



Bottleneck by William Catton - A Review

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Humanity's Impending Impasse?

Book Review

Bottleneck: Humanity's Impending Impasse, by William R. Catton, Jr.

Reviewed by George Mobus

First I should confess to a strong bias toward the content of this book. As readers of my blog, [Question Everything](#), will realize, I have been moving inexorably toward the same conclusion as the author, so you will perhaps forgive me if you think I may be suffering from a lack of sufficient critical thinking. Put bluntly, I think this is a book every thinking human being should read, and then consider for themselves.

To a growing number of people it is looking more and more like mankind is about to undergo a most unpleasant transition. One might write such views off as being what kooks and apocalyptic religious fanatics hold to, and we know they are crazy. But over the last five years many deep thinking and well respected people have been sounding some alarms that are not as easily put aside. In 2004 Martin Rees, the Astronomer Royal in Britain and clearly no intellectual harebrain, wrote *Our Final Hour: A Scientist's Warning*, Basic Books. In it he gives humanity about a 50/50 chance of surviving through the century. Not really good chances when you think about it.

Last year James Gustave Speth, dean of the Yale School of Forestry and Environmental Studies at Yale University, wrote a sobering call for a massive revision of capitalism and an end to growth in *The Bridge at the Edge of the World: Capitalism, the Environment, and Crossing from Crisis to Sustainability*, Yale University Press. Like many authors have done, he painted a picture of what was wrong and why, but then pointed to remedies that might presumably fix the problems. That is, if only our leaders and our citizens would see the light and do what is necessary we might avoid total collapse. Most of these authors offer humanity an escape hatch, but point out that we have to be willing to sacrifice substantially, in terms of material wealth, for it to work.

The realization that mankind is damaging its planet is certainly not new. Rachel Carson (*The Silent Spring*, 1962) may have started the trend in increasing awareness that we are doing things, in our zeal to control nature, that were starting to backfire, threatening to leave us worse off if we didn't change our ways and attitudes. Environmentalism has largely operated on this theme for decades. We've been warned of environmental degradation, global warming, and peak oil, and how these are interlinked. We've been made immanently aware of the dangers we have ourselves created.

Now William R. Catton, Jr., Emeritus Professor of Sociology at my state's other PhD granting institution, Washington State University, brings on the sequel to his first book in this genre, *Overshoot: The Ecological Basis of Revolutionary Change*, University of Illinois Press, in which he sounded an alarm being heard more frequently. Like Speth, Catton, in that earlier book, pointed out the problems as he saw them, from the viewpoint of a sociologist, and then declared that *if* we heed these warnings we might yet escape the worst.

In the sequel, *Bottleneck: Humanity's Impending Impasse*, Xlibris Corporation, he drops the part about we can evade the worst. The subtitle says it all. Now he concludes that it is already too late to mend our ways and somehow avoid the collapse of civilization. Indeed the main title refers to an impending collapse of the human population. An ecological bottleneck (also called an [population bottleneck](#)) is where radical changes in the environment of a species causes a die-off of all but the most hardy of the population; hardy, that is, in terms of the selection pressures arising from the change. Of course there may be no sufficiently hardy individuals left or the ones that manage to survive cannot reproduce sufficiently to produce a new population. In that case the species goes extinct.

Catton's arguments for why this is the most likely outcome for humanity boil down to something I have written about in my blog for several years now. It is the rate of change that matters as much as the degree or magnitude of change when it comes to shocking a population. If we look at the rate of climate change due to anthropogenic forcing, or the rate at which our fossil fuel energy sources are depleting, or the rate of aquifer depletion, or the rate of population increase, or the rate of consumption increase per capita in the developed and developing worlds, or... You get the picture. We are changing the world in ways unfavorable to human survivability more rapidly than we can either adapt or mitigate. And we have already passed the point of no return.

As to why we are in this state of affairs, Catton calls on several sociological theories surrounding the evolution of culture and especially the development of over-specialization or 'division of labor'. The latter was touted by Adam Smith as the reason we were so efficient in our manufactures. And Catton, like many authors who deplore modern capitalism and corporatism, recognizes that at a time this was indeed a beneficial capacity. Today, however, he says that we overdid it and that the tendency toward deep specialization has tended to dehumanize and isolate each of us

from the benefit of interpersonal relations. He further argues that we have come to think of others as instruments, mere means to our own ends. This he says is the end result of taking the abstraction of money as representing wealth too far in our thinking.

