Letters to an Author

Extensive response to Richard Duncan's essay on the 'Olduvai Theory'

In the Winter 2005-2006 issue of The Social Contract *we were privileged to publish an essay by Dr. Richard Duncan on the Olduvai Theory of energy depletion. There was a tremendous amount of traffic on our website as interested parties from all over the world read the essay. Dr. Duncan received many letters on the matter. Here are some of them.*

DEAR RICHARD:

Another aspect of the matter apart from electricity, which may trigger the collapse, is financial capital, which is a rather mysterious substance.

I gather that the banks have been lending more than they had on deposit confident that Tomorrow's Economic Expansion was collateral for Today's Debt. But the declining energy supply means that economic expansion can no longer be taken for granted, which means in turn that debt is losing its collateral.

It seems that they wake up to this as I and colleagues have given presentations to J.P. Morgan, Goldman Sachs, Union Banc of Switzerland, not to mention a Swiss bankers' club (all dressed in identical black suits).

So they become aware of the position and are probably on standby to bail out on the first sign of trouble.

Ironically, however, the high price of oil is increasing liquidity. It still costs the Middle East $5 a barrel to produce the stuff so when they sell it for $60 the balance is profiteering. They simply can't eat enough dates to consume it, so it finds its way back to Wall Street making an already fragile structure weaker yet. I am surprised at the current strength of the market as the underlying assets are devaluing: perhaps it is the last hurrah as the insiders unload their paper on the Saudis.

Clearly, the dollar has to devalue to dispose of the mountain of dollar-denominated debt. I see that Ford and General Motors are already close to bankruptcy, closing plants and axing staff – amazing really. Perhaps it will lead the U.S. into a new beneficial isolationism and self-sufficiency. I guess the log cabin can make a comeback when all those lights go out. If they closed the frontier, the natural birthrate might decline so that the population would not exceed the productivity of the land. Cannibalism in Chicago might be an intermediate step consistent with the Olduvai revelation. McDonald's may pioneer a new line of the human hamburger in the best of free market traditions.

COLIN CAMPBELL

[*Colin Campbell is a petroleum geologist and founder of the Association for the Study of Peak Oil (ASPO), author of several books and numerous papers*.]

DEAR RICHARD:

Thank you very much for your letter and the copy of your Olduvai Theory. Well done, congratulations! I am still investigating the ethanol boondoggle. Currently, the U.S. is producing 3.4 billion gallons of ethanol per year (DOE) that represents about 1 percent of total U.S. vehicle fuel use per year and is using 14 percent of U.S. corn production. If 100 percent of U.S. corn were used it would provide only 7 percent of current U.S. vehicle fuel use. Will this make us oil independent?

DAVID PIMENTAL

[*David Pimentel, a professor at Cornell University, is a widely published author on biofuels*.]

DEAR DR. DUNCAN:

Currently, I am reading about the Olduvai Theory and have only one main question in my mind. Since I will graduate high school in 2008, it almost feels like the future after that is grim and hopeless. Are there any solutions or even hopes to overcome the future's bleak fate? Anything that might help "turn the tides" so that the world's future doesn't end up like stone men again? I'd appreciate anything.

MATTHEW WONG

Dear Matthew,

Many thanks for your perceptive inquiry. I share your concerns about the likelihood of an Olduvai future – mostly for my children and their children. And too for all humanity.

In my opinion, big changes are in the offing, although they might differ considerably from what I've described in my essays.

Purely for discussion here, it is useful to categorize three possible scenarios for the future. Of course, it's up to you to choose among them or reject them all.

- Assume that the Olduvai theory is false and the future unfolds with no surprises. In this case: learn your studies well; stay healthy, exercise regularly with good nutrition; bond closely with family and friends; keep a positive outlook; and have lots of fun.
- Assume that the OT has a 50 percent chance of being true and thus some detailed planning and preparation is important. In this case continue to learn your studies well; stay healthy and bond closely with family and friends; keep a positive outlook; get in touch with newsgroups such as *permaculture.com* and *communitysolutions.com* where you will learn what others are planning and doing.
- Assume that the OT is true and hence specific planning, preparation and action are essential now. Continue to learn your studies well; stay healthy and bond closely with family and friends; keep a can-do outlook; and become active in one or more of the localized sustainability groups such as you will find at *permaculture.com, communitysolutions.com*, etc.

