coping strategies" in this world, and how my experience at Guilford helped shape those coping strategies for me.

Consequently, the title of my talk is "Faith in the Future: Science, Technology, Culture, and Coping."

Scientific & Technological Progress

When I started at Guilford in September 1978, the hottest lecture ticket around here was Sheridan's talk on the cosmos, featuring Black Holes. (Hell, for all I know, it still is.) Black Holes were an exotic, confusing, strange, even singular subject matter. Almost

exactly ten years later, in 1988, a Cambridge physicist by the name of Stephen Hawking, published a book about, among other things the cosmos and Black Holes. You have probably heard of Stephen Hawking; his book, *A Brief History of Time*, sat on the bestsellers list for almost two years.

In the ten years between my freshman jitters and the publication of *A Brief History of Time*, not only did astrophysicists come to understand a lot more about the universe than they had before, but so did the average person. Or, at very least, we had the book on our shelves. Except, that is, for those of use who, taking clichs seriously, waited for the movie, which came out last year.

Stephen Hawking an his work reflect a process that increasingly characterizes our life. It is the first, and easiest of the premises I present for your consideration, and I'll phrase it like this:

*Rapid scientific and technological progress
is characteristic of our civilization*

The easiest way to consider the truth of this premise is to consider a few changes we have seen in the relatively short time between my being a student at Guilford, and my becoming the rough approximation of a "distinguished alumnus" you see before you.

In 1982, when I graduated from Guilford, the computational life of the school was pretty much centered in a machine called a PDP-11. (I have no idea who made it -- it was a spiritual entity to me that existed on some different plane.) This computer kept all the records of the school, allowed physics and mathematics students to write and run long, complicated programs, permitted interested students to play early computerized adventure games late into the night, and gave at least one political science student access to a "text editor" to write a paper for an independent study. (Many of you are here, and you know who you are.) The PDP-11 was slow, cumbersome, and required a lot of translation from the way we humans think to the way it worked.

Meanwhile, someone, somewhere out there was thinking about how to change this relationship between people and computers. Some of us worried that this kind of thinking was directed at changing people to meet the needs of machines. Of course, these worry-worts have been proven entirely correct, but in ways they never imagined. The way we got there was by changing the machine first, to sort of meet us halfway. Someone, somewhere out there was developing the PC; the "personal computer."

Last week I typed out this talk on the PC sitting on my desk at home. My PC is significantly faster, more powerful, and easier to use than the PDP-11. This is common, many of you are in the same boat.. Interestingly enough, my PC devotes much of its additional power not to computing faster, but to making me happier with about dealing with it. And, with me happier about dealing with it, I can do more; write more; calculate more; develop more persuasive presentations; communicate better. Life, today, is unthinkable for me without my PC. It is an important, fundamental extension of my ability to communicate.

I'm not alone. PC's have become big business over the last decade or so. Almost everyone growing up today is, to some extent, computer-literate. For example, Stephen Hawking lives with an extremely advanced stage of Lou Gehrig's disease. His writing, his speech, and even his breathing are produced laboriously using state-of-the-art PC and medical technology. Without computers, Hawking would have no voice. And I would have less of one.

When I walk the campus here, I see new pavement everywhere. (You probably didn't even notice it.) And although I may miss the slate paving of my memories, I can't miss the signs everywhere of the communications lines of networked PC's -- lines of communication criss-crossing the campus. Increasingly, we see them criss-cross the nation, and the world. But can they pull us together?

Computer technology is not the only area of advance. In the summer before my senior year at Guilford, I worked on a loading-dock. A good friend, and significantly better physics student, Jennifer Kuhn, went to New York to work at Columbia University on a special project. At Columbia, they were adapting a national weather-predicting program to see if they could model the effects of a large meteor hitting the prehistoric earth. (Think about the problem: with no mountains, what stops winds?) The project was testing a then-new, and now generally accepted theory of the destruction of those huge, slow-moving, reptilian, cold blooded creatures that got to rule the earth before us, the dinosaurs.

Of course, any moderately coherent four year old today will be happy to inform you that dinosaurs could hardly have been classified as what we would call "cold-blooded." Many dinosaurs probably moved very quickly; behaving more like birds than reptiles. The evidence seems to be there in fossilized bones, in tracks, and in scientific deduction. Few of us would have suspected back then, but new insights changed re-animated old science. The debate continues today.

