

Apocalypse Now?

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By

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Abstract

I look at a variety of challenges for the human species some of which it is likely to face in the not-to-distant future. Then I consider some societal developments of the last century for insight into the future of western civilization. I end with a considered view of the evolutionary state of western civilization and its future.

Introduction

I am resisting the temptation to write a completely science-oriented paper since it is my area of expertise. However, as I have been reminded by some senior members of the Club, this is a Philosophy Club, not a Science Club. But I would note, that there is a well recognized academic area known as the Philosophy of Science to which some members might profit from a closer acquaintance. So, in spite of Max Born's conviction a century ago that "That theoretical physics has become real philosophy", I shall avoid that venue.

Instead, I purpose to indulge myself in an aging man's observations about the past's relevance to the future. I will also depart from my usual extemporaneous style and deliver a written paper as has become traditional with this group. I realize that every generation seems to feel that the "World is going to Hell in a Hand Basket" and I submit that at least the last several generations may well have been right. To that end I will look at changes in technology, some in medicine, and a little in language and art. But let me begin with a short list of unfamiliar natural calamities any of which will challenge the survival of the human race.

Natural Calamities

I will spend little time on these for they largely fall into the realm of science and I am trying to avoid exposing you to too much of that. But here are a few possibilities any of which are extremely unlikely, but considering the number, one can't help but wonder if in the future "*the best laid plans of mice and men oft gang a glee*". I list them not in order of likelihood, but rather in order of devastation.

1. Galactic Gamma-Ray Burster aimed at the Earth. Result: Sterilization of at least half the planet within a few seconds, and likely major modification of the atmosphere. (This may have happened at the end of the Devonian Period)
2. Asteroidal/cometary impact. Result: Massive blast and tsunami destruction followed by "Nuclear Winter" for years/decades. [This has happened (took out the dinosaurs) and will again.]

3. Large earthquake along the continental shelf releasing significant quantities (10s of millions of cu. ft.) of methyl clathrate. Result: instant global warming of several degrees, possible atmosphere modification. (May have happened in the past)
4. Large volcanic eruption (Krakatoa \times 100+) Result: “Nuclear winter” for 1-10 years and potential large tsunami damage. (May have happened perhaps as recently as 536AD)
5. Massive island landslides into the ocean (i.e. One of the Canary Islands or half of the island of Hawaii) Result: Super tsunami destroying everything within 10-50 miles of the continental coast boarding the associated ocean. (We know little about these) Note nearly 90% of the world population lives within 50 miles of the coast.

Anthropogenic Calamities:

It seems useful to divide this source of calamities into two classes. Those that are essentially the result of “unintended consequences” of our actions and those which are the result of deliberate human actions designed to damage human well being. In the first category we have problems that can arise from:

The Unintended Consequence Class

“Advances” in Technology

No generation, except possibly the next one, has seen advances in science and technology to the extent that we have. I remember my father saying that he had seen the Wight Brothers fly around Manhattan beginning an era, the Hindenburg crash at Lakehurst ending an era, and men walk on the moon potentially beginning another. My mother was born into a static, eternal universe at the beginning of a revolution in Physics, matured as the Universe was found to have an origin in time and be expanding, and lived long enough to see that the expansion is accelerating thereby perhaps laying the ground work for the next paradigm-shift in Physics. During my parents lifetime automobiles, telephones, radio and television appeared for the common man and the population of the country more than quadrupled.

I found those lifetime advances amazing, but they have been topped by those seen by my generation. I was born about the time the neutron was discovered and I have seen my own discipline of astronomy go from a data-starved science to one buried in data acquired at a rate unimaginable just a decade ago. This has led to a two order of magnitude improvement in the quantities that describe the basic structure and history of the universe. Cosmology has become not only a science, but a precision science. Before the end of this century it is likely that every galaxy in the visible universe will have been detected.

The nuclear and chemical advances in knowledge during the last 50 years are nearly as unimaginable. Over the course of recorded history, the economic cost of killing someone has steadily risen until the 20th century. The advent of nuclear weapons has dropped that cost to below what it was during the time of the Egyptians and the price continues to decrease.