This idea that once things like money and capitalism, etc. fulfilled good purposes and were good for society as a whole, but have simply been overdone in our modern technologically-driven world, is actually one of the common themes sounded by many writers. It is certainly something I have subscribed to in my evaluation of human affairs. Early in mankind's history, these inventions, these institutions, served a purpose to make man more fit as a species, to quell the negative selective forces of nature and allow humans to succeed evolutionarily. But somewhere along the line humans failed to recognize that too much of a good thing is actually bad.

The failure to recognize this is the lack of wisdom, to which I will return in a bit. But to understand how humans got so carried away it is important to recognize, as Catton and others have done, that humans, like all animals, have a biological dictate to maximize their access to energy. For humans this took the shape of learning to control fire, making clothing, building shelters, and later finding additional external energy sources to supplement their bodily abilities. This included the invention of tools and agriculture. And it essentially culminated in the discovery of fossil fuels that allow modern humans incredible power over their environment. Catton renames a subset of *Homo sapiens* as a 'quasi-species', *Homo colossus*, those being the people in developed countries who consume massive amounts of fossil fuels to motivate and control machines that do orders of magnitude more work than a human can do with muscle power alone. To achieve this we are combusting carbon to produce CO₂ and returning fossil carbon deposits to the atmosphere and oceans after sequestration for millions of years. And it is the rapidity with which this is happening which leads Catton, and others, to conclude that it is infeasible to put the brakes on for this train. That is, you can try to brake, but you won't stop in time to avoid a crash.

Unfortunately for mankind, there are now far too many of *Homo colossus* in the global population. And the damage is done. NASA climatologist James Hansen has claimed that the concentration of CO₂ in the atmosphere should not be over 350 parts per million (ppm) in order to avoid calamitous climate shifts. But we are already at 385ppm and climbing, even though the global recession has slowed the burning of fossil fuels. It just isn't enough to stop let alone reverse the growth in carbon in the air. But beyond the damage done already, and the potential damage to come due to climate changes and sea level rise, Catton sees an impending threat from the fact that we are going to run out of this magical fuel one day. Or at least we will hit a barrier where the cost of extraction exceeds the benefit of having the fuels. When that happens what becomes of *Homo colossus*? Indeed what happens to *Homo sapiens* in toto? Even though peoples in developing and underdeveloped nations don't burn the fuels directly, they still rely on the developed world for aid produced by burning those fuels.

Catton bases his analysis on the idea of [carrying capacity](#). Fossil fuels have artificially boosted the carrying capacity of earth for human occupancy (if you ignore the damage we've done to other species). We are in overshoot, the theme of his previous book. We are like the cartoon character, Wile Coyote, who would race off a cliff in futile pursuit of the Roadrunner and would remain suspended in mid air until he realized his predicament; then it was too late and he would fall. When the fossil fuels are effectively used up, what will replace them? As things stand now, there simply is no realistic or viable alternative energy source that could scale up to the level needed by modern civilization in time to take over the job. Once again, it's the rate of change that gets us. In spite of continued pie-in-the-sky thinking by even engineers and scientist who should know better, no one has shown how real time solar energy in all of its many forms (thermal, photovoltaic, wind, even hydroelectric) will ever match the power in fossil fuels. These came from ancient photosynthesis over millions of years compressed and cooked into a convenient package over more millions of years. The scope of concentration is literally unimaginable (apparently) yet very serious people dream of capturing current solar influx and replacing fossil fuels with it. They may be serious but they are also dreamers or delusional. While in theory, the total daily influx of solar energy to the earth would provide many times over what we need to

sustain our current civilization and provide development for the lesser developed nations, our systems of capture would have to cover gigantic areas of the planet. Our energy storage and distribution systems would have to be radically redesigned and rebuilt. And all of this comes just as we recognize the impacts of declining net energy from fossil fuels; those fuels being needed to subsidize the building of all that energy infrastructure.

