

Coming, ready or not: The world we are leaving future generations, and our responsibility towards them

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Those of us born and influential in the 20th century have lived, or responded to the lives of others, in such a way that we are leaving the future generations who will be born and live in the 21st century a world so different from our own--even more different than our century was from the 19th and all previous centuries--that, unless we are willing to devote far more intellectual and financial resources to studying the future than most of us have so far, it is almost literally impossible for many of us to imagine accurately what the world of the future will be like for those who will have to live in it. Because of this failure of imagination, it is not strange that so many of us not only can not feel the sense of obligation towards the future that I believe we should, but also that they do not have the will to carry out that obligation more empathetically and effectively, even if they felt they should.

Of course, having to be concerned about the world of the future in this manner is very new for humans. For eons, people did not worry, and did not have to worry, much about their responsibilities towards future generations. Most cultures encouraged people instead to be aware of their duties towards their ancestors. If they but revered the past and followed meticulously the ways of the generations who lived before them; and if they taught their children well, and showed them, by the example their own lives, how to live as they had also been shown to live by all of those who had gone before them, then everything would certainly be as good for future generations as they could possibly be, or as anyone should reasonably expect it to be.

But, for better or for worse, the world has been, for the past two hundred years or so, officially under the thrall of the concept of "progress" and "development": that very abnormal belief that we know how to make our world better than was that of our ancestors, while the world of our children will be ever better than our own.

In a sense, then, believing in progress and striving for development also meant that we did not need to worry too much about future generations. If we did our bit now faithfully to follow the path towards development--if we hired the right international advisors, followed the latest United Nations proclamations on the subject, appointed the best Oxford or Harvard educated natives to be Ministers of Development; if we created institutions like those of the fabled Advanced Countries, enacted whatever theory of industry, trade, and finance was fashionable at the moment, sent our children to the proper schools; and if we invited the right people to our international conferences on development--then we too could ascend the steep strong slope towards development knowing without fear that, with every step forward, we would be building a better world for ourselves, as well as offering the opportunity of an even better one to our children.

But now, all of that is changed--or at least challenged. There are more and more voices warning us of unimaginable dangers and frightful catastrophes ahead. Most of these voices are coming from on high--from some of the people who are already sitting on the lofty peaks to which we aspire. At the same time, others still, also on the top, disparage these naysayers and continue to urge us ever onward and upward.

Indeed, at the present time, the world of the future seems to be divided into four camps:

First of all, there are those who continue to tell us to strive towards development without further thought or concern save that of what might happen to us if we were to pause for a while, and others were to move forward on the development path, and indeed push us farther back down.

Then there are those warning voices of which I spoke, by no means as numerous as the first group, but certainly even more shrill. Many of the people in this second group also tell us how precious was the world which we have been attempting to leave behind us. Return, restore, recover the old ways, they urge us. Consider the balance that once was ours; the sense of place; the environmental and interpersonal serenity--all almost lost, but all recoverable if we stop now, and go back; if we return and restore.

But there is a third group--perhaps mainly an offshoot of this second, which says, in effect: Woe is us. All is lost. The end is at hand. Prepare to meet your Maker. And it is our hubris, our false belief in the possibility of true human progress, and indeed of human progress, that is to blame. Now, we will all be punished for our sins of believing in and striving towards continual progress and development.

There is, of course, a fourth group--a huge, enormous, and rapidly growing fourth group of humanity--for whom the future is an empty concept. For the millions--if not billions--of people in this fourth group, there is only today--the next minute; the next few hours at the most. Simply living in the present takes all of the effort one can possibly muster. To survive is to live as well as one possibly can. To take heed of the morrow is impossible; a waste of time which no one has to waste.

My sympathies and respect are with all four perspectives. There is good evidence to support each position. But I must admit, I am much less respectful for or sympathetic of the first--of the old development gang, or even of much of the new gang (say, for example, the World Bank with its newly-greenish, happy face) which does accept and appear to be willing to address some of the fears, or at least some of the rhetoric, of the second and third groups; those who now may speak of sustainable development, but of development nonetheless.

But if I must choose between the four alone, then I must admit a bias for the third group--for those who warn of unprecedented, and wholly man-made calamities ahead.