Note: I haven't had any specific practical experience in what to do. However, John Michael Greer <threelynx@earthlink.net> has been fostering localized rural communities for many years and he is likely to have some useful real-world experience to share.

All good wishes, Richard Duncan

EDITOR:

Thank you for posting Dr. Duncan's latest thinking. Dr. Duncan's analysis makes it clear that social collapse is already a "done deal," and there isn't anything we can do about it beyond Richard Heinberg's "lifeboat" option. Something tells me that 2012 rather than the nearer date of 2006 is the time when it will become clear to all but the most retrograde that our society, and all that it promised, is a mirage sustained by energy, pure and simple.

NARESH G. GIANGRANDE
United Kingdom

DEAR DR. DUNCAN:

I have seen several articles on the internet related to your work on systems dynamics modeling and the petroleum peak. I am currently conducting a number of analyses for Senator Harry Reid (D-Nevada) relative to the use of fossil fuels versus renewable/alternative energy resources. The goal is to look at how we should be balancing our use of fossil fuels versus renewable/alternative energy resources and to what extent we should be investing in renewable/alternative energy resources now and in the near future. So, I am interested in a number of your articles that I have glanced through on your web page and elsewhere.

Also in my "day job" at the Idaho National Laboratory, I work with a group of scientists who do systems dynamics modeling. So I am very intrigued with the concept that you've engaged in – some rather extensive modeling of the world petroleum peak.

GERALD SEHLKE
Advisory Scientist/Engineer
Idaho National Laboratory
Congressional Fellow for Senator Harry Reid

DEAR DR. DUNCAN:

I am a 33-year-old energy engineer who has been researching Olduvai Theory related issues over the last several years. Although my formal background is technical, my interests range widely to include social dynamics and ecology. Early in undergraduate study I was researching material for a presentation on population pressure and resource depletion and found I was innately interested in the topics. It wasn't until I was studying distributed generation and had learned about Peak Oil in 2003-2004 that inevitabilities became obvious.

This past year has found me visiting an eco-village, working as an apprentice on an organic farm in New York and in March I hope to apprentice again for a horse-powered organic farm in Oregon through the spring/summer. It is difficult at this point imagining a return to technical-type work unless I can find a research-oriented position with an organization or program, academic or otherwise that is aware of our situation and that feels the need to educate others. Do any like that exist? I feel I have more to offer in terms

of research and outreach on this path. I have attached my technical resume although it doesn't reflect experience like those listed above.

BRANDON MARSHALL

[Dr. Duncan responded with several suggestions for Mr. Marshall's future work.]

DEAR DR. DUNCAN:

Thank you so much for latest "Olduvai Essay" which was plenty interesting as usual. Your two billion people by 2050 was quite a shock: I had envisioned between six to seven billion based upon Professor Abernethy's theories. But, you might be correct after all.

ALI SAMSAM BAKHTAIARI

[Mr. Bakhtaiari is a petroleum geologist in Iran.]

DEAR DR. DUNCAN:

I have just read your paper, "The Olduvai Theory" in *The Social Contract*, and being familiar with Heinberg, Kunstler, et al, your argument, although it goes considerably beyond theirs, seems quite plausible (and more so every day.) I have a few questions:

1. I didn't read a rationale for the 2008 beginning of the steep decline in "e." Would I need to go to your model to understand that date?

2. What about the efficiency factor? Would "work/population," with work being a term for the efficiency of energy, give a significantly different result?

3. Does your gut instinct tell you whether the decline of "e" will stop at a level in which agricultural village life could work, or will "e" decline to a Stone Age level?

Thank you for telling the truth about our situation. If only our species could hear and act.

TIM HANSEN
Highland Books
Brevard, NC

Dr. Duncan replies...

1. Actually it reads "circa 2008" defined as 2006-2012. We put Peak Oil at 2007 (Duncan and Youngquist, 1999) and the peak will be known only in the rear-view mirror (per M. Simmons). U.S. natural gas peaked in 1971 and North American natural gas peaked in 2001 (Youngquist and Duncan, 2004). Moreover, as everyone now knows, there are non-depletion causal factors too (Iraq tragedy, Middle East mess, U.S. trade deficit, Federal deficit, housing bubble, Nigerian uprising, etc.]