Equally compelling is another by-product of the kind of work Jennifer was doing. In the early eighties, I took Guilford's forth semester of calculus from Sheridan and Elwood Parker. (I believe Sheridan's teaching that class this semester as well.) One of the features of the class at the time was the solution of differential equations by computer.

Solving differential equations by computer was a pretty serious advance in mathematics. Historically, only relatively simple classes of differential equations could be solved because of their complexity. Computers, slavishly churning through minute mathematical steps, allow for more complex differential equations to be solved. These solutions are not what we called elegant, but they do provide insight into more complex problems.

Why should we care? For those of you not schooled in differential equations, they provide very good mathematical models of a variety of processes we care a lot about. (In graduate school, for example, we used a simple differential equation to model the effects

of harvesting levels on the worldwide whale population.) I was a disaster at this kind of computer programming, as Sheridan can personally attest. My results almost never made sense; because I wasn't very good at it.

But at the same time, much smarter folks were worried about their results not making sense, either -- with problems no more difficult than the ones I was trying to solve.

Weather forecasting makes use of differential equations solved by computer. In fact, the development of computer models like the one Jennifer was using was, really, the only way to begin to consider the complicated differential equations needed to predict weather patterns accurately. By the time I entered Guilford, mathematicians realized that these complicated differential equations didn't behave very well. And the reason was not the same as the reason for my disastrous efforts -- the computer models were working fine. Some of the results just seemed unpredictable: unpredictable but somehow, oddly, patterned.

Struggling with these differential equations, mathematicians started down a new path of thinking -- now called Chaos Theory. Chaos Theory is a scientific insight into turbulence; into things in life that do not appear to behave all that predictably. It represents a kind of new science -- more than a new theory but less than the hype it receives. Adherents have tried to apply it to physical phenomena, biology, and even stock market pricing behavior. Whether all this works or not, it is striking to consider that Chaos is a new science based *almost totally* on the expanded computational powers of computers.

So what does this all mean? Why can't I just ignore all of this popular science stuff and get on with my life?

Scientific and technological advance is about information, communication, and understanding. As a businessman I could argue that dinosaurs, chaos, cloning, computers have nothing to do with, in my case, drilling natural gas and oil wells. But that's not true.

In the competitive field of exploration and production of oil and gas, technological advance is one of the most compelling economic factors my company faces. Last year, the National Petroleum Council reported that

"[d]uring the past two decades, technology advancement has acted to reduce drilling costs by almost 3 percent per year below what they would have been in the absence of technology advancement. The rate appeared to be accelerating with more effect in the 1980s than the 1970s. This rate is expected to continue to accelerate. . .

This is why national energy prices don't seem to rise much these days. This is why new nuclear power plants make no economic sense anymore. And while this is good news for many of us, this fact of technological advance has profound strategic implications for me and my business, and for you and your future.

Daniel Boorstin, the former Librarian of Congress and, in my opinion, one of the most perceptive historians to write about American history and technology explains, in an essay titled "The Republic of Technology and the Limits of Prophecy," that

Nothing can be uninvented. . . . While any device can be made obsolete, no device can be forgotten, or erased from the arsenal of technology. While the currents of politics and of culture can be stopped, deflected, or even reversed, technology is irreversible . . . Our inability to uninvent will prove ever more troublesome as our technology proliferates and refines more and more unimagined, seemingly irrelevant wants. Driven by "needs" for the unnecessary, we remain impotent to conjure the needs away. . . . We live, and will live, in a world of increasingly involuntary commitments.

Cultural "Progress"

If this were a little different crowd, I might try an experiment here. In any random collection of owners of a copy of Stephen Hawking's *A Brief History of Time*, I would expect maybe one or two percent to be able to do a reasonable job of summarizing Stephen Hawking's description of, say, Black Holes. (There are too many physicists in the room for the test to work properly) This is tough stuff to understand. And yet, in 1990, Stephen Hawking was interviewed in *Playboy* magazine. In 1993 he appeared in a cameo role in the season's final episode of *Star Trek: The Next Generation*. Stephen Hawking, incapable of speech, and even breath without substantial technological help, is today a cultural icon, recognizable world-wide because of a pretty dense book about science.

Which brings up an interesting point, and my second premise:

*Our culture is very fast and efficient
at assimilating scientific and technological change.*

The scientist-as-pop-icon is just one form of this phenomenon -- and a relatively benign one at that. While we may not always like what we see, our culture is tirelessly digesting the relentless development of technology. We live in Boorstin's "world of increasingly involuntary commitments."