In my judgment, however much I and others may wish it to the contrary, the world cannot sustain development of the type it has known for the past fifty to one hundred years. Indeed, a plausible case can be made in my judgment also that the world cannot even sustain much longer the kind of development it has known for the past two hundred, or perhaps 10,000, years.

We human beings may yet show ourselves to be one of Mother Nature's many experiments which simply did not turn out. It has been said, by some, that humans, far from being the crown of divine creation, are rather a kind of cancer on our Mother's voluptuous body.

Well, if we humans cannot find a way to survive the 21st century--and I will show you in a few paragraphs why I am not sure we can--then those harsher judgments about humanity will in fact turn out to have been accurate.

I also regrettably do not believe either that there was so much value and virtue in past societies that we should try to return to them, or that we have the time and ability to return to them, even if we were to try, or if they are, in some important way, superior to the present or any truly sustainable future.

Although I treasure and revere the wisdom of the past as much as anyone; and while I relish in bemoaning the excesses and apostasies of the young, I do not see that any one tradition, or all of them together, or the essence of each distilled into one mighty ecumene--has the answer. Nothing from the past is enough to guide us all clearly and surely into the future before us now.

As some one said, we are all aborigines in a new land. We are all in the process of irreversibly going where no one has ever gone before. While we need all the wisdom and grace and knowledge and cunning that we can possibly acquire from the best of past and present sources, I still think it will not be enough, because of the novelty, rapidity, and multiplicity of the challenges we are laying, unwittingly and irresponsibly, at the feet of future generations

Let me briefly say what it is about the future which makes me feel this way. I will simply remind you all of things you know very well--which probably were stated in all the previous papers at this conference. At least I certainly hope they were, and that no one will take the following to be new--or, worse yet as, false--information. I intend it only as a reminder. And I will be speaking of the world as a whole, with a few comments about some regional variations. I will not speak about the specific situation in Malaysia at all before so many people who are experts on all aspects of this place.

First, some words about **global population growth and distribution**.

I remember my grandfather very well. When I was young, he was for a few short years a very important person in my life. It seems like only yesterday that he was with me. Those are wonderful memories. Can you remember your grandfather, and what his world was like?

Well, when my grandfather was born, the population of the world was for the first time in all of human history little over one billion people. That is to say, it took humanity tens of thousands of years to total the one billion souls alive on this planet when my grandfather was a boy.

Yet, by the time I was born, the population of the world had doubled, to two billion people. At the present time, only sixty years later, the population of the world has trebled to almost six billion people.

To put it another way, while it took all of human history for global population to reach the first billion, it took the life span of my grandfather for that population to double. But in my life span so far (from my birth to that of my grandchildren) the human population trebled, and sextupled from that of my grandfather.

It is expected that over the next twenty-five years--by 2020--the population of the world will grow to between eight and ten billion, and we can optimistically hope that there will be no more than twenty billion humans by the end of the 21st Century.

And what about the population in the second hundred years from now, in the 22nd Century?

Frankly speaking, I am extremely pessimistic about the chances of humanity surviving--at all, or at least in any form resembling that of any of the dominant cultures today--beyond the 21st Century. I feel this way partly because of the sheer enormity of these numbers, the speed with which the increase is happening, and the fact that spiritual, intellectual, financial, and political resources for coping with such a mass of humanity seem to be nonexistent. While it is very unfashionable in some development circles, and in some cultures, to speak of the calamity of overpopulation, I am unaware of anything that is being done, or can be done, to slow and stop overpopulation quickly, peacefully, and effectively.

Nonetheless, if we can find some way to cope with overpopulation during the 21st century, then I can be optimistic for the 22nd century and beyond. The reason for my tentative long range optimism is the fact that a global consensus seems to be forming which does recognize that overpopulation is an overwhelming threat, and what to do about it. That consensus is around the fact that the best way to stop overpopulation is to enable women to become at least full and equal partners with men, and with each other, in all aspects of life. This means especially to enable women--truly, fairly, and quickly--to control their own fertility; to live in a healthy environment with easy and cheap access to good maternal and child care; and to have ample opportunities to obtain educational, training, and occupational experiences of their own choice and preference.

I am mildly optimistic in the long range also because I see population control being linked as a dependent variable to visions of sustainable, equitable development by more and more of the UN and other global commissions reporting at the present time, including the new Commission on Global Governance whose work I applaud.

