**Excerpts from *The Young One: Wandering through the Great Disruption***

**by**

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**Excerpt from Chapter 1: Home**

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I had once found a box of last-century books by Ayn Rand, Milton Friedman, and Fred Hayek in a garbage can. The writing was pretty thick, but it was obvious to me that these people were crazy and antisocial. I gave them to my father for use as fire-starting material. Municipal recycling had long ago been stopped as people couldn't be bothered devoting time to separating their garbage. There were too many other things for adults, like my parents, to do to keep families fed. Besides, by now everybody knew most of the collected material was just being sent to the dumps.

On the other hand, at another spot, I found a bin with discarded copies of *An Essay on the Principle of Population, The Origin of Species, A Sand County Almanac, Silent Spring, Man's Impact on the Global Environment, A Primer of Population Biology, The Limits to Growth, Our Common Future*, *Collapse*, and *The Revenge of Gaia*. From the information on the covers, I knew what a treasure trove it was. I couldn’t wait until the time was right to read these, but I knew it would be best to wait until I was a bit older.

**Excerpt from Chapter 3: Tough Decisions**

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In the end, we all went to the counselling sessions. The psychologist helped us see that we were all suffering from confusion, anxiety, and fear. We felt helpless, really. We were frustrated that more had not been done to prevent our world from getting destroyed. In fact, we had a sense of betrayal. Even little Erica understood that it had been clear for a very long time that all of this could have been avoided.

It really helped when mom finally put things this way: "People have burned an awful lot of coal, oil, and natural gas to give us energy for planes, cars, and electricity. We started a long time ago.

“When those things burn, they give off gas we can't see, just as we can't see the air we breathe. The gas goes into the oceans and the air, where it stays for a long time. That changes the oceans and the air.

“The ocean waters are now acidic—like there's some lemon juice in them. That makes them more harmful to creatures that evolved there, so we are losing our reefs, our whales, our fish, and our shellfish.

“The water and the air are now hotter, so we are losing our ice and getting rising seas, more intense storms, floods, dry times, and heat-waves.

“When we found out about this problem, many people didn't want to believe it. Now that we can see the results all around us, there aren't many people who still refuse to believe it is happening or that it is because of us.

“We're sad that it is now too late to prevent really bad things from happening, but that's not our fault. The people who controlled the coal, oil, and natural gas, and who encouraged everyone to use them, knew long ago that the burning would cause these changes.”

“Now, all that dad and I can do is to try to keep you safe from the climate chaos.”

That brought more acceptance to all of us, and the grim determination to survive as best we could.

**Excerpts (3) from Chapter 9: A New Kind of Learning**

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I decided that each evening, after helping clean up the eating and cooking areas, I would sit down for a reading session. My plan was to read all 10 books I had brought. I figured it might be good to read them in the order in which they were published. That would give some sense of the advances in scientific thinking over time. I knew this would be a long process, but it would certainly keep me occupied when there weren't chores to do. More importantly, it would allow me to learn a lot about the natural world. It would also let me see something of how our language and attitudes had been changing.

So, I started with *An Essay on the Principle of Population*, which was written in 1798 by Reverend Thomas Malthus. It took most of a month to wade through this monster. It was written in language I found pretty unusual. It was full of passages like this:

“The advocate for the present order of things is apt to treat the set of speculative philosophers either as a set of artful and designing knaves who preach up ardent benevolence and draw captivating pictures of a happier state of society only the better to enable them to destroy the present establishments and to forward their own deep-laid schemes of ambition, or as wild and mad-headed enthusiasts whose silly speculations and absurd paradoxes are not worthy the attention of any reasonable man.”

The main message was that people would always suffer from periodic disease, famine, and war until they could, collectively, learn to control their desire to have children. I gathered that Reverend Malthus' observations of the world led him to believe that we would always expand our numbers until we ran into some serious socio-ecological crisis. Hmm, that seemed to foretell our current predicament pretty well.

Mr. Ryan had told my class what the human population was in the mid-1800s, at the time Reverend Malthus was writing. It had been about one billion people.