Every year we introduce about 50 new chemicals into the environment. Rarely is the toxicity rigorously tested. I know one local trucking company which moves HF over interstate distances and I know from their Safety Supervisor that the drivers have no real appreciation for the danger of the cargo they carry. Some recent examples of really bad stuff might include the Osmium Tetraoxide confiscated in a recent terrorist plot in London. Some of you may have heard of the innocent sounding Nickel Carbonyl, which years ago, one the faculty at OSU discovered was so toxic that Merck Chemical Company would not even ship it. The only toxicity experiments done on the compound were done by the Nazis.

But even these “advances” are dwarfed by the advent of the computer. The first computer I ever used filled several rooms and is now in the Smithsonian. Its capacity is exceeded by most Palm Pilots. In my youth a computer was a person who used a calculator to solve carefully posed numerical problems. Now the capacity of home computers “boggles the mind” of the average user. Yet we stand on the threshold of a technological revolution as profound as the industrial revolution initiated by James Watt’s steam engine. “How can a computer be hazardous?” you say. We saw during the summer of 2003 what happens to an electrical power grid when computers mal-function by accident. Many hydroelectric dams through out North America are remotely controlled by computers which are readily available to hackers. There is almost no aspect of our current business society that isn’t controlled by computer.

All attempts to forecast the future implications of the computer-revolution are destined to fall short of the mark. Perhaps Carl Sagan was correct when he suggested that Homo Superior will be a silicon-based life form. Certainly recent experiments showing the possibility of growing cell cultures on chips that respond to electrical stimuli from the chips which in turn can recognize electrical patterns emanating from the cells lend credence to “evolution” in this direction. The advent of “quantum computing” will literally allow for the development of automaton like Data of STNG. My own guess is that Homo Superior will be a hybrid carbon-silicon based life form should the social climate permit their development. Perhaps the reverse will be true and change in the actual climate will require such a hybrid form in order for the race to continue to exist.

“Advances” in Medicine

The last century has seen an unparalleled rise in a doctor’s ability to improve the lot of his/her patients. While it can be argued that advances in public health such as effective sewage treatment and water purification are more responsible than anything else for the near doubling of the average life-span in the twentieth century, certainly the ability to control and treat infections in patients must have been a significant factor. I am reasonably certain that I would not be alive today had it not been for the advent of sulfonamides before the second war, and the development of antibiotics, diagnostic testing, and advanced surgical techniques after the war. While “new plagues” cultured by our miss-use of antibiotics, or resulting as unintended consequences of genomics, or the over colonizing of the planet will threaten the human race for the indefinite future, they are problems that conceptually can be managed.

Far more subtle are the impacts of a greatly extended life span. It should be noted that the large increase of the life-span in the 20th century resulted from a huge reduction in infant

mortality. The result was largely an increase in the world population. A similar increase in the 21st century is likely to result from the expansion of the life span and would produce in a major shift in the age-distribution of the population. There would be folks routinely living to be 150. Accommodation of such an elderly class will require significant societal change. The impact will further be exacerbated by the likelihood that such an expansion would not be available around the world. Thus, third world countries will not only covet our standard of living, but also our increased life span. This will only add dimensions to the class struggle around the world.

Equally perplexing are the implications of modern genomics for agriculture, human health such as organ transplant, curing of inherited congenital diseases, and species reproduction itself. Such innovations will challenge the most ardent evolutionist to predict their outcome. However, I fear the growing religious evangelical fundamentalists will have no problem predicting the outcome and attempting to curtail the development of new knowledge and technology. I have not seen such an abundance of absolute moral certainty abroad in the world since the middle of the last century. This is not to deny that there are serious philosophical problems connected with the development of knowledge concerning the human genome, but I fear that the absolute morality of the first millennium does not hold the answers that will best serve the human race.

Advances in Science

I expect the 21st century will see the advent of a major paradigm shift in the physical sciences. It will take some time for the fruits of such a shift to appear in technology. In the 20th century the technological implications of quantum mechanics lagged at least 50 years behind its discovery. In the 20th century many looked to science to solve the developing societal problems and to some extent it did. It is clear that there is no way the present world population could be fed using the agriculture of the 19th century. It is likely that disease after WWII would have destroyed much of the population of Europe if it hadn't been for DDT. It is unlikely that our current standard of living could have been supported by the individual productivity that existed even after WWII. It may be that science will save us from ourselves in this century, but I regard that as more of a desperate hope than a probably reality.

