

Realistic Fortune Telling

**A Canadian academic looks ahead and sees ...
uncertainty.**

By Peter Calamai

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Pity the grad students in a seminar with Vaclav Smil. Or perhaps, envy them. If they survive his intellectual blast furnace, they will emerge much stronger. In *Global Catastrophes and Trends: The Next Fifty Years*, Smil dismisses the faulty analysis of other senior academics, many named, with phrases such as “this is nonsense” and “entirely missing the fact.” Perhaps students receive more gentle put-downs.

The distinguished professor at the University of Manitoba wields a relentless scourge against shibboleths and nostrums. He abhors shallowness and worships rigour. Above all Smil dismisses forecasts in general and even the very idea that humanity can make meaningful prognostications about catastrophes and trends between now and 2050. The core message of his book is that the only thing certain on this planet is uncertainty. The best course is to figure out what is truly worth worrying about over the coming half century—he would say nuclear mega-war and viral pandemics—and act as rational risk minimizers.

The book makes great demands on the reader. Judging by the citations, Smil appears to have read everything relevant to thinking about catastrophes and trends, natural or human induced—and often in the original language, as he portentously reminds us. As well, the volume is replete with numbers that span the range of prefixes from micro to exa, which is 10 followed by 18 zeroes. At least every dozen pages there are charts, graphs or tables that make little concession to the numerophobic.

The contents could easily be seen as depressing. For instance, while many readers might have an inkling that all is not rosy with the supply of freshwater in much of the world, Smil hammers home that dismal news for page after page. Ditto for the spread of infectious diseases, the loss of arable land, population decline in developed countries, the inevitable twilight of Pax Americana and so on. Yet so clear eyed is this unrelenting dose of realism about what will shape humanity’s near-term future that the open-minded reader should actually come away energized. Thank goodness we do not really have to fret that much about the risk of devouring nanobots running amok or an asteroid a kilometre in diameter smashing into Earth in the next 50 years (the odds, on page 27, are 0.0025 percent to 0.05 percent).



Smil lays down his markers in a frank preface that, unlike most, is worth reading. Of his intention, he writes:

In sum, do not expect any grand forecasts or prescriptions, any deliberate support for euphoric or catastrophic views of the future, any sermons or ideologically slanted arguments. Instead, expect eclectic inquiries, reliance on long-term historical perspectives, reminders that limited understanding and inherent uncertainties are our constant companions in appraising the risks of globally fatal discontinuities and the strength and ultimate outcomes of unfolding trends.

The book focuses on discontinuities (e.g., catastrophes) and trends (e.g., demographics) as the two very dissimilar sides of the same coin. Either can bring about a fundamental shift in human affairs, although discontinuities are low probability while trends are continuous. The quite natural reaction of most people is to pay too much attention to the catastrophes and too little to the trends, especially geopolitical ones.

The tragedy is that few of the people in Canada who ought to read this volume will do so.

After an opening chapter headed “How (Not) to Look Ahead,” Smil devotes two fact-studded chapters to “Fatal Discontinuities” and “Unfolding Trends.” His approach is to provide the reader with a framework for thinking rationally about very scary things. He divides fatal discontinuities, for example, into known catastrophic risks such as volcanic mega-eruptions and virulent pandemics (which have happened before, so we can calculate the probability over the next 50 years), plausible catastrophic risks such as accidental nuclear wars (which have not happened and are much more difficult to rate quantitatively) and entirely speculative risks such as the emergence of an all-devouring gooey nano-species. Forget about that last kind, Smil counsels, since we cannot rationally assess the risk and there would be nothing we could do if it happened. For the other two categories, he works out in detail a range of risk probabilities and ranks these by relative orders of magnitude. Like deliberate deep breathing, the very exercise is strangely calming.

Much more challenging would be statistically ranking the relative probabilities of unfolding trends to affect the fortunes of nations and reshape world history in the current half century. Instead, Smil adopts a thematic approach, first zeroing in on the protracted transition to renewable forms of energy as the driver of the most fundamental shifts in the world economy. He then analyzes how the fortunes of the world’s leading economies will be affected by that energy transition plus key demographic, geopolitical and strategic trends.