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Snow had not yet begun to fall when I started on *The Origin of Species.* The real complete title was *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle.* No wonder the name got shortened.

The book was published in 1859 by Charles Darwin. I knew from the preface to the edition I had that Darwin had written it over the preceding 20 years or so. He had been so upset by what his observations and experiments had revealed that he couldn't bring himself to publish the work until he was essentially forced to do it by the revelation that Alfred Wallace had generated the same theory about evolution.

Darwin had been a religious Christian. He had been taught that there was a single god who had created everything, including all the plants and animals, and who had created humans in his own image. Darwin had found, however, that natural selection was the driver of the continual evolution of new species. As Darwin had feared, his proposal of the theory of evolution had met a great deal of criticism. It had also been misused later, by so-called Social Darwinists, to advocate for prejudice and violence against people perceived as comparatively different or weak in some way. However, the theory had been found to be sound and evidence that it was accurate had become overwhelming.

This book, too, proved to be a challenge to read as it had paragraphs such as this one:

“It is, no doubt, extremely difficult even to conjecture by what gradations many structures have been perfected, more especially amongst broken and failing groups of organic beings, which have suffered much extinction; but we see so many strange gradations in nature, that we ought to be extremely cautious in saying that any organ or instinct, or any whole structure, could not have arrived at its present state by many gradual steps. There are, it must be admitted, cases of special difficulty opposed to the theory of natural selection; and one of the most curious of these is the existence in the same community of two or three defined castes of workers or sterile female ants; but I have attempted to show how these difficulties can be mastered.”

While Reverend Malthus' work was an essay of about 100 pages, Darwin's was a tome over 400 pages long in my edition. Still, I was hooked by the intricate detail of Darwin's science and could hardly put down the book at some points. I was perhaps most interested by the fact that his developed knowledge didn't allow him to get over the dogma he had been taught, so that he integrated those beliefs into his theory. He concluded with this statement:

“It is interesting to contemplate a tangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent upon each other in so complex a manner, have all been produced by laws acting around us. These laws, taken in the largest sense, being Growth with Reproduction; Inheritance which is almost implied by reproduction; Variability from the indirect and direct action of the conditions of life, and from use and disuse; a Ratio of Increase so high as to lead to a Struggle for Life, and as a consequence to Natural Selection, entailing Divergence of Character and the Extinction of less improved forms. Thus, from the war of nature, from famine and death, the most exalted object which we are capable of conceiving, namely, the production of the higher animals, directly follows. There is grandeur in this view of life, with its several powers, having been originally breathed by the Creator into a few forms or into one; and that, whilst this planet had gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being evolved.”

He didn't know it at the time, but the world population had been about 1.2 billion people. Thanks, Mr. Ryan!

My reading of Darwin seemed to show that Reverend Malthus was right is at least a basic understanding of the propensity of populations to expand. Both books showed me just how intelligent people could be.

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For now, we were warm, adequately fed, and healthy. I slipped readily into Aldo Leopold's *A Sand County Almanac*, which was from 1949. According to the introduction to my edition written a century or so later by April Watson, an environmental activist of whom I'd not heard, Leopold was a writer about nature, professor, ecologist, and forester, but first of all an outdoorsman. He held beliefs in the rightness of a land ethic and having an ecological conscience. He was perhaps the first novelist to advocate that people live in harmony with their environment. At once, I could see that tied back to Reverend Malthus' suggestion that people need to learn self-control and to Darwin's observations about survival through adaptation to local conditions.

Leopold's book was over twice as long as Reverend Malthus' book and about half the length of Darwin's. I breezed through it, finding it uplifting. How could I not when it contained prose like this:

“The outstanding scientific discovery of the twentieth century is not television, or radio, but rather the complexity of the land organism. Only those who know the most about it can appreciate how little is known about it. The last word in ignorance is the man who says of an animal or plant: ‘What good is it?’ If the land mechanism as a whole is good, then every part is good, whether we understand it or not. If the biota, in the course of aeons, has built something we like but do not understand, then who but a fool would discard seemingly useless parts? To keep every cog and wheel is the first precaution of intelligent tinkering.”