2. World energy efficiency (oil, gas, coal, nuclear and hydro) has never been rigorously quantified. It would be a useful contribution for someone to calculate and publish the ratio of world "work/population" from, say, 1900 to 2005.

3. The OT just takes us to 2030 when E/P has fallen to the same value it had in 1930 when some people had cars, airplanes, radios, electric appliances, etc. See Dr. Youngquist's statement about the material standard of living in 2050 in my *The Social Contract* essay. A big decline, yes, but hardly the Stone Age. However, per King Hubbert, in the longer run we're heading for "the agrarian level of existence" by about 2200 and still falling.

Sincerely, Richard Duncan

[Dr. Duncan received a message from a professor of engineering in Ibaraki, Japan, who posed several questions. He divided the message and answered each portion of the original. Dr. Wakabayashi's questions are in italic.]

Dear Hiroaki,

Many thanks for your perceptive comments and useful questions. The brief responses below are followed by a critique showing that the mounting U.S. debt is probably more of a threat to civilization than energy supplies. The page numbers are from the online publication of my essay.

After reading through your new paper (TSC, Winter 2005), I am still curious to know the causes of phenomenon of the too quick decline of E/P Circa 2008 which appears in Figure 3 Note 6 in the paper.

The rule from statistical analysis is straightforward: "correlation is not causation." In other words: In a complex time-varying system, statistical tests can't prove anything about causality. That said, however, we can make some reasonable and useful estimates.

Question #1: As to your calculation of E, is there any specific model in your system dynamics calculation of each electricity production from sources of coal, oil, natural gas, hydro and nuclear? In other words, have you included, for example, the shortage of natural gas as a cause of blackouts and related it to the production of primary energies in your calculation of E? The reason I ask this question is that the Cliff

only may occur solely in this case. Is this correct? If so, I want to know a little more of the detail of the model.

Response #1a: Total world energy (E) includes oil, gas, coal, nuclear and hydroelectric energy (primary energy) – but not electricity (end-use energy). I estimated the fraction of each primary energy used to generate electricity on page 4 of my essay. To get the estimate of primary energy used for electrical generation over the years go to the graph "World consumption" on page 39 of the BP Statistical Review of World Energy (June 2005, bp.com) and then multiply each annual amount of primary energy used for electricity by the fraction I gave.

Response #1b: Yes indeed, a shortage of natural gas could cause the U.S. dollar to collapse and the world economy to plunge. In fact, some 10 years ago, Jay Hanson predicted that U.S. natural gas shortages would be the "Trigger Event" for the Olduvai Cliff. (See Youngquist and Duncan, "North American Natural Gas: Data Show Supply Problems", Natural Resources Research, December 2003, pp. 229-240.)

Response #1c: A whole series of energy forecasts served to put the Olduvai Cliff event at circa 2008, Most important was our world oil forecast #2 that put Peak Oil in about 2007. See Duncan and Youngquist (1999) as referenced in The Social Contract.

Question #2: You mention in your paper that The Olduvai Theory puts the world population peak at 6.90 billion in 2015 and falling to 2.00 billion in 2050 (sic). Are these figures the results of your system dynamics calculation with a model based upon birth rate, death rate, etc. If so, could you provide your past published paper or others for me to understand the population model of OT.

Response #2: The 2.0 billion population in 2050 is based on the work of the five analysts cited in my Olduvai essay. And more recently I located a sixth analyst, Dr. Ross McCluney, who came to the same conclusion. Specifically he writes, "My warning of today: We are systematically taking apart the life-support system of Planet Earth: (a) We've exceeded the sustainable carrying capacity of the planet by a factor of 3; (b) For everyone to live like the average North American it would take three Earths." See slide 24 of 50 at <http://www.futureofhumanity.org> and click on "The Fate of Humanity".

And finally let's consider how the soaring trillions of $US debt are a threat to civilization:

"FLASH: COLLAPSE OF THE US DOLLAR IS IMMINENT." That's pure fiction, of course, but now it looms real. Moreover, the soaring U.S. debt has been lurking in the shadows for a long time. In fact there have been many clear warnings, including: (1) Robert Kaplan's Book *The Coming Chaos*, (2) Walter Youngquist's *GeoDestinies* (especially the chapter "Minerals, Money, and the Petro-Currencies," and (3) most recently (2006) Kevin Phillip's *American Theocracy* which states that the total "present and future U.S. debt may exceed $70 trillion." Thus the $9 trillion U.S. federal deficit that recently shocked the nation is only a part of it.