But I see no bright points of light shining in the immediate future, I am sorry to say.

However, what is true for the globe as a whole--overpopulation perhaps to collapse--is not true for all parts of it. In some parts of the world--western, and especially eastern, Europe and Japan, for example--the population is either stabilizing or actually declining. In other parts--North America, New Zealand and Australia, for example--population would be declining were it not for substantial amounts of immigration, legal or illegal.

So, one can say that the population in the currently developed world is declining, while in the developing world, it continues to grow far too fast.

Or to put it another way, population is declining in the white, Western portion of the world, but continuing to balloon in the nonwhite, nonWestern portion.

There are many consequences of this divergence.

On the one hand, it means the white West is becoming very old, very tired, and comparatively very, very few, while the nonwhite nonWest is increasingly being reinvigorated by very, very many dynamic young minds and bodies.

One hundred years ago--when my grandfather was young--the population of the world was roughly equally split between white and nonwhite regions. Now, because of changes in fertility and mortality, the white portions are only about 20%, while the nonwhite portions are about 80% of humanity. If these trends continue, as they likely will over the 21st Century, the white portion of the globe will shrink to about 5%, or even to only 1% of the total.

I advise my friends in the developing world who are angry at the power, privilege, and prestige of the West to be patient. Soon, there simply won't be enough white folks around

to cause much mischief. Indeed, I fully anticipate that, at some point in the 21st Century, charity bazaars will be held--here in Kuala Lumpur, perhaps--to help preserve that threatened, dying, and endangered species: the last remnants of the once mighty white race.

But don't hold your breath in anticipation. There are some very formidable challenges ahead.

For example, a report by the United Nations University recently reminded us that "at the dawn of the 20th Century, the world was largely a rural place--fewer than one person in seven lived in an urban area. By the end of this century, we face a global population that is half urban. By far, most of this growth will occur in the largely overcrowded and unmanageable cities in the third world, particularly in those huge urban conglomerations known as 'mega-cities'" "At the beginning of the 19th century, the largest city in the Western world was London with just under a million people, whereas in Asia, Tokyo had just over one million...." "A hundred years later, at the onset of the current century, there were 11 cities worldwide with more than a million inhabitants--most of them in Europe and North America. By the year 2000, it is estimated that there will be a total of 24 cities around the globe with populations in excess of 10 million. Eighteen of these mega-cities will be in the third world." London which even by 1950 was the second largest city in the world, will not rank among the top 30 by 2000. [UNU Work in Progress, September 1991, p. 1, and Roland Fuchs, et al., eds., Mega-city Growth and the Future. United Nations University Press, 1994]. It is expected that Mexico City, with a projected population of more than 26 million people by the year 2000, will be the largest. By comparison, the population of all of Canada now is only about 26 million. And the human movement towards mega-cities with their mega-challenges and mega-opportunities is continuing unabated. While world urban population rose from 34% in 1960 to 40% in 1980, it is expected to rise to 48% in 2000 and 62% in 2025. "Cities in the Third World are growing at 3-4% per year, but shanty towns, illegal subdivisions, and low income neighborhoods are growing at twice that rate. This means that any innovative solutions for livable, sustainable cities must deal with the issues of massive urban poverty." [Michael Marien, abstracting Janice Perlman, "Megacities and Innovative Technologies," Cities, May 1987, in Future Survey Annual 1987, p. 129]

So, meeting the housing and infrastructural needs of the future almost certainly will be different from meeting those of the present and past. As Maurice Strong said at the opening of the Rio UN conference on Environment and Development in 1992, "No place on the planet can remain an island of affluence in a sea of misery."

Perhaps that is so, but many places on earth are trying to remain islands of affluence in the rising seas of misery. Certainly that is one of the meanings of the most recent national and state elections in the United States where, public opinion polls show, once proud and reasonably secure, but now frightened and insecure, white men voted to protect their interests without concern for the havoc their policies will have on other Americans, and on other people elsewhere in the world--and ultimately to their own long range disadvantage.

The 21st century world will see human migrations on a scale which will dwarf those of the 19th and 20th centuries. The human numbers will be vastly greater, the reasons to leave immensely more compelling, the hope for a better life elsewhere at least as alluring.

