

The Olduvai Theory

Heading into the Gorge

BY RICHARD C. DUNCAN, PH.D.

Abstract

The Olduvai Theory is defined as the ratio of world energy production and population. It states that average energy production per capita will decline to its 1930 level by 2030. Collapse will be strongly correlated with an “epidemic” of blackouts around the globe. This warning has come from scientists for more than a century, but it is still disallowed in Washington, D.C. A back-to-the-land movement has emerged and is accelerating.¹

Key Words: *Earthlights; electricity; blackouts; agrarian-to-industrial-to-agrarian (A-I-A); the transition dilemma (TD); cliff2012.*

In a previous paper for *The Social Contract*, I focused on the Olduvai Theory. This raises the following question: Where will the Olduvai die-off occur? Answer: Everywhere.

Large cities will be the most dangerous places to reside when the electric grids permanently fail. Therein millions of people are packed in high-rise buildings, surrounded by acres and acres of blacktop and concrete: no electricity, no work, and no food. The Olduvai Theory is defined by the ratio of world energy production and population (*e*).... It states that energy production per capita will fall to its 1930 value by 2030, thus giving industrial civilization a lifetime of less than or equal to 100 years. The theory projects that the collapse will be strongly correlated with an epidemic of blackouts worldwide.

Urban areas will rapidly depopulate when the power grids die. In fact the danger zones are already

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mapped out. Specifically: The big cities stand out as brightly lighted areas on NASA’s satellite mosaic, *The Earth at Night*. These planetary lights blare out “beware,” “warning,” “danger.” The likes of Baltimore-to-Boston, London and Paris, Brussels-to-Berlin, Bombay and Hong Kong and Osaka-to-Tokyo are all unsustainable hot spots.²

Let there be light

All primary sources of energy are essential to modern civilization. The Olduvai Theory however focuses on a secondary source, namely *electric power*. And visible proof of its global importance is confirmed by NASA’s composite display of Earthlights at Night.²



Figure 1. Earthlights at Night: Chicago, New York, etc.

The above image shows the lights of Chicago near the upper left corner and those of New York City near the upper right, plus many cities to the south, including Baltimore and Washington, D.C.³

The solar basis

Electromagnetic energy was, is, and always will be fundamental to all life on this or any other planet. Many millions of years ago the incoming solar rays “nourished” microorganisms (protists) whose bodies ultimately morphed into the fossil fuels: coal, petroleum

and natural gas. Then about 150 years ago we learned how to turn fossil fuels back into electromagnetic energy. Enter a boy named Tom.

Thomas Alva Edison (1847-1931, USA)

In 1882 Thomas Edison’s Pearl Street Station in New York was the forerunner of global electrification. (3) An artist’s rendition of Edison’s station appears on the Web.⁴

... Thomas Edison was more responsible than any one else for creating the modern world... No one did more to shape the physical/cultural makeup of present day civilization... Accordingly, he was the most influential figure of the millennium.

The benefits of electric power were immediately obvious:

Electricity was good for more than just light and transit. Cheap, plentiful electricity would attract industries, jobs and prosperity. City Light isn’t just a utility; it’s a “city builder.”⁵

Henry Adams (1838-1918, USA)

Henry Adams was Chairman of the Department of History at Harvard University for six years and a celebrated resident of Washington, D.C. His lifelong goal was to discover a succinct *law of history*. It was at the Chicago World’s Fair in 1893 — the campus blazing with electric light — where he hypothesized, “Incandescent lighting and electric power will soon destroy industrial civilization.”

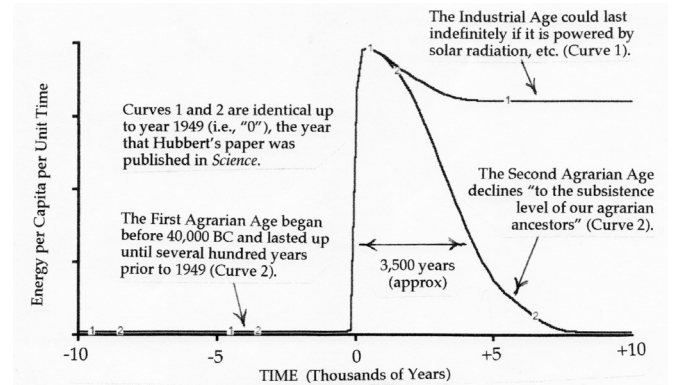
The new American — the child of incalculable coal power, electric power, and radiating energy, as well as of new forces yet undetermined — must be a sort of god compared with any former creation of nature.... The new forces would educate.... The law of acceleration was definite.... No scheme could be suggested to the new American, and no fault needed to be found, or complaint made; but the next great influx of new forces seemed near at hand, and its style of education promised to be violently coercive.... Forces totally new would accelerate society into chaos and ruin.⁶

M. King Hubbert (1903-1989, USA)

Dr. M. King Hubbert in 1948 depicted an Agrarian-to-Industrial-to-Agrarian (*A-I-A*) scenario as a possibility for the world’s economy.