Reflecting on what Leopold had written, it seemed to me that we were out here trying to live in harmony with the land. This was something we had never dreamed of doing when we lived in the city.

It also seemed to me that when Leopold was writing, the human economy had rarely gotten so big that its influence spread much beyond local areas. There had been about 2.5 billion people. I doubted whether World War II, which had ended just a few years earlier, had really much affected his thinking, for it had not destroyed the mainland of the USA. Some would have said it was a great economic boon to the USA, though that would have required ignoring all the mined out areas, discarded wastes, released effluents, and emitted air pollutants that had powered the American war machine and allowed Lend-Lease to America's allies.

 **Excerpts (2) from Chapter 10: Disappointment**

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I finished the *Almanac* quickly and moved on to *Silent Spring*, which came out in 1962. In that book, Rachel Carson showed how the widespread use of pesticides in post-war USA was in the process of wiping out many species, especially the birds. Those birds were responsible for the wonderful bird-song which she had known as a youngster (like me). She really missed their presence in the forest. Heck, I now really missed forests. She identified dichloro-diphenyl-trichloroethane (DDT) as just one of the main culprits. Importantly, I guessed, Ms. Carson, who ended her university studies at the Master's level, uncovered how industry was feeding disinformation to the public in an effort to sell its products. Industry created the idea that all sorts of plants and insects (“pests”) needed to be wiped out with the application of man-made chemicals.

Ms. Carson had not let the prejudices of the day hold back her career. As a marine ecologist, she became a fisheries researcher, but she was also a prolific author, with many published essays and *Silent Spring* being her fourth full scientific book. Several of those books, including this one, became best sellers.

I wasn't too surprised by the fact that the chemicals that she had found were being sprayed everywhere were largely the result of chemical research done as part of the American war effort for World War II. Nor was I surprised that it turned out those chemicals were getting into the human food supply in the USA.

I loved Ms. Carson's writing style, which many others had too—the book had been judged one of the top 100 non-fiction books of the last century. It contained many paragraphs like this:

“We stand now where two roads diverge. But unlike the roads in Robert Frost‘s familiar poem, they are not equally fair. The road we have long been travelling is deceptively easy, a smooth superhighway on which we progress with great speed, but at its end lies disaster. The other fork of the road—the one less travelled by—offers our last, our only chance to reach a destination that assures the preservation of the earth.”

Suffice to say Ms. Carson was controversial in some circles, but also a great inspiration to the American environmental movement that really grew after the publication of *Silent Spring*. That was made clear by Edward Wilson in his Afterword in my edition of the book.

I knew I was soon going run into E.O. Wilson again.

While Ms. Carson didn't have much to say about the population, in the early 1960s it had just passed 3 billion people.

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It was during our first rainstorm of the spring that I started on *Man's Impact on the Global Environment.* The book had been published in 1970 under the guidance of W.H. Matthews, W.H. Kellogg, and G.D. Robinson. It was subtitled *Assessment and Recommendations for Action*, and it was a report on the work on something called the Study of Critical Environmental Problems (SCEP), which was done at the Massachusetts Institute of Technology (MIT). The report contained sections by various working groups, a concept of which I had never heard. However, dad explained that a working group was a bunch of scientists with similar interests and expertise who got together to assemble what was known about some subject. The working groups in MIT's SCEP had been: climatic effects, ecological effects, monitoring, implications of change, industrial products and pollutants, domestic and agricultural wastes, and energy products. While Part II contained the details of what the working groups had recorded, Part I was divided into 3 sections: the climatic effects of human activity, the ecological effects of that activity, and the implications of change and remedial action.

Wow, did this book ever open my eyes. It was about as long as *Silent Spring* and packed with information. About a century ago, the alarm bells were already being rung about climate change, pollution, and a host of other environmental problems. They weren't talking about problems in specific locations; they were exposing problems that were present at regional and global scales. All of those problems could be traced to the ever-expanding human population. In 1970, that population stood at about 3.7 billion people.