Attempts now by certain countries further to restrict or stop legal as well as illegal immigrations will not work, and may well lead to violence on an unprecedented scale. And I am not speaking only of actions by the countries in North America, Europe, Oceania, or Japan, for example. However open some nations elsewhere in the world might now be towards immigration, I anticipate that soon all nations will seek, unsuccessfully, to stop it.

The form which migration is likely to take over the next decades might well come to resemble a diffusion model based on relative deprivation and relative affluence. That is to say, the poorest peoples might well move not only to far distant places of true affluence, but also to their nearest, less poor neighbor, thereby driving people from that area of poverty to some slightly richer place nearby, and so on, with the effect that, once again, the wealthiest nations will attract and receive, however resentfully, most of the wealthiest migrants.

But people will move, and wash over the planet in ever-increasing mighty waves. In contemplating this, it is also important to remember that 100-200 years ago, when migration from Europe began, and floods of Europeans moved to the Americas, Australia, and New Zealand and elsewhere, Europe was very much like the so-called Third World now with very high birth rates and low death rates. In many ways, Europe was able to develop, and to help the Americas develop in the 19th and early 20th Centuries, because it exported its surplus population of the time. But where in the world will the people of the Third World go except to those same and other parts of the world that offer some promise of refuge from the miseries of the present?

Now, if this specter is troubling, all I can say is that policy makers should have worried about and acted on this matter twenty to fifty years ago, when the population bomb was first most clearly noticed. This is not a newly-discovered forecast, but one which has been around for many decades, but now is coming to pass as predicted.

Fifty years ago, the wealthy and powerful should have been sincere about controlling births, and improving the economic conditions of the poor in their own countries and abroad. But instead, the US and the former Soviet Union led the world in a global insanity which massively wasted resources on the Cold War and created the parasitical Military Welfare States which still flourish everywhere in the world today, distorting policies and productivity away from the true needs of the present and the future and into the pockets of a wealthy, privileged few.

We should not pretend that it is other than this.

Moreover, it is my firm belief that all of us here today, whatever part of the world we might live in now, have a moral obligation to provide for future generations, whose very lives we caused, and whose impoverished lives are the direct result of our failure to have prevented the waste of militarized societies then and now.

So far, I have only been talking about one small tip of the iceberg of change looming ahead in the future--global population growth.

Equally important as a dangerous legacy we are leaving the future, but doubly important when considered along side of population growth, is **the specter of global change and possible environmental collapse.**

Since 1984, the Worldwatch Institute in Washington, DC, has published an annual authoritative summary of global (primarily) environmental concerns and activities called State of the World 19XX. It is the most useful single annual compendium of environmental monitoring I know of. However, in 1992, the Institute began publishing an even more useful annual capsule of the present and future quality of life on the planet titled, Vital Signs 19XX: The Trends that are Shaping our Future. Vital Signs 1992 was also published in Chinese, French, German, Italian, Japanese, and Spanish. It is also available in computer disk. I am sure you are all familiar with it in some form or language.

The most recent edition of this latter publication available to me as I write this paper is Vital Signs 1993. Lester Brown, the President of the Institute, wrote an opening chapter, "An Age of Discontinuity," which summarized the trends discussed in the volume as a whole. It opens with this statement:

"When the history of the late twentieth century is written, the nineties may well be seen as a decade of massive discontinuity. Long-established global trends that had been rising for decades...are now falling. Others that were going nowhere, or at best rising slowly, are suddenly soaring...."

"A survey of the 42 global indicators compiled for this year's Vital Signs shows four new challenges facing policymakers: First, it is becoming more difficult to expand the output of basic foodstuffs, such as grain, seafood, and livestock products, as fast as population. Second, the global economy is not expanding as easily as it once did. Third, we appear to be on the edge of a basic restructuring of the world energy economy. And fourth, the prospect that continuing rapid population growth could undermine living standards is becoming a reality.

"In the production of food, neither the world's farmers nor its fishing fleets are keeping pace with the growth in human numbers. Grain output per person has fallen 8 percent from the historical high reached in 1984, dropping roughly 1 percent a year. There are no new technologies in prospect suggesting that farmers can restore the 3 percent annual rate of growth in the world grain harvest that prevailed from 1950 through 1984, helping reduce hunger and malnutrition.