When planetary probes disappear, David Letterman jokes about it. When drug dealers in New York make increasingly efficient use of touch-tone phones to complete their deals, officials try, futilely, to slow them down by putting rotary dials back on pay phones. Think about it. Most of the kids born over the last five years will never know what a record player is.

As the science and technology changes, so does the culture. Consequently, we should be able to find the most obvious, and compelling evidence of this change is in our public

mythology -- and the most obvious and compelling form of our public mythology today is popular film.

In May, 1977, a year before I started at Guilford, a young film director by the name of George Lucas released a movie most all of us have seen: *Star Wars*. After almost a decade of neglect, Lucas was tying brand new, big budget special effects to a fairly straightforward story about "saving the princess and defeating evil in the universe." It blew me away, and I was not alone.

Lucas's film was crammed with literally 10 times the number of discrete special effects as its biggest budget predecessor, *2001: A Space Odyssey*. (Someone actually counted.) And, like it or not, *Star Wars* represented a kind of cultural breakthrough for the time -- a turning-point of culture and technology that would change both the visual and financial dictates of movie making forever.

For his story, Lucas borrowed heavily from several readily available cultural sources. He has acknowledged the debt owed to the Joseph Campbell book, *The Hero With a Thousand Faces*. Campbell's book, first published in 1949, became a kind of definitive popular discussion of our mythical past -- a consideration of the heroic figure finding his or her way through the world to find, at least in the western context Lucas borrows, a proper and fulfilling role. Lucas was also borrowing heavily from earlier science fiction series, and even the westerns that preceded them. And Lucas steals scene after scene from the marvelous 1958 film by Akira Kurosawa, *The Hidden Fortress*.

Star Wars reflects much of its late '70s and that time's appreciation of science and technology. The science itself was not so good. Lucas has his space ships swoosh their way through banked turns. (The physics students here should be able to explain how "swooshing" and "banked turns" are simply two evocations of the same thing -- neither of which is likely in space. There will, however, be no quiz.) So, even if the science was a bit sloppy, the cultural placement of technology was engaging and acceptable to an audience mesmerized by special effects and appealed-to by the familiar outline of a very old plot.

After a year, *Star Wars* was the highest grossing film in history, to that time.

Today, *Star Wars* shows its age pretty badly. The special effects that were so special in 1977 have been eclipsed again and again, mainly by a company spun off from the whole *Star Wars* effort. Industrial Light and Magic has become George Lucas' greatest money-making asset, and it's a rare special effect that's not developed there, and that doesn't look more convincing than anything in *Star Wars*.

And, in all honesty, the story is no longer as appealing. Hell, saving the princess and defeating universal evil constitutes a relatively uninspiring afternoon's entertainment on the typical kid's Nintendo or Sega set. The explosion of communications and data processing gives almost any red-blooded American child (or adult) the ability to pretend he or she is almost anyone, starting with Luke Skywalker if you want. I'm not kidding.

Nintendo was a gleam in some engineer's eye when *Star Wars* was made. By early 1991, it was estimated that Nintendo had established a "household penetration" of 30 percent in the United States -- 27 million units were sold in the 5 years starting in 1985. Sales of video games in the US are expected to reach \$6.9 billion in 1994. Today, we have begun to consider rating these games, like movies, to protect children from the increasingly bloodthirsty nature of the games. (And, by the way, I'm sorry but the term is no longer "pretend," now we use the phrase "exploring virtual reality.")

In a decade, Nintendo sets went from nowhere to sitting in 30 percent of our households. By contrast, the first recorded mention of a fork used in dining was Venice in the eleventh century. The second was in Florence in the fourteenth century. In the early seventeenth century, one writer was still able to make fun of the French court for using forks to move their food from plate to mouth. In a world of speed-of-light communication, it becomes hard to distinguish innovations from fads.

But, what sells to movie-goers today? In 1993, George Lucas' sometime collaborator, and cultural fellow-traveler Steven Spielberg, released his film, *Jurassic Park*. Don't tell me you haven't seen it. By the end of 1993, *Jurassic Park*, based on the best-selling book by Michael Crichton, had grossed some \$340 million in US theaters alone; well on its way to becoming the highest grossing film in history. Perhaps surprisingly, banal as it may seem, I believe that *Jurassic Park*, ultimately a story about nature and technology, reflects a pretty clear statement about our culture.

