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This month's Museletter comprises 3 short articles. The most recent concerns the oblique language of government which continues to stifle honest debate on the urgent issues we face; the second is a concise summary of those issues for policymakers; and finally I have included my foreword to the US edition of the excellent collection of essays published as 'Fleeing Vesuvius'.

Petroleum Propaganda 101: Develop vs Deplete

The following POP QUIZ is brought to you in part by the American Petroleum Institute:

Which sounds better? A) The Obama administration should be doing more to *develop* U.S. oil-and-gas reserves. Or, B) The Obama administration should be doing more to *deplete* U.S. oil-and-gas reserves.

If you answered "A" give yourself a pat on the back. But you'll also want to brace for impact, because you fell right into a trap built by the API and its Republican friends like House Speaker John Boehner (R-Ohio) who endorsed *development* with patriotic gusto on Monday, July 4. Of course we should do more to *develop* our resources. Sounds great! How can any sane person take issue with that?

It's a trick question. Let me explain: What does it mean to *develop* non-renewable resources? Extract, mine, dig up, disperse, burn. When we *develop* muscles or skills, we have more at the end of the process than when we started. When we *develop* non-renewable resources, we have . . . less.

Pretty sneaky, right? Now you can see that the better way to describe the extraction of America's non-renewable resources would be "B." *Deplete*.

Deplete America first! Deplete here, deplete now!

Nobody ever says that. But why not? It's precisely what we are doing by increasing rates of drilling and mining.

This is not semantic hairsplitting. It's an exercise in cognitive clarity. By using the word *develop* to describe a process of *depletion*, we are fooling ourselves—or allowing ourselves to be fooled. We

unconsciously accept the notion that we are furthering a process of wealth creation that is sustainable, when all we are really doing is spending down a finite resource.

Excuse me, would you mind if I *develop* your bank account?

But wait—an economist would argue that oil, gas, and coal accomplish nothing for us if left in the ground. By extracting and burning them, we are deriving real benefits that justify the term *develop*. That makes this situation fundamentally different from the mere spending down of a bank account.

Or does it? When there's money in your account, it only shows up as a number on a computer screen. When you spend that money, you get real stuff in return. Hot diggity! You're deriving a real benefit! Only trouble is, the number on the computer screen gets smaller and smaller until all you have left is a big fat zero, with which you can buy exactly nothing.

Or maybe not. If you're a responsible participant in the economy, you're not just spending down your account; you're also adding to it by working for a paycheck, or selling stuff, or whatever you do to get by.

So from that standpoint our use of non-renewable resources is *not* comparable to spending down a bank account. It's actually much worse! That's because we *can't add to the amounts of these resources provided by nature*. We can't create more oil, coal, or gas in any significant quantities, using a process that doesn't itself require huge amounts of energy. There's no paycheck being deposited in Earth's crust at the end of the week.

Depletion is depletion. When non-renewable fossil fuels are extracted and burned, they're gone. There will be less for future generations to use. That's the truth. Let's stop fooling ourselves.

Rising Hydrocarbon Costs: A Quick Summary for Policy Makers

During the past century, world economic growth has depended largely on ever-expanding use of hydrocarbon energy sources: oil for transportation, coal and natural gas for electricity generation, oil and gas for agricultural production. It is no exaggeration to say that the health of the global economy currently hinges on increasing rates of production of these fuels. However, oil, gas, and coal are non-renewable resources that are typically extracted using the "low-hanging fruit" principle. That is, large concentrations of high-quality and easily accessed fuels tend to be depleted first. Thus, while the world is in no danger of *running out* of hydrocarbon energy sources anytime soon, oil, gas, and coal extraction efforts are increasingly directed toward low-quality, hard-to-produce fuels that require higher up-front investment and entail increasing environmental costs and risks.

These trends are easily demonstrated in the case of oil.

Dependency: The dependence of the world economy on oil is illustrated by the close correlation between oil price spikes and US economic recessions that has been noted by several analysts.[1]

Declining resource quality: The pace of world oil discoveries has been declining since 1964. Oilfields found during the past decade have tended to be smaller, on average, than those located decades earlier, and tend to require expensive new technologies (including horizontal drilling, deepwater drilling, and hydrofracturing) for their development. As Jeremy Gilbert, former chief petroleum engineer for BP, has put it, "The current fields we are chasing we've known about for a long time in many cases, but they were too complex, too fractured, too difficult to chase. Now our technology and understanding [are] better, which is a good thing, because these difficult fields are all that we have left." [2]

Increasing upstream production costs: The cost of developing a new barrel of oil's worth of production capacity has increased dramatically in recent years. In 2000, the oil industry remained profitable with prices pivoting around \$20 per barrel. Today it is estimated that oil prices of \$60 to \$80 per barrel are required in order to incentivize new exploration and production in many prospective regions.[3]

Increasing environmental risks and costs: As drillers operate in ever more hostile and fragile environments, accidents can have far worse consequences on ecosystems and human economies that depend on ecosystem services. This trend was forcibly illustrated by the Deepwater Horizon blowout in the Gulf of Mexico in 2010. Lower-quality hydrocarbon resources typically also entail higher carbon emissions per unit of energy produced.