"Expanding the world fish catch is even more difficult. The oceans may not be able to sustain a catch of more than 100 million tons, the level reached in 1989." [Brown, Vital Signs, p. 15f]. Particularly disturbing was near-catastrophic losses of marine mammals, such as whales, dolphins, seals, manatees. While some of this is the direct consequence of human predation, much of it is the indirect consequence of ocean pollution and ozone depletion. "Future trends among marine mammals may be a telling measure of stability in human society itself." [Brown, Vital Signs, p. 111. See also Janet Raloff, "Something's Fishy," Science News, July 2, 1994, p 8f]

In addition, deforestation, air pollution, desertification and rapidly eroding topsoil, and freshwater scarcity and pollution continue to rise alarmingly. Concerning freshwater, the report said that "Today, 26 countries, collectively home to some 230 million people, fall into the water-scarce category. Many of them have very high population growth rates, so their water problems are deepening fast." "Some of the most worrisome cases of unsustainable groundwater use involve 'fossil' aquifers, underground reservoirs that hold water hundreds of thousands of years old, and that receive little replenishment from rainfall today." "Shrinking groundwater reserves, falling water tables, increased flooding and droughts, and water budgets that are badly out of balance are tangible indications of unsustainable water use--a situation that, by definition, cannot continue indefinitely." [Brown, Vital Signs, p. 106f]

Global warming, and eventual damaging sustained sea level rise, remain a major concern. "Although not as warm as some recent years, 1992 was still well above the average for the years 1951-80, the period used by meteorologists as a reference period."

"Although the precise effect on temperature of rising amounts of greenhouse gases is debatable, measuring the rising concentrations of greenhouse gases in the atmosphere is extraordinarily precise" and good reason for urgent concern and action.

"World agriculture, which has evolved over the last 10,000 years during a period of remarkable climate stability, would be directly affected. Any major climate shift would be extraordinarily disruptive."

Moreover, "the projected rise in global average temperature is expected to cause a rise in sea level of 18 centimeters by 2030, and 44 centimeters by 2070 due to both thermal expansion of the oceans and the melting of mountain glaciers. Such a development offers a specter of vast displacements of people. " [Brown, Vital Signs, p. 68].

The movement of millions of angry global environmental refugees, the loss of countless hectares of the best agricultural land, and the destruction of most traditional agricultural habitats must be anticipated worldwide during the 21st century--and yet food production globally is already decreasing, and population increasing precipitously.

The Australian National Commission for the Future several years ago conducted a nationwide campaign about "The Greenhouse Effect" and global warming. As part of that campaign, they printed and distributed a poster, which I still have, that depicted the famous billowing "sails" of the Sydney Opera House nearly underwater, as global warming melted ice caps and raised sea levels dramatically. The caption for that poster read:

"If we act as though it matters and it doesn't matter, then it doesn't matter. But if we act as though it doesn't matter and it matters, then it matters."

I would agree with this entirely. I think the stakes are high enough, and the uncertainty great enough, that we all ought to "act as if it matters." I especially bitterly resent the foot-dragging which has been characteristic of all nations on this matter, but has been the hallmark--almost the pride--of US policy. The United States has the obligation, I believe, to be the world leader in assessing and proactively anticipating all aspects of global change, since it has contributed so much to the processes which may result in global change, and has profited even more from them. If it turns out the worst fears--or even the minor fears--about global change were wrong, then, "no matter." But if it turns out that the worst fears, or even some of the minor ones, were correct (as I suspect), then we might have acted usefully, as well as responsibly, towards future generations--as we should, but (especially over the last one hundred years), as we almost never have.

Regrettably, the most recent national elections have made it clear, however, that many Americans are not at all ready to accept that responsibility. To the contrary, it is likely that America will adopt even more regressive policies towards the future than ever before. Since the policies of so many other countries are, equally regrettably, influenced by the United States, I can find no solid reason to be optimistic towards the future in this respect either.

Now, from my point of view, the underlying cause of the two factors I've mentioned so far--indeed also of all those which will be discussed later--is **technology**. I believe that new technologies historically have been the major agents of social and environmental change. And I believe the technologies of the present and immediate future--I'm thinking here of electronic information and telecommunication technologies--have already marginalized and bypassed, if not utterly destroyed, all major institutions of the present--including many of the reasons cities--and megacities--came into existence to begin with. But when I look at what the completing of the human genome project, and all the other aspects of the biological and nanotechnological revolution are about to do to our ideas about and fund of "information," "intelligence," and even "life," then I realize that the impact of electronic technologies on our old institutions and beliefs is nothing compared to what these new technologies are about to bring.