For example, the technological application of thermodynamics has led to the development of engines of all kinds that have certainly allowed for continued population growth and the elegant standard of living most the West enjoy. Yet these same engines have produced great quantities of CO₂ which is currently changing the planetary climate in such a fashion that there will have to be major changes for continued human existence. This is not the only human "adventure" that could kill us with its unintended consequences. There is the plague that could emerge from the exploitation of the rain forests, or perhaps the destruction of the oceans through over fishing and poisonous runoff from agribusiness. Loss of the great plains through irrigation from the declining Ogalaca aquifer, or the poisoning of ourselves through "advances" in chemistry (consider the increases of certain complex polymers associated with fire retardants in clothing and their presence in our blood) also pose challenges for survival. Note that rate of species extinction has never been this high on the planet since the dinosaurs (and all animals over 100kg) departed 65 million years ago.

The Deliberate Actions

The most obvious of these is, of course, WAR. Formal war between major states has become increasingly unlikely, but should it occur, the results are likely to involve nuclear weapons. Even a limited use of such weapons is likely to result in deaths numbered in the many millions and make a significant part of the globe uninhabitable for millennia. Far more insidious is the current threat of “terrorism”. The underlying threat seems to be ultimately driven by a sort of “religious” belief. Here attacks do not even contain the pseudo-rationalism of formal war. The extent of the damage is likely to be beyond the ken of the terrorists and the impact on a technologically dependant society such as ours is likely to result in its total collapse within months of a well coordinated attack. Several of these come to mind, but prudence keeps me from delineating them here.

The Extrapolation of History

I believe it was Santayana who observed that “Those who do not learn from history are doomed to repeat it”. What can we learn from past and current trends? As a cursory attempt at answering this question, I will look briefly at a few areas that have struck me as I have aged.

The Evolution of Language

I am not a linguist, so much if this section is based on impressions from various sources. First, I realize that language must evolve to accommodate societal changes and the addition of new knowledge. However, one would expect that these pressures would expand the power, complexity and the richness of language. Is there much evidence of that happening? On the contrary, I would claim that the richness of language has declined and markedly in my lifetime. The vocabulary of the man-in-the-street has shrunk. How many current “rappers” would even understand the Gettysburg Address or any of Lincoln’s speeches for that matter? Some say this is the result of the catering of the mass media (notably television) to the uneducated. I find this difficult to reconcile with Ken Burn’s documentary of the Civil War where the “dialogue” was largely taken from the diaries of foot soldiers including presumably uneducated privates. The use of language by these “uneducated” foot soldiers exceeds that of most contemporary college graduates.

I had the privilege of recovering a sermon of my great grand father Alexander B. Jack D.D. from the time just after the Civil War. His parish was in Hazelton Pa. and the congregation largely hard coal miners. The complexity and power of this sermon was a marvel to behold. Like Shakespeare, things tended to be said three times; first in the vernacular, then in the language of the church, and finally in a manner that just sounded well. This minister’s object was not to simply preach the gospel, but rather to educate his flock both in the message of the church and in the use of language. Language was primarily used for communication and the prevailing wisdom was that the richer your use of language, the more effective your ability to communicate. Sadly, I do not find much evidence in the language use of contemporary society for this view. How long has it been since high schools offered course on rhetoric? My mid-west high school required it half a century ago, but we were far behind the prep schools of the East as I discovered when I went to Princeton University in 1955. If the society cannot communicate effectively, how can it

hope to deal with some of the difficult philosophical problems I described earlier? I would further argue that, in democracy, a shallow use of language among the electorate leads to shallow leaders. Shallow leaders lead to a decline of the society. When was the last time you heard a really moving political speech?

The Evolution of Music

The only art form I feel really confident discussing is music. Some will correctly believe that here I betray my snobbish side. I have a deep and abiding love of what most call Classical Music. The evolution of this musical form from the Baroque, through Bach to the Classical, Period, Romantic Period, and Contemporary Era is fascinating. The music represented by these periods is clearly a product of Western Civilization and some will accuse me of being elitist by dealing primarily with this form. So be it.

I tend to view the first three periods as being dominated by the influence of the church and the development of what we now call the symphony orchestra. There is also a continuing tendency for the composer to write more for himself than for a client. Most of the early music was written for a patron or to fill a need in a church service. This tendency shifted steadily through the romantic era into the 20th century. However, there was a period during the middle of the 20th century where it is clear many were writing for the approbation of other composers and much of the music became unapproachable by the general public. Happily there is some evidence that this may be changing.