Coal and natural gas likewise exemplify these trends, though in somewhat different ways. While global coal reserves estimates have been used to justify the oft-repeated assertion that the world has hundreds of years of supplies, recent studies suggest world coal production could peak and begin to decline within the next 20 years. The most heralded recent development in natural gas industry is the application of hydraulic fracturing technology to production from low-porosity formations to boost reserves; however, this new technology poses increased environmental risks while entailing higher production costs.

Together, coal, oil, and gas contribute to the overall societal cost of anthropogenic climate change. The ultimate burden of climate change on the world economy has been variously estimated; in the worst-case scenario (a global average temperature increase of five or more degrees Celsius), the economy simply would not survive. On the other hand, however, action by governments to limit climate change will almost certainly directly or indirectly increase the price of fossil fuels, adding to price increases resulting from depletion.

As fossil fuels become more scarce and expensive, international conflict over remaining supplies, especially of oil and gas, is likely to become more heated—a trend already clear in the South China Sea and Central Asia.

The replacement of fossil fuels with alternative sources of energy is clearly necessary, but presents the world with an unprecedented technical challenge. Transport systems (autos, buses, trucks, trains, aircraft, and ships) can in some cases be electrified; in other cases, petroleum-based liquid fuels can be replaced with biofuels. Electricity can be produced from sunlight and wind rather than coal and gas. However, alternative energy sources currently provide only a tiny portion of current world energy, so a build-out will require enormous investment over several decades. Moreover, when the prospects of alternative energy sources are evaluated using all important criteria (including the amount of energy returned on the energy invested in energy production, or EROEI; environmental impacts; size of the resource; and variability in flow rates), it is difficult to identify a realistic scenario in which total world energy supplies can continue to grow—or even remain constant—as fossil fuels deplete.

Thus, even if governments act wisely now to develop energy alternatives at maximum possible rates, the world faces a nearly inevitable energy crunch during the next few decades.[4] Governments must therefore develop strategies for energy conservation. Not only must much greater efficiency be brought to energy production and usage, but essential and non-essential uses of energy must be differentiated, with essential uses prioritized and non-essential uses discouraged.

References:

1. James Hamilton, "[Historical Oil Shocks](#)." (PDF), National Bureau of Economic Research working paper no. 16790 (2011).
2. Jeremy Gilbert, "No We Can't: Uncertainty, Technology, and Risk," lecture presented at ASPO-USA Conference, Washington, D.C., October 9, 2010. Quoted in Richard Heinberg, *The End of Growth*. Gabriola Island, B.C.: New Society Publishers (2011), p. 104.
3. Chen Rui, "[Analysis on 'New Fundamentals' and Range of Oil Price Trend](#)" (PDF), World Energy Council, 2009.
4. P. Moriarty and D. Honnery, "What Energy Levels Can the Earth Sustain?" *Energy Policy* 37, no. 7 (July, 2009), 2469-2474.

Foreword to the US edition of [Fleeing Vesuvius](#)

"What a goldmine!"

That was my first reaction upon digging into the contents of this book. Others might have said something more along the lines of, "Oh my God! I had no idea our predicament was this terrible! What a pit we are in!" My rather gleeful response was due to the fact that I happen to be in the midst of researching and writing a book exploring the evident fact that resource depletion, debt overhang, and climate change have brought about the end of world economic growth (as currently defined). When I drilled into *Fleeing Vesuvius*, I encountered a rich vein of thought very much attuned with my own, one that includes stimulating ideas and examples that were new and helpful to me.

While other readers may come to this book with backgrounds different from mine, I think they will nevertheless find just as much

stimulation and help as I did.