One major reason we have a looming global population crisis is because of 19th and 20th Century technologies which made it possible for so many pregnancies which might otherwise have miscarried, to reach full term; so many infants (and mothers) who might otherwise have died during or shortly after childbirth, to survive; so many children who might otherwise have died of various accidents and "children's diseases" to reach puberty and quickly produce so many surviving children of their own; and, so many men and women who might otherwise have used traditional ways of birth control to limit their family size to chose to use none and to have as many children as possible precisely because the dream of "development" encouraged them to do so, since continuous economic growth, progress, and endless wealth now was said to be obtainable for every human being on the earth--the root cause of all of this lies in certain technologies (greater sanitation and other public health measures, some of the original "miracle" drugs, and to a far lesser extent, modern medical and hospital practices) and the concomitant belief in continued progress, growth, and technological improvement which became the orthodox ideology of "development" that is the distinguishing mark all industrial and industrializing societies everywhere.

Similarly it was the technologies of industrialization that felled the trees, destroyed the topsoil, raped the earth, consumed or poisoned the water, polluted the air, destroyed the ozone, and in general and everywhere, paved paradise and put up a parking lot. It was, in short, industrial technologies which were, and are, the agents of "global change."

Many futurists are content to stop here--at a backward, accusatory stare and condemnation of all of the bad old technologies which have brought us to our fetid present and are propelling us into a thoroughly unsustainable future.

Maybe that is enough. Maybe those technologies--in most ways still dominant around us--are enough to help us understand what is important about what lies ahead.

But I don't think so. I believe certain still-developing technologies of the present, and emerging technologies of the near future--and beyond--are infinitely more powerful (more truly transformative) than anything humans have ever experienced before which many people feel has already been quite enough.

Indeed, so saying, it is essential that I point out that I do not believe there is anything particularly new in all of this technologically-induced change. To the contrary, one of the most--if not actually the most--characteristically distinguishing mark of humans--the thing that makes humans so different, so dangerous, or at least so problematic a life form--is our willingness, from the very beginning, to use technologies to bend nature to human purposes--and in the meantime, to interfere with natural process we may be able to use, but do not adequately understand.

The only important difference between humans now and at any time in the past is not that we use technologies now, but did not use them previously. No. It is that our current technologies are orders of magnitude more powerful and global than any previous ones--and that emerging technologies will be even more powerful and, well, (clearly beyond merely "global") cosmic.

One of the most alluring bits of nonsense, found in every part of the world now, is that once upon a time, noble savages lived in purposeful harmony with their environment. To the extent early humans lived in harmony with their environment at all it was because they did not have the tools that would permit them to do anything else. To the extent they did

have tools that permitted them to modify--destroy or foul--their environment, more often than not, they did so.

As critical as I am of the unwillingness of our present economic and political "leaders" to face the increasingly obvious environmental tsunami racing towards us, I categorically deny that most cultures and groups, given the chance, would have done it otherwise.

Genocide--the extermination of one cultural and/or ethnic group by another--is historically pervasive where it was technologically possible, and always morally reprehensible. If certain ethnic groups now can successfully invent a mythic past of moral purity and ecological sustainability to help them get back at ethnic or cultural groups which oppressed or tried to exterminate them in the past, well and good--as a political tactic. But, for the most part, it is only a potent political weapon and not an historical truth.

Marshall McLuhan's famous statement--"We shape our tools, and thereafter our tools shape us"--is accurate for all of human history, and prehistory.

It is also true for the future. So what new, emerging, or developing technologies lie ahead, and how might they impact society?

The most potent technology transforming the present, in my opinion, is the vast array of electronic communications technologies which are now being widely touted as composing the Information SuperHighway. Once, all eyes focused on television as a major agent of change. Then some people began to see how people were using computers to do more communicating than computing, and speculated on the social consequences of that. Now we see that many once-separate and expensive technologies are being woven together into a gigantic, global, and comparatively inexpensive information network which, among other things, is destroying the necessity of traveling to a single centralized location to work, or to trade, or be entertained, or even to govern. It is now increasingly possible, and preferable, to telework, to telemarket, to televise, and to telegovern.