Crichton's *Jurassic Park* is about a crazed industrialist using the newest computer technology and advances in cloning to make real dinosaurs which he plans to show off in the "theme-park" that gives the book its title. Much of the appeal of the book comes from Crichton's active application of the most recent theories regarding dinosaur behavior. Much of the appeal of the movie comes from Spielberg's active use of Lucas' Industrial Light and Magic (reputedly \$25 million worth) to depict realistic dinosaur behavior.

For Crichton, *Jurassic Park* represents a concrete attempt by human beings to apply technology far beyond their ability to understand natural processes. The computers and cloning technologies used both create the Park, and are to control it. Crichton then uses a character developed to be conversant in Chaos Theory (and based on an actual Chaos mathematician) to speak, in effect, for the natural forces that he will use to kick some butt in this action story. Crichton's grasp of Chaos Theory is not so strong. But somehow, we do recognize what his character represents: a human voice for the terrific natural forces straining in his story at technological control -- the dinosaurs themselves.

Spielberg is even less concerned about the science -- he's in this for the butt-kicking alone. He makes minimal use of the limitations-of-computers theme Crichton develops, and raises Chaos to an even more ridiculously metaphysical level.

But together, Crichton and Spielberg are borrowing the newest science, the newest technology, and weaving them into something like a public mythology for the 90's. Notice, however, that Campbell is almost gone here. Characters behave heroically at

times, but the heroes in *Jurassic Park* are not the people, the hero -- flawed like the classical tragic hero we've known since the time of the Greeks -- is the technology.

Instead of Campbell and his *Hero With a thousand Faces*, *Jurassic Park* owes its coherence as a story, recognized or not, more to Camille Paglia and her book, *Sexual Personae*. Paglia, the bad girl of western cultural interpretation and the sworn foe of feminists everywhere, argues that western culture and science are the rational human mind's delusional reaction to its (reasonable) fear of nature. In the second paragraph of *Sexual Personae* (the first chapter is a tour-de-force of the most controversial possible intellectual scholarship) Paglia writes:

Society is an artificial construction, a defense against nature's power. Without society, we would be storm-tossed on the barbarous sea that is nature. Society is a system of inherited forms reducing our humiliating passivity to nature. We may alter these forms, slowly or suddenly, but no change in society will change nature. Human beings are not nature's favorites. We are merely one of a multitude of species upon which nature indiscriminately exerts its force. Nature has a master agenda we can only dimly know.

Jurassic Park, consistent with Paglia's description of the creation of western art and culture, is exploring the tenuous and ultimately futile notion that we are separate from, and can control, nature. You may not buy her elaboration of this theme, but it certainly helps explain the story that, so far, tries hardest to incorporate the mishmash of scientific and technological change of the last decade into a mythology we will buy, or at least pay for.

The Human Reaction

Jonathan Malino and I worked out my arrangements for this lecture entirely by sending messages -- letters really -- through something called the Internet. The Internet has been best described as "a network of computer networks" It links government agencies, academics, researchers, and subscribers to on-line service providers like CompuServe to one another through our individual computers.

Coincidentally, last November 14, in the Sunday morning edition of the *Dallas Morning News*, a kind of quirky news story about the Internet caught my eye. I'd like to read you some of it:

Gregory N. Steshenko is not sure freedom of expression will survive the digital age in the Western World.

Twice in the past five months authorities in the United States have pulled the plug on his comments on Ukrainian and Russian politics that he has posted on the Internet, a network of computer networks that spans the globe.

In June he was fired from Microsoft Corp. after the big supplier of personal computer software fielded dozens of complaints that his messages were offensive and even obscene.

In October, he was disconnected again from the Internet by the University of Texas at Dallas, where he is a graduate student in electrical engineering.

The university withdrew his privileges after a barrage of complaints, saying his electronic messages strayed from any possible educational purposes. Mr. Steshenko has countered with a lawsuit that seeks \$2 million for damage to his career.

I'm sure that the University of Texas at Dallas was really happy to see this in the paper. The article goes on:

To Mr. Steshenko, saying what he pleases on an electronic network that now reaches an estimated 20 million users is a matter of pursuing and protecting his First Amendment rights. Like other migrants from Eastern Europe, he is fiercely protective of his new-found ability to openly say what's on his mind.