There was no pulling of punches and politically correct language, but also some hedging in view of the very real limitations of the science at the time:

“Radiative equilibrium computations [in computer models], including a convective adjustment, suggest that the projected 18% increase of carbon dioxide concentration by the year 2000 (to about 379 ppm) would result in an increase of the surface temperature of about 0.5 °C and stratospheric cooling of 0.5-1.0 °C at 20 to 25 km [above the surface]: a doubling of the carbon dioxide concentration over the present level would result in an increase of the surface temperature of about 2 °C and a 2-4 °C decrease in the stratosphere at the same level. We would like to emphasize, however, that these computations neglect the important interacting dynamics and thermodynamics of the atmosphere, as well as the ocean-atmosphere interaction. This neglect makes the computed temperature changes very uncertain.”

I recalled that Mr. Ryan had told us the concentration of carbon dioxide had been about 280 ppm before the beginning of the Industrial Revolution, 325 ppm in 1970, and 370 ppm in 2000. That did not account for the other greenhouse gas constituents, such as methane, nitrous oxide, and refrigerants.

I had heard people say that carbon dioxide, being essentially a trace gas, going from 0.028% of the air to 0.037% of the air couldn't do much, but I knew better. If hydrogen sulphide, another trace gas, got to just 0.070%, which is 700 ppm, anybody breathing it in would die in minutes. Carbon dioxide was less acutely toxic, but it was acting like a poison to Earth's ecosystems. If carbon dioxide were harmless, it wouldn't be used by bees to kill giant hornets, but they do use it to good effect.

Mr. Ryan had gone through with us the history of research on carbon dioxide in the air. From Fourier, to Newton-Foote, to Arrhenius, to Calendar, to Keeling, and many others—a who's who Mr. Ryan had explained—the scientific understanding of this gas had been accumulating. It was all pretty clear even if people had been refusing to believe for decades.

The computed temperature increase by 2000 had been 0.4 °C from the 1970 level. More importantly, the temperature increase compared to the computed global average in 1850, a century after start of the Industrial Revolution (by which time the human economy was in full swing) had been 0.8 °C at the time.

Even I knew that was a big and important temperature change with incredible effects. Whenever I had a body temperature 0.8 °C higher than normal, my mom was really worried.

By 2020, the carbon dioxide concentration had passed 420 ppm and the temperature increase from 1970 had passed 0.8 °C, while the increase from 1850 had reached 1.2 °C.

Now, my guess was that nobody really knew how high the carbon dioxide concentration was, let alone how hot it was compared to those times long ago. While our car and my wrist computer could give us temperature readouts, the sorts of temperature and humidity measuring stations that generated the data sets that had once been constructed were likely all destroyed.

Well, anyway, it was now clear to me: there had been lots known about climate change and plenty of warning given even before the turn of the century. We knew! We really knew. What idiots we were.

**Excerpts (2) from Chapter 11: Tragedy**

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As the heat of the spring started to rise, I got busy with *A Primer of Population Biology.* This turned out to be a short textbook, written in 1971 by Edward O. Wilson and William H. Bossert, both professors at Harvard University. Dr. E.O. Wilson later became really famous as a specialist on ants, writing an incredibly detailed and beautifully illustrated book on them that Mr. Ryan had brought to class one day after borrowing it from the city library. He also had other claims to fame.

While Dr. Wilson was a biologist who specialized in insects, Dr. Bossert was a mathematician. I'm pretty sure he was the whiz behind many of the population equations and models in their book.

In the book, Wilson and Bossert explained population genetics, community ecology, and species equilibrium theory, including genetic drift, rates of evolution, competition theory, reproductive measures, and species equilibrium. Given the content, the inside cover of my copy said it was widely used as a university textbook for many years.

Right from the start of the book, I was into reading about exponential growth. There were all sorts of equations and graphs. One of the most interesting chapters was on Ecology. I wished that the people in charge of our politics had been exposed to this sort of science over the last century or so, for perhaps then they might have understood how badly the human population was being allowed to over-shoot the carrying capacity of Earth.