It thus is no longer necessary, nor desirable, anywhere in the world to continue to create huge urban centers which require people to live near, or travel to, a central place of work, commerce, play, or governance. It all can come to you, in your village, or on your remote mountain top, or even (as it does to me) to the most remote spot on this Earth, Honolulu.

Now, the components of this net are getting more numerous, more ubiquitous, more inexpensive, more powerful, and more intelligent. And, among the many things they are doing, and will continue to do, they are replacing humans in almost all aspects of traditional or industrial life.

Indeed, one of the major causes of the current crisis in jobs in the so-called developed world is that electronic communication technologies have already reduced truly needed human labor, mental as well as manual, to only a fraction of what it was thirty, fifty, and certainly one hundred years ago, and earlier.

We simply do not need, and never will ever need again, so many people "working" as we did in the more recent centuries of human history. We must understand that the old economic system is utterly obsolete and dangerously misleading in this respect, and that we must begin to orient human life around something other than "jobs" which are less and less available to more and more people.

At the same time, we must find ways to keep people meaningfully and peacefully occupied even though they are not working. And, most importantly, we absolutely must find ways

to give people easy and equitable access to the goods and services which are produced without their labor.

All in all, I believe that the transforming power of the Internet, and all of its possible successor networked communication technologies, are in the process of completely destroying all of the institutions, behaviors, and values which arose around the industrial technologies of the 18th, 19th, and 20th centuries--economic, military, political, cultural--just as industrial technologies destroyed--or at least marginalized and substantially changed--the institutions, behaviors, and values of pre-industrial, agricultural societies.

But in many ways, I am only making a very shortrun observation here.

Far more transforming, in my view, is the imminent emergence of artificial intelligence on the one hand, and genetic and molecular engineering on the other.

As with my other areas of concern expressed so far, there is great controversy surrounding first the existence, and then the probable impact of these new technologies. The literature on whether, for example, the immanent completion of the human genome project is no big thing, or of godlike proportions, is enormous, technical, emotional, mind-numbing. Many people argue that this is merely one more tiny step in a remote branch of science, which, like many Big Science Projects, is really of consequence only to a handful of nerdy biologists and computer scientists. Others say that (especially when linked to other converging technologies) the completion of the human genome project will be the most revolutionary intellectual/technological step humans have ever made.

Similarly, among those who think that humans are on the verge of achieving truly godlike powers, there are unending arguments as to whether it is "good" or "bad" for humans to have these powers. Is it all over for humans, and all life, or "only" a transformation of life equivalent, for example, to the evolution of photosynthesis, or the first movement of some animals from water to the land--but occurring, this time, in a few decades?

Well, I take the "godlike" and "good" position in this controversy. I believe that developments in electronics, artificial intelligence, virtual reality, genetic engineering, and nanotechnology are truly revolutionary-evolutionary in scope and effect, portending the end of homosapiens in one form, and the potentiality of our emergence, during the 21st Century, into something totally different.

Moreover, the Foresight Institute is devoted primarily to research and development of "nanotechnologies"--the engineering of machines which operate at the nano scale, at the size of atoms and molecules. Eric Drexler, the founder of the Foresight Institute, says that "Eons of evolution and millennia of history have prepared this challenge [of nanotechnology] and quietly presented it to our generation. The coming years will bring the greatest turning point in the history of life on Earth. To guide life and civilization through this transition is the great task of our time." [in his Engines of Creation, Anchor/Doubleday, 1986, p. 239]

After recounting "the tumultuous history of the search for Artificial Intelligence," Daniel Crevier ends with a chapter, "The silicon challengers in our future," (note that he does not even mention the biological challengers--much less the cyborganic ones--which I see racing at us from the future) with the following set of questions which are probably on the lips of every person who has ever been willing to take the possible emergence of these new entities seriously:

"If, indeed, early in the next century, machines just as clever as human beings appear, the question arises of how we will interact with them, and how they will affect our society. Perhaps the new machines will simply relieve us of tedious chores, expand our intelligence, and bring about universal peace and prosperity. But will not the sight of a lifetime of human experience embodied into a few thousand dollars of electronics strike a fatal blow to our self-esteem? Will these machines not create a massive unemployment problem as they replace us first in factories, and then in business, science, and the professions? Even if we do find ways to redistribute the wealth generated by automated factories and businesses, what will be left for humankind to do? Having taken control of our lives through the economy, how do we know that machines will act in our best interests? [Daniel Crevier, AI: The Tumultuous History of the Search for Artificial Intelligence. Basic Books, 1993, p. 312]

In my opinion, seriously asking (though not necessarily believing it is possible yet to answer) these questions now should become a major activity of humanity--on a par with asking, and trying to answer, the questions presented by the tsunamis of population growth and environmental, global change.