"I am trying to live in a normal democratic society," said Mr. Steshenko, a native of Ukraine who was deported, he says, for political reasons in 1986. "I didn't leave Russia to live in another totalitarian state."

And what exactly has Mr. Steshenko been writing to upset everyone on the Internet so much?

In his postings on Internet mailing lists, Mr. Steshenko makes liberal use of terms such as "hohol," which many Ukrainians regard as a racial epithet; has compared the official Ukrainian national symbol, the trident, to a sexual device; and has implied a homosexual relationship between Russian President Boris Yeltsin and Ukraine President Leonid Kravshuk.

If this isn't enough, the article goes on to point out that:

Mr. Steshenko . . . retaliates against (what he calls) "denunciators." He has sent copies of what he says are personal attacks by on-line adversaries to the chief executive officers of their employees . . .

These "denunciators" are not very happy about Mr. Steshenko and his approach to free speech. The article quotes one as saying:

"I can take a lot in stride, but if someone sends a posting to the CEO . . . (threatening) a lawsuit about me calling (him) a fool and it has implications with my position here at the company, then I'm going to get a little bit upset."

Finally, the article pointed out, perhaps unnecessarily, that:

. . . Mr. Steshenko says he feels there are few bounds to how or when he should be able to exploit his freedom to express himself.

Gregory Steshenko feels that he has a right to say anything he wants through one of the fastest growing technological innovations in communications in the world. (Hell, the Vice President staged an on-line press conference last week through CompuServe.) Mr. Steshenko has been handed an unprecedented ability to communicate with others; an

ability he uses to hurl invective and threaten the job security of those he disagrees with. How do we feel about this?

Mr. Steshenko's experience points up my third premise:

Scientific and technological progress increases our ability to do things, but does not increase our capacity to discern right from wrong, and act for the good.

Intellectually, this premise is the most controversial of the three I have tried to assert. And, yet, it is a familiar problem for us.

Sheridan's story, *Gift*, used the annihilation of the earth with nuclear weapons to set up its premise. This was a familiar and compelling Cold War image. The western world's best scientists rushed, in the forties, to develop weaponry before the clear and common enemy of the age could develop it. Once invented, as Boorstin points out is inevitable, nuclear weapons could not be "uninvented." In the '50s and '60s we began to suspect that we had created something we did not have the moral capacity to manage. We were right, and the scope of destruction we were forced to contemplate was appalling.

Today we face a world that may (possibly) be less dangerous, but that certainly is much more confusing. The Cold War is over. I crossed its most coherent symbol, the Berlin Wall, in a trip to East Germany as a Guilford Student in 1980. Today a small fragment of that wall sits on my desk, a lump of concrete with one face spray-painted in a day-glo pink. Kids born in the last five years will find the Berlin Wall a footnote at the end of their history text -- the part that many will never get to because they will run out of time in their school year.

Presidents Clinton and Yeltsin have agreed to point our warheads toward the open sea instead of at each other. Who knows, Mr. Yeltsin's reputed sexual partner, President Kravshuk may be able to live up to his promise to destroy the former Soviet warheads in Ukraine? The technological revolutions we have been considering may be enough to bring us all together in the absence of that hoaried old bogeyman, "mutually assured destruction."

And yet, when Yugoslavia freed itself of its Soviet yoke, nationalism repressed for decades erupted fresh. Have we become so jaded, so inured to violence and war that we can ignore the chilling echoes of history in the news of fresh gunfire in Sarajevo? The First World War wasn't that long ago. And how can we use our new capacity for technology to help those caught -- and caught up in tribal violence in Somalia? Or, for that matter, in gang violence arising from depravation and despair in our own cities?

Gregory Steshenko comes from a place where divisive nationalist tendencies have been suppressed for decades. The anger and frustration of the impossibility of raising, much less compromising about issues close to everyday life creates rage. No matter how completely smothered, that rage will smolder. And for Mr. Steshenko, a free man, that rage has a right to be expressed through the most powerful of voices available.

The problem is not that Mr. Steshenko has an opinion, or that he professes it aggressively. It is that he has no manners. I'm not arguing this to belittle him, or to belittle manners for that matter. Culturally developed standards of behavior are important in a society without coercive rules about how to live. "Rights" are heady things, and in life, real rights are seldom found without corresponding responsibilities. Perhaps Mr. Steshenko will develop the manners we in the US choose to use in public discourse -- in his personal interactions or through E-mail. Perhaps not.