Figure 2. Agrarian-to-Industrial-to-Agrarian (A-I-A)

Figure 2 shows the middle 20,000 years of Hubbert’s Frame #3. His reference year is zero, designating 1949, the year his paper was published.



Time perspective

The consumption of energy per capita after having risen very gradually from 2,000 to possibly 10,000 kilogram calories per day is seen to increase suddenly to a maximum value of several times the greatest previous value. Again it is physically possible to maintain the high value, indicated by Curve 1, on a stable basis for an indefinite period of time from current energy sources, ... It is also possible, however, that through cultural degeneration this curve may decline, as in Curve 2, to the subsistence level of our agrarian ancestors.... It is clear, therefore, that our present position on the nearly vertical front slopes of these curves is a precarious one, and that the events, which we are witnessing and experiencing, far from being “normal,” are among the most abnormal and anomalous in the history of the world....

Among the inevitable characteristics of this future will be the progressive exhaustion of the mineral fuels, and the accompanying transfer of the material elements of the earth from naturally occurring deposits of high concentration to states of low concentration...

Fred Hoyle (1915-2001, UK)

Sir Fred Hoyle in 1963 gave a series of lectures wherein he stated:

It has often been said that, if the human species fails to make a go of it here on the Earth,

some other species will take over the running. In the sense of developing intelligence this is not correct. We have, or soon will have, exhausted the necessary physical prerequisites so far as the planet is concerned. With coal gone, oil gone, high-grade metallic ores gone, no species however competent can make the long climb from primitive conditions to high-level technology. This is a one-shot affair. If we fail, this planetary system fails so far as intelligence is concerned.... (p. 64)

If the world population is not stabilized... nothing but pain and grief will follow. The future will then indeed be based on our cries of agony. (p. 69)

Roberto Vacca (Italy)

Roberto Vacca is a member of the Club of Rome. His book, *The Coming Dark Age*, theorizes that industrial nations are increasingly at risk because of their dependence on complex and sensitive systems such as the electric power grids.

Such critical situations as I have described [e.g., blackouts] develop gradually, and are contributory prerequisites of graver crises that will come more precipitately. These are our real interest and concern, for they will be an integral part of that ultimate avalanche of a breakdown, which will initiate a new dark age. (p. 65)

And yet the probability that a crisis is on the way is strong and growing stronger in all great cities where people are densely congregated. ... (p. 132)

Urban crisis will not be exclusive to New York; that particular megalopolis serves as our example of what will occur in every great metropolitan city. On the other hand, the vivid events here foreshadowed would not produce The Dark Age overnight; they would be, rather, the germinal beginning, disintegrating agent — of a profound breakdown of society and of civilization itself, as we know it.... (p. 137)⁷

Jay W. Forrester (USA)

Dr. Jay Forrester in 1971, at the request of *The Club of Rome*, built a world model “to understand the options available to mankind as societies enter the transition from growth to equilibrium.”

What happens when growth approaches fixed

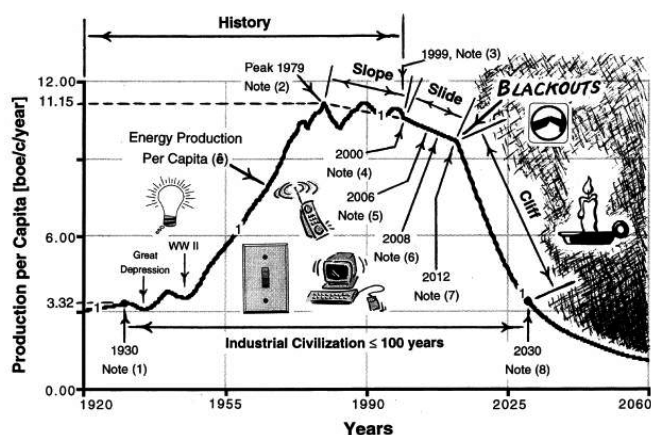
limits and is forced to give way to some form of equilibrium? We need have no fear that population will continue to rise forever... If man does not take conscious action to limit population and capital investment, the forces inherent in the natural and social system will rise high enough to limit growth.... (p. 68)

Our greatest challenge now [i.e., in 1971] is how to handle the transition from growth into equilibrium. ... The folklore and the success stories praise growth and expansion. But that is not the path to the future.... (p. 112)

Dr. Forrester didn’t include the possibility of urban blackouts in the standard run of his model. Nonetheless, even without blackouts, the world population peaked in year 2023 and then declined by 28 percent in 2100. (Fig. 4-1, p. 70). In contrast, with blackouts the world population would likely decline by considerably more than 28 percent in 2100.