The root cause of humanity's impending impasse, however, is not his lack of will, or cleverness, or even sufficient energy resources. The root cause is his lack of wisdom. Catton points to this on page 190, speaking about his great-grandson:

...by the time surviving members of his generation have emerged from the coming bottleneck, when he may himself have somewhere a great-grandson he will wish to visit, **somehow his contemporaries will have attained the wisdom** Linneus implied was characteristic of our species when he named us *Homo sapiens*.

(Emphasis mine)

For several years now I have been pursuing a quest to understand better why our species is not, on average, wiser than it is, apparently. With all of the history we have experienced, with all of the science we have learned, with all the cleverness our kind has for solving local (in time and space) problems, you would think that we would have developed greater wisdom than we have in fact. Why haven't we been able to learn from our mistakes and develop a society that reflects individual and collective wisdom? What I came to realize was that the brain capacity for wisdom (which I have boiled down to: good judgment in complex social issues, strategic thinking, highly developed systems thinking, and strong moral sentiment, coordinated by the most recently evolved patch of prefrontal cortex) was a relatively new emergent capacity coupled with symbolic thinking and language and second order consciousness (conscious of being conscious) for early *Homo sapiens*. But it was evolved, as Catton notes, to meet the needs of the late Pleistocene existence of our small group-oriented species. It is not, on average, up to the task of modern complex society. One of my main conclusions is that our species is simply not sufficiently wise (or I prefer the term 'sapient' to differentiate between a native capacity and an actualized capability) to deal with the world we have created. For a more in-depth treatment of this subject, readers are directed to my working papers at: <http://faculty.washington.edu/gmobus/Background/seriesIndex.html>.

It is this lack of inherent wisdom that will keep us, has kept us, from doing the right things to prevent the *impending impasse*. Catton's 'Prognosis for Humanity', page 206, is alarming.

...with great reluctance and regret, I am compelled to doubt that we can confidently hope to avoid a serious "crash" as the focal human experience of the 21st century—envisioned also as our species having to pass through an ecological "bottleneck".

This is by far the most explicit statement of what we would call doom of any author in the popular book trade. There have been many writers, especially in the blogosphere, who have expressed similar conclusions. But I have yet to see a writer of some eminence such as Catton go all out and claim that the end is near. Unfortunately, I happen to agree with him.

The question for me is: Will humanity come through this bottleneck with a gene pool competent to meet the challenges of a changed world AND have a stronger native capacity for sapience, for wisdom? Assuming some remnant of humanity does survive, that is no guarantee that our descendants will go on to evolve a better ability to make good, long-term judgments in that future world. Nor are we guaranteed that they will be able to reconstruct anything like modern technology-based society in order to re-achieve a species fitness allowing them to survive and thrive in the very long run.

My only complaint with Catton's thesis is that he didn't go far enough in suggesting what those of us who see this coming might do now to save our genus from extinction or, in the case of my

concern, to increase the likelihood that our descendants will inherit genetic components leading to higher sapience. He assumes that some humans may survive and the future environment may select for greater wisdom. I'm not so sure that will be the case. His parting words simply express thankfulness that he lived during the epitome of human achievements in science and understanding as well as freedoms to travel the world. My question is: Now what do we do?

I have to applaud Catton for writing so honestly about what he has concluded. I have contemplated writing a book on the evolution of what I call *eusapience*, true sapience, as the future of the genus *Homo* – *Homo eusapiens*. Necessarily, the species *sapiens* must go extinct to allow the rise of a new, wiser, species of humans. And an evolutionary bottleneck would be the most likely mechanism for this to happen. But I have hesitated, realizing this is a message no one wants to hear! Every other author of books on end-of-the-world scenarios at least offers that if we would only come to our senses... the world won't end. William Catton does not do this. Sorry for the spoiler but you should know in advance. Thus this probably isn't a book easily digested by everyone, even though I think everyone who believes themselves to be a critical thinker should read it.

The reviewer is an Associate Professor of Computing and Software Systems at the University of Washington Tacoma. He is currently on sabbatical leave studying biophysical economics and energy-related issues at the State University of New York, Environmental Sciences and Forestry in Syracuse NY. His blog is Question Everything at: <http://questioneverything.typepad.com>



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