Following these two chapters is one devoted to “Environmental Change.” This is dominated by global climate change that Smil positions as *sui generis*. It could obviously lead to fatal discontinuities, but is happening on an evolutionary time scale so also qualifies as an unfolding trend. This reader was left with the feeling that environmental change may also have rated such special treatment because Smil could freely draw upon a huge reservoir of his own published work. In any event, he convincingly punctures the overblown fear mongering of some celebrity environmentalists such as Stephen Schneider, while also demonstrating that governments need to give much higher priority to mitigating and adapting to climate change.

The book's final chapter—"Dealing with Risk and Uncertainty"—is the closest that Smil gets to saying what we should really worry about (remember nuclear mega-war and viral pandemics) by setting out a rational framework for quantifying risks and weighing unfolding trends.

This barebones summary does not convey the true flavour of the book. Reading it is like seminar classes at universities from the 1960s through the '80s (denied most undergraduates today and increasingly rare even at the graduate level). You can almost see Smil raising a quizzical eyebrow as he lets loose one of his "eclectic inquiries," or smiling wryly while tossing out one astonishing factoid after another. Consider, for instance, that by the middle of the century octogenarians will outnumber children in Japan, making it the most aged of all the aging high-income societies. Or that a major reason for falling life expectancy in Russia is the ravages of alcoholism. Or that 99 percent of all creatures and plants in parts of the San Francisco Bay are not native. And, finally, that African termites may consume annually as much biomass per unit of savannah as do elephants.

This last item, however, illustrates one of the book's shortcomings. The meaning is unclear (to this reader at least) and its contextual significance far from obvious. It is difficult to avoid the suspicion that Smil has a stack of neatly handwritten three-by-five cards through which he shuffles to select such astonishing tidbits.

And sometimes Zeus nods. The British Antarctic Survey only discovered the ozone hole over Antarctica—confirming the peril of chlorofluorocarbons—after missing the evidence for more than a year because automated data manipulation rejected the telltale satellite readings as anomalies. The statistics for adult "illiteracy" in China and India derived from the United Nations Development Programme are "nonsense," to use Smil's own language, since those two countries do not participate in the only rigorous assessment of national adult literacy levels, initiated in Canada in 1987 and now coordinated by the Organisation for Economic Co-operation and Development.

Merely irritating is the high level of typographical slips in a book from an academic publisher. I counted a half dozen misspellings, missing words or grammatical glitches, none of which I assume were Smil's doing. More than irritating, however, were the many poorly reproduced illustrations of dubious value. Why is a whole page given over to a photograph of Mustafa Kemal Atatürk or two thirds of a page to a black and white picture of the common European honey bee or a muddy half-page shot of Easter Island *moai*, which, after Stonehenge, must be the most portrayed bits of human-shifted stone on Earth?

These quibbles aside, the tragedy is that few of the people in Canada who ought to read this volume will do so. Smil is embarrassingly close to a prophet without honour in his own country. His books, published by MIT Press, are regularly reviewed in such august publications as *Nature*, the British science journal, and *Issues in Science and Technology* from the National Academy of Sciences, but largely ignored here. His website lists a sweeping range of more than three dozen sole-authored books since 1976, not including translations into Japanese, Italian, Spanish and Chinese and paperback editions. Even more impressive is that four more books are listed as forthcoming this year and next—entitled *Energy Myths and Realities*, *Why America Is Not a New Rome*, *Energy Transitions* and *The Two Prime Movers of Globalization*.

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So why is Smil's name not regularly heard among the elites in this country, those same people who have so far been taken in by one-trick ponies like Richard Florida? A major part of the problem is that Canada's chattering class is not only scientifically illiterate and largely innumerate but by and large not troubled by these lacunae. Just to take one example, few if any of the political commentators or politicians who regularly pronounce on the future energy course for the country have an inkling of the differing energy densities of biofuel, coal, natural gas and oil (as concisely and simply explained in the book, higher density means more energy produced from the same weight of fuel, with greater efficiency as one result). They display little chagrin at such base ignorance of the world around them and yet would be quick to disparage anyone who could not rattle off the name of Margaret Atwood's latest offering.