Picture the Olduvai Theory

I graphed the Olduvai Theory in 2001 by a steep upside curve, followed by a bumpy “plateau,” then a brief “slide,” and finally a steep “cliff,” reproduced in Figure 3.



The curve from 1920 to 1999 is historic data, so that still stands. But the forecast from 2001 to 2011 is wrong because the value of energy per capita rose to 12.83 in 2011. However the *Olduvai cliff* remains at year 2012 as overpopulation, global warming, national bankruptcies, blackouts, etc. strike wide and deep.⁸

Dennis Meadows (USA)

Dr. Meadows in 1972 was one of the authors of *The Limits to Growth*. Therein he stated that there is still time for “the transition from growth to global equilibrium.” But now he sees things differently:

In so far as I can tell, people who use the term

[sustainability] mean, essentially, that this would be a phase of development where they get to keep what they have but all the poor people can catch up. Or, they get to keep doing what they've been doing, but through the magic of technology they are going to cause less damage to the environment and use fewer resources. Either way you use the term, it is just a fantasy.

It has probably been only in the last four or five years that it has become really clear to me that we just haven't got a chance of dealing with these issues in any kind of orderly way. ... *Limits to Growth* is absolutely focusing on a bubble, a bubble in population and in material and energy consumption. ...

Theoretically, resilience is the capacity of a system to absorb shocks and to continue functioning. ... I am talking about coping with the permanent loss of cheap energy or the permanent change in our climate and what we can do at the individual, the household, the community, and the national level to ensure that ... we will be able to pass through that period still taking care of our basic needs.

Walter Youngquist (USA)

Dr. Youngquist is a geologist who has worked abroad and traveled in more than 70 countries where he studied the vital relationship of Earth resources to nations and populations. In January 2012, he noted:

I think your view of the future of electricity is very prescient — in that the scale of things is beyond what can be coped with — and black-outs are increasingly the mode in the United States, but already evident elsewhere.

The use of electricity defines civilization, as we know it today almost as much as is the use of oil.

Things continue to come apart everywhere — famine in Africa because of too many people for a beaten-up environment to support, government debt rising in Europe and here as all the industrialized countries are living beyond their means. Frugality will arrive whether people like it or not. I see one statement saying that the U.S. standard of living has been in decline for several years. It can only get worse. Also we are making (and import-

ing) people faster than we are making jobs. ... The unemployment rate will never get back to the previous 5 percent. So what does government do to handle the unemployed? Spend more money it doesn't have to support a standard of living that cannot be supported. Social upheavals are ahead for sure.

We just don't have the resources on this finite Earth to sustain people in the lifestyles they have now — much less for those who would like to achieve that lifestyle.

Chaos is ahead as populations face a future of LESS.

And in May he continued:

Over history austerity has been the NORM. Recent prosperity for a few of us cannot last.

The world in general faces more austere times — a future of less!!! When the Greeks had to face it they rioted — to no avail. Many such social upheavals are to come as more and more people divide up declining and degrading resources. Roots of troubles are ahead as population rockets up to 10 billion—I cannot visualize that world!

Colin J. Campbell (Ireland)

Dr. Campbell is a petroleum geologist and in February he spoke on the past and the future.

We have now passed the first decade of the Twenty-First Century and may again face radical changes. The success of the last Century has severely depleted the resources of the Planet, especially its critical energy supplies, suggesting that the *Industrial Age* has passed its peak to face contraction...

Looking ahead, it is evident that we enter the Second Half of the Oil Age, when this critical energy supply that fuels the modern world, including its military engagements, declines from natural depletion. Today, some 60 billion barrels of petroleum a year...support a population of 7 billion people, but by 2050 the supply will be sufficient to support no more than about half that number in their present way of life. It speaks of a radical change, with the transition likely to be accompanied by much tension, signs of which have already been seen.

We may see a return to regionalism with the

development of local markets, even local currencies, and a new community spirit, as the imperial constructions of the past pass into history. As always, there will be winners and losers, with the winners being those who adapt better to the changing circumstances. The Transition Town Movement had its origins in Kinsale, Ireland but has now spread around the world setting an example of the new strategies to be followed.

Transition towns and doomsday preppers

The World is in terrible shape—including the U.S. The Olduvai Gorge looms.

We are living beyond our means and the Earth's natural resource credit card is maxxed out. Now what?

