

CHAPTER 50

Second Epilogue

The first Epilogue, Chapter 24, was written during a stressful period when the autobiography had a low priority. Fortunately, time to write more chapters became available.

Some of the values I acquired during my career follow, not necessarily in order of importance:

- Have the courage to be different when evidence and reason lead you off the beaten path.
- Research should never dominate your personal life, especially your core values.
- Never micromanage when working with competent people.
- Transdisciplinary research requires leaving your comfort zone (i.e. area of specialization) but enables one to frame a broader world view.
- Continuous, effective communication is the *sine qua non* of teamwork.
- All teamwork requires a synthesis of information generated within a time framework that facilitates sharing information promptly.
- Grants and contracts must provide adequate funds and time for sharing information.
- All individuals benefit from working for the common good.

The common good deserves much more dialog:

1. Should the common good include all humans?
 2. Should the common good include all species (i.e. the biosphere)?
 3. Should the common good include posterity?
 4. Does wealth disparity impede the quest for the common good?
 5. At what level does individualism damage the quest for the common good?
 6. Should the common good only have the highest priority during catastrophes?
 7. What is the relationship between individualism and the common good?
 8. What is the relationship between economic growth and the common good?
 9. What is the relationship between population growth and the common good?
- Too intent focus on a problem often limits one's perspective. I found the solutions to aggravating problems often came during or soon after fly fishing, folk dancing, white water folboating, long hikes in natural systems, classical music, and theater.

- Coping with the inevitable criticism of science and scientists:

“To avoid criticism say nothing, do nothing, be nothing.” Aristotle

“You have enemies? Good, that means you’ve stood up for something sometime in your life.” Winston Churchill

“Let me never fall into the vulgar mistake of dreaming that I am persecuted whenever I am contradicted.” Ralph Waldo Emerson

Peer review (enlightened criticism) is a useful quality control component of science. But evidence free criticism of science has been evident since civilization began. In the last part of the 20th century and the first part of the 21st century, a well-financed, aggressive attack on scientific evidence and the scientists who generated it has been carried out by corporations, religions, wealthy individuals, and some components of the news media. Global climate change and a biological evolution have borne the brunt of this assault. It is ironic that as the scientific evidence base for global climate change increased dramatically, so did the attacks on scientists. The general public is confused by the complex evidence upon which the conclusions about global climate change and evolution are based. Thomas Jefferson believed an informed citizenry was required for democracy to survive.

If present trends continue, the fate of civilization and the Biospheric Life Support System are at greatly increased risk! How should scientists respond to this anthropogenic threat? Although the deniers of climate change and evolution seem to be unaffected by greatly increased evidence supporting these processes, catastrophes are increasing both in frequency and magnitude. If the general public demands policy decisions based on scientific evidence, it must be global and continuous. Humans are influencing both climate change and the evolutionary process. However, a surge of released, stored carbon due to an increase in the mean global temperature will almost certainly result in irreversible change. Scientific information about the consequences of irreversible change will be essential for informed policy decisions! The scientific process will be essential during a planetary state shift.

The shift will have both short and long term effects and may last a long time from a human perspective. Scientific research on this danger cannot be turned on and off like a light switch or a water faucet. For optimal results teams of scientists must remain intact for long periods of time. Uncertainty will probably be common during the shift.

The “best case” scenario is that human civilization will persist until the sun dies billions of years from now. But many civilizations have perished in the short time *Homo sapiens* has been on Earth.

- Whenever my world (e.g. collapse of civilization) requires reframing, I check for quotes to determine what others have said. Some selected quotes follow:

“If a nation expects to be ignorant and free, in a state of civilization, it expects what never was and never will be.”

Thomas Jefferson

“A nation that continues to produce soft-minded men purchases its own spiritual death on the installment plan.”

Martin Luther King, Jr.

“If civilization is to survive, we must cultivate the science of human relationships- the ability of all peoples, of all kinds, to live together, in the same world at peace.”

Franklin D. Roosevelt

“While civilization has been improving our houses, it has not equally improved the men who are to inhabit them. It has created palaces, but it was not so easy to create noblemen and kings.” Henry David Thoreau

“There is something even more valuable to civilization than wisdom, and that is character.” Henry Louis Mencken

Humans vary greatly with regard to their own death. Egyptian pharaohs built pyramids. In times of war military individuals are preoccupied with death. But extinction of an entire species is an entirely different matter. Humans make plans to use a spaceship to take a tiny portion of 7.1 billion people to another habitable planet. What they will find if the voyage is successful is, as yet, inadequately discussed. How will the passengers be selected? Extinction of other species, often the result of human activities, is occurring constantly but is discussed by few people. A few extinction quotes follow:

“The damage that climate change is causing and will get worse if we fail to act goes beyond the hundreds of thousands of lives, homes and businesses lost, ecosystems destroyed, species driven to extinction, infrastructure smashed and people inconvenienced.”

David Suzuki

“He who refuses to learn deserves extinction.”

Rabbi Hillel

“Life on our planet has been a constant series of cataclysmic events, and we are more suitable for extinction than a Trilobite or a reptile. So we will vanish. There’s no doubt in my heart.”
Werner Herzog

“There are plenty of problems in the world, many of them interconnected. But there is no problem which compares with this central, universal problem of saving the human race from extinction.” John Foster Dulles

“The end of the human race will be that it will eventually die of civilization.”
Ralph Waldo Emerson

Since I began research on environmental pollution in 1948, I have learned many things:

1. Humanity must accept the universal laws of physics, chemistry, and biology.
2. Denying scientific evidence of the existence of these will result in severe penalties to *Homo sapiens* and drive many species to extinction.
3. Since *Homo sapiens* is a part of the Biosphere, not apart from it, this will probably include us unless humans learn to nurture the biosphere rather than exploiting it to achieve economic growth.
4. Humankind’s introspection from individual to global levels is minimal to lacking. Humans either ignore or fail to understand the interactive global crises that threaten Earth’s life support system- the Biosphere. Worse yet, there are substantial attacks on scientists and denial of the evidence painstakingly gathered.

It is not yet clear that an irreversible planetary state shift is underway, but if it is, humankind will need all the information science can generate to increase the probability of civilization surviving. Tipping points are, at present, not observable except in retrospect. As a consequence, it is prudent to implement remedial measures before science judges that a planetary tipping point has been passed.

Passing an irreversible tipping point for a planetary state shift could be caused by substantial amounts of released stored carbon, by greatly increased volcanic activity, or by both. A global discourse on this issue is mandatory to increase the probability that civilization and humankind will survive.