The book was a bit under 200 pages, but it took a long time to read because I kept having to ask dad about how to read and comprehend the equations. At the risk of getting into something too complex, this is an example of what they had written:

“Over long periods of time, in all populations of organisms, *dN/dt* averages zero or some value very close to zero. This is another way of saying that N, the population size, fluctuates up and down around some average value; every temporary increase in population is sooner or later cancelled by a compensating decrease, and vice versa. The LOGISTIC GROWTH CURVE...is a common (but not inevitable) curve by which exponentially growing populations approach their limit. This limit, the number of organisms (*N*) at which *dN/dt* is zero, is often called the CARRYING CAPACITY OF THE ENVIRONMENT...”

I had to go to dad to ask about *dN/dt* and got a brief explanation about derivatives, which are part of Newton's calculus. His high school and university education had included advanced math. The 'area under the curve' was actually a pretty easy concept.

If only economists, politicians, bankers, business tycoons, and religious leaders had known about carrying capacity, perhaps we would not have gotten into the Great Disruption now affecting the world.

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Shortly after Wilson and Bossert had been tackling population ecology, *The Limits to Growth* was published. That was in 1972, though the modelling that went into the book had been going on for several years before. The authors were Donella H. Meadows, Dennis L. Meadows, Jørgen Randers, and William W. Behrens III. They were studying and working at MIT.

They used a computer model called *World3* to show what might happen to the human population over time, along with it levels of pollution, resource consumption, food supply, and resource supplies. My edition of the book mentioned that the model had been known as the *Model of Doom* by some.

There were many aspects of the Wilson/Bossert work in the work of the MIT team. Essentially, what they showed was that the human population and socioeconomic system were on track to exceed the carrying capacity of Earth. Eventually, around the middle of this century, they determined that business as usual was going to lead to an expanded population that would deplete our resources, fill our environment with pollution, and reduce our food supply, after which the population would start falling quickly. Well, talk about prophesy. Here we were living the nightmare.

**Excerpt from Chapter 12: Carrying On**

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As our lives slowly got back to as normal as they ever would, I took up reading my scientific books again. Next in the queue was *Our Common Future*, the 1987 report of the Brundtland Commission to the United Nations. Dr. Gro Harlem Brundtland, a physician and public health expert who had become Prime Minister of Norway and Chairperson of the World Commission on Environment and Development (WCED). WCED had members from over 20 countries and was supposedly aimed at the search for a way to develop human societies in a sustainable way. The report supposedly sought to recapture the spirit of the 1972 UN Stockholm Conference on the Human Environment, where environmental concerns really first rose to the global political agenda.

The 300-page report was based on public hearings all over the world, but it seemed to me filled with platitudes and misdirection. There was quite a lot of value in the report, such as discussion of environmental refugees (like me) and destruction of the carrying capacity of our environment. They mentioned just about every major social and environmental problem of which I had ever heard: war, poverty, inequality, pollution, resource depletion, climate change, ocean acidification, soil degradation, food insecurity, and so on. However, despite their claims, the authors didn't leave me with the impression they had any particular strategy in mind and they certainly didn't provide the sorts of details I thought should have been there.

The report popularized the term 'sustainable development' as "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs." However, that seemed to me ridiculous. There was so much room for interpretation in that statement. The authors had simply taken a term which had long been in use in forestry and fisheries, where 'sustainable yield' was a management concept (much abused to justify maximum harvesting).

Besides, one can't include a word in the definition of the word itself!

Worse, I found there were many seemingly alternative definitions of 'sustainable development' in the book. For example, there were these 2 passages:

“In essence, sustainable development is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development, and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations.”

“The common theme throughout this strategy for sustainable development is the need to integrate economic and ecological considerations in decision making. They are, after all, integrated in the workings of the real world. This will require a change in attitudes and objectives and in institutional arrangements at every level.”

Worse than that, it was clear that in the following decades nobody took WCED seriously. There had been essentially no movement toward balancing our human population and our activities with the ability of our environment to provide a stable platform. Despite the report containing recommendations that things should change, they didn't.