However, to see the societal effect of music perhaps one should not look at classical music, but rather at the popular music of the time. And here I just look at the 20th century and our own culture. I would claim that there has been a steady increase in the cacophonous nature of popular (and to a considerable extent in classical) music. Initially, this was mild in the introduction of Jazz and the Blues and was almost non-existent in the “Broadway Show Tune” of the first half of the 20th century. However, with the advent of rock-n-roll in the late 50s, punk rock of the late 60s, Hip Hop and Rap, dissonance has steadily increased to the point where it is no longer often able to be recognized as dissonance. This music does seem to reflect the environmental noise of society. Simply stand on Public Square during rush hour and you will hear many of the same noises that you might hear on MTV. I am told that no one under the age of 40 has what would have been called normal hearing just half a century ago. Also the complexity and focus has significantly changed. Consider a popular song of the 30s-40s like “Blue Moon” to any contemporary entry. The lyrics and tonality are far more complex in the music of the first half of the 20th century when compared to the music of its last quarter.

Happily there are some exceptions. A great deal of really outstanding music has been written for motion pictures. The music for the Lord of the Rings trilogy is of classic proportions. I feel that John Williams is one of the most under appreciated composers of our time. But like my father and his, I am inclined to believe that “they don’t write them the way they used to”.

So what lies in store for the future?

We should remember that the dinosaurs dominated the planet for about 100 million years. Our tenure might be considered to be about two million years, but there is considerable evidence that the species has had difficulty surviving even that limited span. We are all acquainted with the impact of the plague on Europe. What is less widely known is the impact of a major volcanic event about 100000 years ago that may well have reduced the human species to the brink of its genetic survival limits. Looking at the calamities natural and human-generated that I have listed above, it is difficult to be optimistic about the race's long term survival.

But more specifically, I fear we may be witnessing the decline and fall of Western Civilization and with it much of the human race. Our society has become precariously balanced on technology. Not many years ago a single communication satellite failed and most all the pagers in the U.S no longer functioned. There was modest chaos for about a day until the pager communications could be shifted to another satellite. More recently, poor maintenance of a computer system led to a major failure of the electrical grid in Northeast America and only by the intervention of a brave soul near Philadelphia was it prevented from taking out everything east of the Rockies. The outage was relatively short, but we saw at least two major cities (Cleveland and Detroit) unable to supply water to its citizens. Consider what the implications would have been had the black out lasted weeks instead of hours. As suggested above, we have embarked on a planetary experiment which will change the very nature of the world on which we live. Only an individual adopting the ostrich posture can deny the fact that the climate is warming. It takes a nearly equivalent state of denial to fail to recognize the anthropogenic contributions to this warming. The only bright spot is that we have ignored the problem too long for us to be able to do much about it, so ignoring it could be claimed by some to be a rational act. However, it is not at all clear that we may yet be surprised to discover that the climate exists in a bi-stable mode and we shift on short time scales (decades) from one state to another. The warming trend could be temporarily interrupted by a brief (several hundred years) cold snap of ice age proportions.

Are we at all prepared to deal with the surprises of the future? A scientific community whose knowledge of the scientific literature rarely extends back more than five years certainly cannot be accused of have a great temporal perspective. An electorate educated by "reality TV" may even have trouble boiling water. A government that can't look past the next election seems an unlikely source of programs for long term solutions.

In my youth, when Josef Stalin threatened nuclear war, I wondered what if any the optimum survival strategies were. I approached the problem by considering how a patrician would optimize his life during the decline and fall of Rome. Then the only real treat of continued existence was nuclear war and *On the Beach* by Neville Shute seemed a likely scenario. Now I find the threat for continued existence to be so much more complex that any optimum strategy eludes me. So I blunder forward one day at a time.

Now I am fully aware that the aged have been accused for generations of always believing that the "good ole days" were better than today. It will be easy for many to dismiss this treatise as my finally reaching that age. But remember that Rome did not fall in a day. It took

several centuries to produce the Dark Ages. Perhaps all those past generations of the aged were right and we are living during the decline and fall of western civilization which may yet take another century to complete. So does this mean there is apocalypse now? No. An apocalypse is a quick dramatic event and like the fall of Rome, the decline of Western Civilization will take a little time. I hope.