Such ignorance and even disdain toward science among opinion leaders and society nabobs is hardly new. C.P. Snow wrung his hands about these attitudes almost 50 years ago in *The Two Cultures*. What is different today is how much more science pervades our lives and how many of the major challenges facing the human race demand the brand of rigorous thinking that science inculcates.

Challenges such as: How much of Canada's economic resources should be devoted to preparing for a pandemic along the lines of the 1918 influenza outbreak? Should Ontario spend multiple billions on nuclear power? What genetic modification of foods ought to be allowed and do we have the knowledge to regulate it safely? What about exploiting the frozen gas hydrates in the Arctic Ocean and off the Pacific Coast? Is pumping carbon dioxide underground a sensible mitigation strategy for climate change? Should vast tracts of the Prairies be sown with switchgrass as feed stock for cellulosic ethanol? If the country is facing an "epidemic" of diabetes and cardiovascular disease, wouldn't targeting obesity be the most effective strategy to reduce that mounting burden on the healthcare system?

It is not that such questions are not being addressed. Some have already been tackled by the Council of Canadian Academies (curiously not cited in this volume). But there is a paucity of intellectually rigorous public discourse on these and other issues that have a scientific dimension.

One current example of such synaptically loose thinking is the accusation that the Harper government has turned its back on science, based on the evidence that the last budget did not increase the monies for curiosity-driven research at the three federal granting councils and also failed to top up the coffers of Genome Canada, a government-created agency that funds specialized biomedical research. Researchers have mounted a well-orchestrated media campaign to convince the public that the country's best scientific brains will soon be packing their bags to head south, where the Obama administration is promising large increases in spending on just such curiosity-driven research.

In the din and clamour of charge and countercharge, however, no one in public life in Canada, much less anyone in the media, has raised the key question: what is the optimal level of spending on scientific research and how should this be determined? Some researchers have complained

that one granting council could afford to fund only a quarter of the research projects submitted for approval. So what should be the right proportion? Half, two thirds, three quarters, all? Silence from those very scientists who usually insist that public policy should be evidence based. The inescapable suspicion is that the candid researchers would answer: “Whatever proportion secures my grant.”

Over the past 30 years, the proportion of U.S. federal government discretionary spending devoted to non-military research and development has remained remarkably constant at about 10 percent, according to statistics compiled by the American Association for the Advancement of Science. Canada’s federal spending is less than half of that. Do researchers believe the government should double our spending? What would they recommend cutting to close the gap, or would they advocate a major increase in taxation?

If the chattering classes in this country were not so befuddled by anything that smacks of science, they would not be such patsies for the self-serving arguments researchers are currently making without any rigorous evidence to support their claims of imminent eclipse. The media gullibility is probably not unrelated to the fact that almost no one in a senior editorial position at the country’s major newspapers has any post-secondary education in the natural sciences.

Smil demonstrates that it is possible for a well-trained mind to span science, the arts and the humanities. His formal training was in the earth sciences, but he has developed impressive expertise in areas as wide-ranging as economics, public policy, population growth, the global food supply and the environment. (In 1984, he was one of the very first to warn publicly about environmental degradation in China.) As a former foreign correspondent in Africa and the Middle East, I can attest that he has an appreciation of Muslim culture and its competing ideologies usually present only in those who spent years living in those realities. I appreciated the aptness of the Latin quotations selected for chapter headings in his book (I appreciated the translations as well). But Smil can also reach into the recesses of his vast reading to come up with an equally apt quotation from Ray Bradbury’s novel *Fahrenheit 451* or references to *The Rage and the Pride* by the Italian journalist and author Oriana Fallaci.

All this experience, expertise and learning are brought to bear in *Global Catastrophes and Trends: The Next Fifty Years*. It is a hard read, but those who persist will emerge intellectually toughened from this virtual seminar with Vaclav Smil.

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