The authors thought sustainable development might be achieved by the year 2000. Boy, were they wrong! Mr. Ryan had explained that, while there was a UN Conference on Environment and Development (UNCED) in 1992, there never was another major conference on sustainable development. There were several attempts of global development goals, but they gradually changed into simple calls for more economic and population growth. Even the series of conferences on limiting climate change, and biodiversity loss, and desertification were eventually simply stopped. We were too busy dealing with the effects of those crises to deal with their causes, plus their causes were our behaviors. How inconvenient—at the same time, how odd—that the 'growth-thinking' that got us into this mess was now the approach we thought was the way to get us out of the mess.

Thinking back on our record, I was disgusted with the people in power, and with the voters and shareholders of the major corporations that got us into this chaos. I could read between the lines. The whole book was a series of reasons to carry on with population growth and economic growth. They even went so far as to write this (my emphasis added):

“**What is needed now is a new era of economic growth—**growth that is forceful and at the same time socially and environmentally responsible.”

“Humanity has the ability to make development sustainable—to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs. The concept of sustainable development does imply limits, **not absolute limits** but limitations imposed by the present state of technology and social organization on environmental resources and by the ability of the biosphere to absorb the effects of human activities.”

There really wasn't anything in it about what 'development' might mean, and certainly no clue that really means improvement. The closest they came was in these passages:

“The satisfaction of human needs and aspirations is the major objective of development.”

“The concept of sustainable development provides a framework for the integration of environmental policies and development—the term 'development' being used here in its broadest sense. The word is often taken to refer to the processes of ecological and social change in the Third World, but the integration of environment and development is required in all countries rich and poor. The pursuit of sustainable development requires changes in the domestic and international policies of every nation.”

Two things the authors did get correct, I'd say, were these:

“If we do not succeed in putting our message of urgency through to today's parents and decision makers, we risk undermining our children's fundamental right to a healthy, life-enhancing environment.”

“From space, we see a small and fragile ball dominated not by human activity and edifice but by a pattern of clouds, oceans, greenery, and soils. Humanity's inability to fit its activities into that pattern is changing planetary systems fundamentally. Many such changes are accompanied by life-threatening hazards, from environmental degradation to nuclear destruction. These new realities, from which there is no escape, must be recognized—and managed.”

Little did I know as I read that my disgust was about to be reinforced by crop failure in our gardens.

**Excerpt from Chapter 13: Horror**

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In the evenings, I was still finding time for reading. The next item in my library was *Collapse: How Societies Choose to Fail or Succeed*, a 2005 book by Dr. Jared Diamond. There it was—the lesson we should all have learned. When populations get too big and societies too complex, and when they get out of touch with their supporting environments, they disappear.

This was the longest book in my collection, by a factor of 2. What a slog, but what a gem.

Dr. Diamond, mainly a geographer, examined a set of regional powers that had collapsed: the Vikings of Greenland, the Rapa Nui of Easter Island, the Polynesians of Pitcairn Island, the Anasazi of the southwestern USA, and the Maya of Central America. He also examined the State of Montana, USA, to see how it compared. The comparison was sobering.

Dr. Diamond thought climate change, hostile neighbours, the demise of essential trading partners, environmental problems, and each society's responses to these caused all to collapse. Each disappeared less than a century after its peak, some in just a few decades. The root for most of those factors he saw as over-population relative to the carrying capacity of the local environment. One environmental problem not related to over-population is the harmful effect of accidental or intentional introduction of non-native species.

He also wrote that cultural values, such as the reluctance of the Greenland Norse to eat fish, sometimes contributed to collapse. That reminded me of our stubborn maintenance of liquid-fuelled vehicles and holiday cruise ships early in the century.

Diamond gave a list of factors that had played a part in previous collapses: deforestation and habitat destruction, soil problems (erosion, salinization, infertility), water management problems (pollution, depletion), meat shortages (over-hunting, over-fishing), effects of introduced species on native species, increased per-capita impact of people. All were rooted in over-population and human nature, which I recalled Reverend Malthus would have labelled lack of self-control.