Sincerely, Richard Duncan

DEAR DR. DUNCAN:

I'm a PhD student in atmospherical science, but have ended up researching some energy topics as well. Your writings are inspiring, although I might have less pessimistic thoughts about the effects on the western world than the Olduvai Theory predicts. [Dr. Duncan quotes the questions that follow as part of his response.]

Best regards,
STAFFAN SJOEGREN
Paul Scherrer Institute
Hanover, Germany

DEAR STAFFAN SJOEGREN:

You ask the question: *have you used primary produced energy for your Fig 2 in the OT Winter 2005-2006 paper? I think so as you state BP as source. Wouldn't it be possible to include a factor for reduced net energy received due to increased difficulties by extraction? In that case the energy "produced" would decline slightly.*

Response 1a: Yes, primary energy from BP 2004 is used. Note well that the latest data was to year-end 2003 (a crucial oversight made by the folks at *theoildrum.com*).

Response 1b: Your question (about reduced net energy) is well taken, but any attempt to answer it would be very complex and the calculations would neither be convincing nor readable. I'll stick with Ackerman's ("White's") Law as written.

Will you provide an update each year? Will we see a

decrease? That would be a bit like each update from Stuart Stanford at the oil drum: www.theoildrum.com/story/2006.

Response 2a: Yes, I'll update the historical portion of the Olduvai curve with data through 2005 when the BP Statistical Review of World Energy comes out in June 2006.

Response 2b: A preliminary look suggests that only world coal production per capita is increasing. Moreover, all of the 20th century energy production per capita is flat or decreasing. If this trend continues we are moving backward to the 19th and 18th century fuels – and beyond. Just as the OT scenario pictures it.

Best wishes, Richard Duncan

Dr. Duncan received a copy of the following exchange between two colleagues:

DEAR MR. PELTO:

I have known Richard Duncan for years and am NOT impressed with his alarming forecasts. I remember arguing with him about the trees all dying alongside the freeways (he claimed) … which is obviously wrong. Which is an early example of his hysteria. And to seriously consider his "Olduvai" hypothesis of a mass collapse and human deaths, all due to oil depletion, is nuts I think. We are much more intelligent and resourceful than that! I'll give him credit for dealing with a vital issue, and calling it to our attention, but his conclusion that the civilized world will collapse is off the wall! He knows my opinions here, too. His conclusion is a terrible insult to all of us who believe in rationality – it says we are as stupid as the lemmings which follow one another off the cliff.

Re the doom and gloom comments of the men below, they remind me of the famous essay, "Tragedy of the Commons" by Hardin.

But the main lesson from that is that this is not really a tragedy, i.e., it doesn't have to happen. The commons can be saved via good management. I think there is much evidence to support this and I do get so tired of the doomsayers.

The example of our own Lake Washington is good. Air pollution in Los Angeles is another. Water pollution in many areas has been reduced. Fish are being managed … Forests … etc. All is not bad news. Even population control is possible.

JEFF DOUTHWAITE
Seattle

Richard Pelto responds to Jeff Douthwaite:

Tweaks here and there are not going to get us through this transition. I call it Living on the Cusp – which is the title of my workshop – the transition from a fossil fuel economy to a renewable and sustainable society. Declining energy supplies are just the start; the ensuing problems with agriculture, resource wars, financial collapse (something Colin Campbell is focusing increasingly on BTW), pollution, climate chaos, civil unrest, and other biosphere and resource constraints all add up to one thing: exponential growth in a finite ecosphere.

Sweden is planning a renewable energy economy – without using nuclear energy. They are planning on making a country-wide "lifeboat" in Richard Heinberg's terminology. An oasis of sanity; and acting in a far more sane and responsible way than I thought any national government capable of. It remains of course to be seen whether this high-sounding proposal ever becomes a reality. I expect any concrete proposals will be hung, drawn, and quartered by the special interest groups and multinationals long before they become law, or government policy. Forgive my skepticism, but after nine years of Tony Blair, the Environmental Champion, here in the UK, I can perhaps be forgiven.

Whether a "lifeboat" of national proportions will be viable in tomorrow's turbulent world also remains to be seen, but fair dues to the Swedes for having a go.

RICHARD PELTO
Seattle