The authors have applied themselves to an analysis of the most important and fateful economic transition in human history. They are among the People who are Paying Attention (PPA)—an almost completely unorganized demographic consisting of individuals who have the privilege to devote a substantial amount of time to following world political, economic, and environmental news, but who are not blinded by any fixed religious or political ideology. PPA probably number globally no more than a few million, and (if I may speak for them) have generally come to the conclusion that the world is facing a triple crisis:

1. The *depletion* of important resources including fossil fuels and minerals;
2. The proliferation of *environmental impacts, principally climate change* arising from both the extraction and use of resources (including the burning of fossil fuels)—leading to snowballing costs from both these impacts themselves and from efforts to avert them; and
3. *Financial disruptions* due to the inability of our existing monetary, banking, and investment systems to adjust to both resource scarcity and soaring environmental costs—and their inability (in the context of a shrinking economy) to service the enormous piles of government and private debt that have been generated over the past couple of decades.

While these three crises are converging on us, our leaders remain obsessed with one thing, and one thing only: the maintenance of economic expansion. For a variety of reasons, growth has become essential to the political well-being of modern societies. Yet our fixation on economic growth prevents our addressing any of the three crises: Governments refuse to curtail greenhouse gas emissions (and thus fossil fuel consumption) because doing so would reduce growth. They refuse to reduce their vulnerability to oil supply shocks because that would require them to proactively rein in oil use, thus threatening growth. And they refuse to explore fundamental changes to financial and monetary systems that would make their economies less susceptible to bubbles and crashes because...well, you can finish the sentence.

On the other hand, however, each of these three crises is threatening the continuation of growth. And not just threatening it; I for one would argue that, combined, they have effectively killed off growth once and for all: while we have seen some relative growth since 2008 (some months have seen increased economic activity as compared to others and some nations are still expanding as others swoon), over all the global economy is stalled and headed into a tailspin.

We can't address the problems that threaten economic growth because to do so would threaten economic growth.

A metaphor comes to mind: the spider monkey trap allegedly developed by tribes in South America, consisting of a staked container with a hole cut into it just wide enough for a monkey to insert its empty hand. The container is baited with banana or nuts.

Monkey reaches for bait but cannot pull its fist through the hole while clutching its prize. Monkey is not smart enough to let go of bait and is thereby captured. Substitute "economic growth" for "bait" and "economic-environmental collapse" for "capture" and you have a fair picture of our human dilemma circa 2011.

The bitter irony is that we can't maintain continuous economic growth on a finite planet in any case. Resources are limited, and substitution and efficiency (economists' magic genies invoked to explain away the inevitable problems of depletion and pollution) are subject to the law of diminishing returns. But that hasn't stopped us from wishing for perpetual growth, believing in it, and trying to achieve it. Indeed, we are endeavoring to do the impossible so valiantly and single-mindedly that we are willing to wreck the only planet we have in the process. To hell with future generations! We must increase our GDP today!

To be fair, politicians are just attempting to do what the majority of their constituents demand that they do—produce more jobs and higher returns on investments. And this means growing the economy. The cognitive dissonance is unbearable: we *must* do something that is actually impossible to do. And so most of us simply give up and go quietly insane, or just stop paying attention.

The People Paying Attention are among the minority who eschew insanity as either a defense or a strategy.

Those among the PPA who happen to be writers or activists of one sort or another have been trying to explain all of this to policy makers for many years, mostly to no avail (one politician who does understand the dilemma is Eamon Ryan, the Irish MP who is a contributor to this book).

Sadly, efforts to address the triple crisis have been put off so long that today an easy escape from the monkey trap is no longer possible. (Warning: abrupt metaphor change immediately ahead!) The tectonic pressure is building and something has to give way. We have set ourselves up for an economic-environmental "correction" that will almost certainly be geological in scope and intensity. We could liken it to an earthquake or volcano of such force that it will likely destroy many of the basic structures of civilization on which we have come to depend.

This book is therefore something of a last warning. It outlines the triple crisis as clearly as can be done. Even more valuably, it points out things we still can do to help our society make the inevitable transition away from a fossil fuel-based, debt-based economy in such a way as to avert the worst of the impacts otherwise in store. And it suggests how to prepare ourselves for whatever seismic events are now unavoidable.

The editors are to be congratulated for assembling essays from contributors who are at the very forefront of efforts to understand and respond to the triple crisis. That's what makes this a goldmine. But (to burden a short Foreword with yet another metaphor) it is also an essential roadmap—an overview of the routes we can take to escape an eruption that has already begun.

Dig in to this goldmine. Reject insanity or denial. Escape our monkey trap by letting go of the impossible dream of endlessly growing consumption. Follow the map; flee the volcano. And join with others who are paying attention: let's save as much of humanity and the natural world as we can.

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