He listed 4 others he thought might imperil societies: anthropogenic climate change, buildup of toxins (poisons) in the environment, energy shortages, and full human use of the Earth's primary production (biomass made by plants).

This was one choice passage in the book:

“The metaphor is so obvious. Easter Island is isolated in the Pacific Ocean—once the island got into trouble, there was no way they could get free. There were no other people from whom they could get help. In the same way that we on Planet Earth, if we ruin our own world, we won't be able to get help.”

He seemed to sum up the situation this way: high population, much generated wealth, enormous resource consumption, and production of a great deal of waste equal disruptive environmental impact. The authors of *Our Common Future* said this, though I thought less forcefully. Dr. Diamond, despite all the evidence of previous collapses that were being ignored in Montana and around the world at the time he wrote the book, was cautiously optimistic that *Homo sapiens* would prove smart enough to see the patterns and learn from past mistakes.

Sadly, it appeared we were proving more like *Homo stupidus*.

**Excerpts (2) from Chapter 14: Flight**

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I had never worked so hard. Nonetheless, I felt I owed it to Erica and my mom to continue my reading. Of all things, the next (and last book) in my corner was *The Revenge of Gaia*, which was by Dr. James Lovelock. He had a doctorate in medicine and had become independently wealthy through his participation in the invention of some electronic laboratory instrument. The book, written in 2006, was one of his many publications.

Although he was more of a chemist than an ecologist, Dr. Lovelock came up with what he called the Gaia Hypothesis. That hypothesis was that there is effectively a living organism, Gaia (after a Greek goddess), that inhabits a very thin layer at the surface of Earth. That organism, collective life, seeks to maintain a stable set of conditions in which it can thrive.

In *Revenge*, Lovelock posited that humans had caused a great deal of harm to Gaia and that she would not let us get away with it. He thought we'd likely be able to prevent the death of Gaia, and ourselves, through changes in technology and attitudes, though likely at a much lower population level. He went so far as to suggest that he thought we ought to aim for 0.5-1.0 billion people. Such a population might be able to be sustainable.

It seemed to me we were either about to start or already into the beginnings of a huge reduction in our population.

While longer than Reverend Malthus' work, this book was much shorter than Dr. Diamond's. It was easy to read too. There was no hidden meaning in paragraphs like this:

“While we cannot go back to the achingly beautiful world of 1800, when there were only one billion of us, we may not be incapable of lessening the consequences of global heating. If there is a threshold and we pass it, the nations of the world could limit the damage by stopping carbon dioxide and methane emissions; the temperature rise would then be slower, as would the rise of sea level, and it would take longer to reach the final steady hot state than it would if we continue business as usual. Even so, enormous damage would still have been done.”

Well, we didn't stop emissions fast enough and the damage just kept building. We had been driven to become climate refugees. Others had not been so lucky. They had simply died. So much for the optimism of people like Brundtland, Diamond, and Lovelock.

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When we came down from the hill we gathered enough food for a big meal and walked over to the Smiths. Nalren was crying when we arrived. I got another big hug. Then, he promised to help me pack whatever I might need for the next leg of our journey. He had one request. He wanted me to leave my books behind so he could continue his education. I was happy to do that.

When I got back to our house that evening, I signed the inner cover of each book with an indelible pen dad had brought in his kit and left a little personal note. The notes were these:

* *An Essay on the Principle of Population*: know yourself, control yourself, enjoy your life.
* *The Origin of Species*: remember that we had humble beginnings.
* *A Sand County Almanac*: love this place.
* *Silent Spring*: listen to the song-birds as much as you can and keep their voices in your head.
* *Man's Impact on the Global Environment*: try not to do harm that can't easily be reversed.
* *A Primer of Population Biology*: may you always have people with whom to be a family.
* *The Limits to Growth*: live within the means of your place, for it is your palace.
* *Our Common Future*: you were a special friend and I will never forget what we shared.
* *Collapse*: learn from the mistakes of others so you don't have to repeat them.
* *The Revenge of Gaia*: live comfortably with uncertainty, for we can't know everything, and endeavour to understand everything within your grasp.