Still, we mustn't presume that these problems are not our own. Mr. Steshenko is not so much different from us as he is the same. Human beings making choices that lead to pain and suffering are part of our world, and part of ourselves. We all have repressed dinosaurs rumbling below the surface somewhere, looking for ways to sneak out and kick butt. Our technologically aided capacity to do good is matched -- and exactly matched -- only by our technologically aided capacity to do evil.

Coping With Science and Technology

So this is the challenge: how do we cope in a world where human beings can do more and more with technology, but can't really get better than they ever were? I think that the best way to answer this question is to propose three coping strategies for life in the '90s.

First: Keep up with science and technology as well as you can. OK, so you may not be comfortable with mathematics. You may have been squirming when I was talking about differential equations. Who cares? Cultural adaptation has resulted in a large, sophisticated, profitable business sector associated with explaining science and technology to people who are not equipped to handle the details. The Dallas paper reserves a section a week to discuss some aspect of science in detail. Popular books are available to discuss scientific issues -- remember *A Brief History of Time*? Use the tools available to keep up.

Second: Don't confuse progress in ethics or morality with progress in science and technology. Science, ultimately, is a discipline of description rather than explanation. It gives us "how"s instead of "why"s. Technology makes use of those "how"s. The "why"s remain.

Our understanding of earthquakes has developed significantly in the past few years -- though we still can't predict them and we still can't build structures to withstand them. Still, our experience with explosive technological and scientific progress over the past few hundred years keeps convincing us that we can apply this success to normative behavioral issues. We can't, and we generally just hurt ourselves when we try. After the earth shakes, with the water and power off, as the sun goes down, you can hear the sound of the dinosaurs on the wind -- trying to break free and kick butt.

Third: Laugh a hell of a lot. Find humor in as much as you can. Humor is the best,

and maybe the only way to deal with the unexpected. And life in a culture of technological change is made up of almost nothing but the unexpected. Our capacity for laughter may hold the best hope for the future.

When I was pulling together my thoughts for this talk, I spoke with my sister, a former student of Guilford as well. Susan remembered bumping into Sheridan at a study break before the most dreaded exam of her entire life, in Sheridan's Astronomy class. Susan was feeling intimidated. Why, she demanded of Sheridan, why should she even be studying astronomy? What did it have to do with human beings? What did it have to do with her life?

She remembers Sheridan answering by speaking of the estimated number of stars; of the number of stars likely to have planets; and of the number of stars with planets likely to have atmospheres hospitable to life that might be like us. With that much opportunity for fellow life in the universe, and places to see, and things to do, how could Susan remain so uninterested in astronomy? How could she ignore the universe around her.

This answer was enough. No, really, this answer was magic. I seem to remember she did quite respectably in the exam. More importantly, she found she was able to better handle her fears about the accessibility of science and technology, and by extension, nature. Our friend, Camille Paglia would point out that this effect on Susan was delusional. But she would also point out that this delusion is the very same that has inspired western culture and science from its beginning. And in its wake, created marvelous things.

And so I find that I, too -- even after the conundrum I see facing our world -- I too have faith in the future. That faith rises from the desperate need we share as human beings to make a mark on the universe, whether that mark be in science, or culture, or art, or politics, or building, or business, or whatever. That need for action can turn into a kind of progress. Don't get me wrong -- our technological comforts have given us the ability to develop through a freedom of expression of personality unparalleled in our history. Boorstin's "world of increasingly involuntary commitments" is also a world of increasingly potent options. Developing the wisdom to use those options with the "good" in mind; with our fallibility in mind as well; and minding our manners all the while; and laughing our asses off at every chance; becomes the highest goal of the best life.

Finding that wisdom is tough. And reaching that goal requires that the few of us who hold the magic Sheridan used on Susan open up the world to others as well. In saying this, I speak to the teachers out there. You faculty members may be among these teachers, but the lessons of life come from many more places than colleges and universities. We all have the obligation to teach others by the way we lead our lives. This is true no matter what freedoms we enjoy.

Strangely, I find that I have to give the final word to Gregory Steshenko. Admittedly, he was working hard to bolster his \$2 million lawsuit, but his point was on target when he said "It is not the purpose of a university to teach just a narrow field," "It is to give you

the broad knowledge of the world."

Thank you, Sheridan, for the broad knowledge of the world.