More and more people are quickly realizing that the Earth's resources that we depend upon, such as arable land, potable water, nonrenewable resources, are rapidly decreasing while the human population is rapidly increasing. This predicament has fostered the Transition Movement, the Preppers Network, and others to prepare.

(a) The Transition Movement is bringing together people that now live in nations, provinces, cities, and towns that are readying for whatever the future holds.

The Transition Town [comprises] vibrant, grassroots community initiatives that seek to build community resilience in the face of such challenges as peak oil, climate change and the economic crisis. The Transition Movement differentiates itself from other sustainability and environmental groups by seeking to mitigate these converging crises by engaging their communities in home-grown, citizen-led education, action, and multi-stakeholder planning to increase local self-reliance and resilience....

- If we wait for governments, it'll be too little, too late.
- If we act as individuals, it'll be too little.
- But if we act as communities, it might just be enough, just in time....

(b) The American Preppers Network is part of a fast-growing international movement organized by nations and regions.

It has formed alliances with independent affiliates such as *Pioneer Living Survival Magazine*, a homesteading and survival skills

website which provides a range of advice for those who want to store extra food in case of a power cut, to those who want to embrace the "off-the-grid" lifestyle of America's western pioneers....

Today you're seeing average people taking smart moves and moving in intelligent directions to prepare for the worst. ... Growing your own, self sustaining, doing as much as you can to make it as best as you can on your own... And it also means becoming more and more tightly committed to your neighbors, your neighborhood, working together and understanding that we're all in this together....

The *Golden Horde* describes the anticipated large mixed horde of refugees and looters that will pour out of the metropolitan regions when a catastrophe strikes. Thus the following dilemma arises.

The *Transition Dilemma (TD)* states: The more successful a Transition Town, the more danger its inhabitants face from the robbing and looting by the starving people fleeing the urban chaos. Thus to protect itself each Transition Town must have (a) a large part-time police force, (b) communications within each town and between the towns, and (c) guns and ammunition for a long siege.⁹

Blackouts are increasing because electric power systems are aging and expensive to upgrade and maintain. And if one-city blackouts occur for an extended period of time, this will cause chaos within that city. However, as the news spreads it is likely to cause more blackouts and turmoil in other cities.¹⁰

Summary and conclusions

In 1882 Thomas Edison brought electricity and affordable lighting to the world. In 1893 historian Henry Adams theorized that electric power would drive industrial civilization into overshoot and collapse. In 1949 M. King Hubbert published an agrarian-to-industrial-to-agrarian (*A-I-A*) scenario. In 1963 Fred Hoyle forewarned that overpopulation would cause "our cries of agony." In 1971 Roberto Vacca foresaw "a new dark age" and used New York City as his example. In 1971 the standard run of Jay Forrester's world model showed that growth "is not the path to the future."

In 2012 three eminent scientists — Dennis Meadows, Walter Youngquist, and Colin Campbell — basically agree: "Chaos looms as the growing population faces a future of less."

The Transition Movement and the Preppers Network recognize the need to balance the world's population and the earth's natural resources.

The *transition dilemma* (TD) states that a successful transition town would also be a magnet for desperate and dangerous people. This problem could be solved in each town by a reliable communication network and a strong defense unit.

Several industrial nations are already over the cliff. Ultimately the world's population will peak and decline. ■

Endnotes

1. Google has built a colorful website about the Olduvai Theory; just google: "*images for olduvai theory illustrated guide*." Then click the pictures, graphs, and cartoons to see how they explain the theory.
2. Could it be that the blackout in the Eastern U.S. in 2012 is a preview of things to come?
3. Envision the chaos that would erupt and rapidly spread if one of the world's largest cities blacked out permanently.
4. Minute amounts of electricity were used in the early nineteenth century for power, e.g., telegraphy and carbon-arc lamps. However, Thomas Edison was the first to make the generation and distribution of electric power commercially viable.
5. If the coming of electricity is a "*city builder*," then the going of electricity will be a *city destroyer*.
6. Henry Adams' visit to the Chicago World's Fair in 1893 resulted in the most remarkable forecast I've ever seen.
7. Is it a mere coincidence that Roberto Vacca in 1971 chose New York City as an example of "*the germinal beginning...of a profound breakdown of society and civilization itself*"?
8. The duration of industrial civilization in the Olduvai Theory is about 100 years (Figure 3) versus M. King Hubbert's *A-I-A* scenario of about 3,500 years (Figure 2).
9. A hand-powered telephone system is essential in each transition town to protect it from desperate outsiders.
10. The loss of electric power in an urban area causes many more problems than just the blackout itself. For example, it also causes the lack of food, potable water and fuel and stops sewage transport.

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