All other questions--those which occupy most of our "serious" attention now, pale in comparison. Moreover, in order fully to understand my argument about the utter novelty of the 21st Century and beyond, questions similar to these need to be considered in all aspects of life--certainly in economics and governance, but also education, the family, religion, worldviews, well, as I say, everything.

Conclusions

So, I conclude once again by referring to the four sets of attitudes about the future that I mentioned at the outset.

1. Given the numbers and needs of the world's growing poor--especially children--and not only in the developing world, but throughout the so-called developed world as well, it is clear that a major responsibility of the present towards the future, as well as towards the present itself, is to reallocate the abundant resources of the present towards the needs of the young and the poor. There is no reason for me to reinvent the wheel here. Ample guidelines for doing this are found in the various UN and other global commissions of recent years, for example Agenda 21: Programme of Action for Sustainable Development, from the United Nations Conference on Environment and Development, Rio de Janeiro, Brazil, 1992; The Report of the United Nations Conference on Population and Development, Cairo, Egypt, 1994; M. S. Swaminathan, chair, Uncommon Opportunities: An Agenda for Peace and Equitable Development, Report of the International Commission on Peace and Food. Zed Books, 1994; and Ingvar Carlsson and Shridath Ramphal, co-chairs, Commission on Global Governance, Our Global Neighborhood. Oxford University Press, 1995.

2. But this is not enough. I believe it is necessary to recognize the urgency of our global situation and our responsibility for addressing it anew. That means we should seriously re-examine and willingly abandon many of the most hoary beliefs of the conventional development paradigm. Far more importantly, it means we must reject and work against the tremendous distortions of material, and especially human, resources of all our grotesquely over-militarized nations.

3. We also need, with more reluctance, to reject many of the attitudes and policy suggestions of those who would have us restore technologies, lifestyles, and values of some past time and place. Certainly it is appropriate to permit those who wish to live by

traditional values to do so, which our present world does not--or at least makes enormously difficult. But all traditions are inadequate as general guides for everyone, given the novelty, enormity, severity, speed, and multiple interactions of the trends and impacts I have discussed above.

4. Instead, in words of the title of a book by Walter Truett Anderson, which I so often quote, we must recognize that it is now our duty "To Govern Evolution." We must admit--reluctantly, fearfully and reverently--that "nature" (in the sense of processes and conditions of life unimpacted by human activities) hardly exists at all at the present time, is rapidly diminishing everywhere, and soon will be entirely gone. All that will very soon be left is "artificiality"--processes and conditions caused by, or substantially maintained by, human attention and activities.

It is thus the major responsibility of those of us who desire to act responsibly towards, for, and on behalf of the future to recognize that it is now, for the first time in human history, our duty to envision and try to create and maintain life.

We must invent the future, and then try to create and maintain it.

It does no good to protest that we don't know enough about how nature operates now to accept this responsibility. We should have thought of that years ago when there was still a choice.

Similarly, it does no good to point to all of the times in the past when humans tried, out of their hubris, to do better than nature, and to create some earthly paradise, only to create, instead, one kind of horrible totalitarianism or another.

It is too late for that as well. We humans destroyed whatever balance nature may once have provided us. Now, the responsibility for creating some kind of a new balance is our awesome obligation towards future generations. We can either accept it and do the best we can, or we can continue to abrogate that responsibility, and hand our grandchildren the mess we have created, saying, "Here, take this. We did it to you, but we don't really care about you; we only care about ourselves, all our protestations of love and family values to the contrary notwithstanding. Even though we pretend to be ethical, pious, and virtuous, in fact we don't have the courage, will, or morality to try to help you fix it. Have a nice day!"

SOURCES (In English) FOR THIS PAPER And FOR THINKING ABOUT THE FUTURE GENERALLY

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