Environment and Conflict – Can We Break the Vicious Cycle?

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Causes of human conflict

- Could environmental scarcity be the main reason that people go to war?
  - I suspect this is too simple; people fight for many reasons (such as religious ideology, symbolism, even disagreements over taste, soccer…);
  - Even if all other resources were abundant, power would still be scarce for those who do not have it.
  - War is fun!

However…

- There seems little doubt that perceived or actual environmental pressures & scarcity are a major cause of (or excuse for) warfare;
- It seems that people will often cooperate in the face of natural disasters such as tsunamis, etc. ---
- But they will fight over resources such as food, fuel, space in the lifeboat…

A Vicious Cycle

Two Kinds of Ecodamage Caused by Warfare

- Deliberate damage to lands, crops, forests, etc., as part of warfare.
  - E.g., the Romans salted the fields of Carthage
- Collateral damage:
  - Neglect of fields, livestock, etc.
  - Squandering of resources such as fuel, timber (for ship-building).
  - Disruption of human stewardship.
  - Destruction of intellectual capital (burning libraries, etc.)
- Such damage tends to be very hard to reverse!
- Thus, warfare can worsen the ecological stresses that helped to cause it in the first place.

There are many kinds of war…

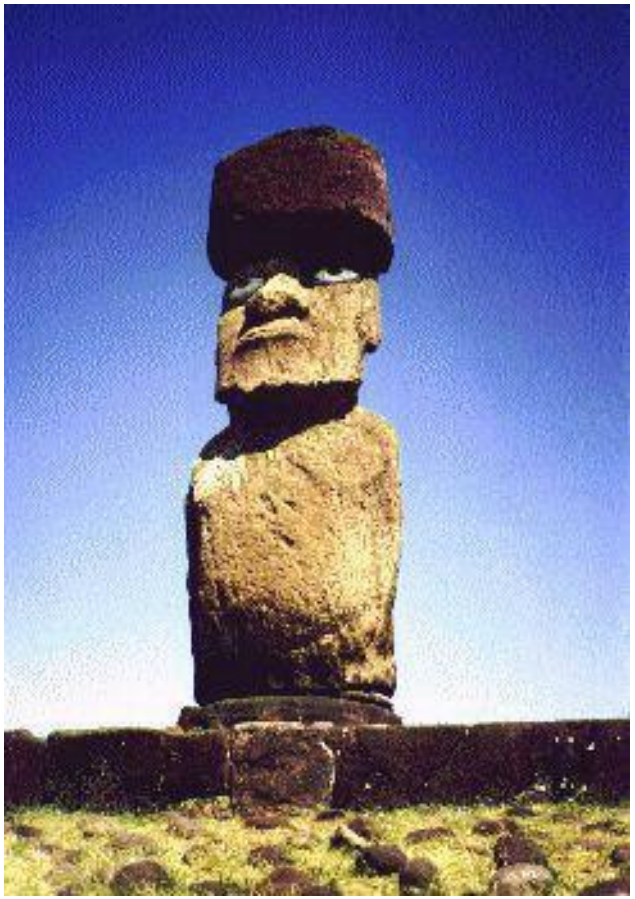
- In this talk I will mostly study what I will call "Malthusian war":
  - Postulated by the gloomy Rev. Thomas Malthus (1798).
  - A consequence of the scarcity caused by over-population; it would tend to keep people in a condition of poverty and degradation;
  - It might help to solve the population problem!
  - But it might in extreme cases lead to the extinction of the population.

What Malthus *Really* Said

- Exponential population growth will eventually outstrip any conceivable increase in resources.
- Malthus implicitly concedes that humans, unlike animals, *could* moderate their birthrates; however, this would require indulgence in "vice," which we must not think of because "the ordeal of virtue is to resist all temptation to evil."
- In other words, the argument of Malthus about the "inevitability" of over-population is actually a tirade against the evils of birth control!

A Tale of Two Islands

- Easter
  - The Bad News
- Tikopia
  - Better News



Easter Island

- Ecological collapse of complex society caused by over-exploitation of resources; a text-book Malthusian scenario.
- Small (66 sq. mi.) and isolated (nearest land is 1300 mi.; away).
- At first was lush; allowed for population explosion of Polynesian settlers, who landed there about 400 AD.
- Relied on palms for their canoes, but deforested the island; trees used to move and erect the moa (totems of their ancestors).

Easter's Ecocide

- Social collapse ca. 1600 AD, marked by vicious fighting between rival clans.
- Result was massive depopulation, cannibalism, abject poverty.
- Ronald Wright: "the statue cult became a self-destructive mania, an ideological pathology."
- Typical example of the grim cycle of deforestation, soil erosion, species loss, leading to warfare and social collapse.
  - Sometimes (as in N. Africa) desertification occurs as well; regional climate becomes drier (though this is controversial).

Tikopia

- Proved Malthus wrong!
  - Tiny island (1.8 sq. mi.) in West Polynesia, between Solomons and Fiji.
  - Almost as isolated as Easter; hardly any resources from surrounding islands.
  - Continuous human habitation (around 1200 people) for about 3000 years.
  - Ecology maintained with horticultural intensity by islanders.

Vice to the Rescue…

- Rigorous population control, using birth control, abortion, celibacy, infanticide, or occasional highly-controlled warfare.
- Sometimes even mass suicide (swimming out to sea, or setting out on hopeless overseas expeditions).
- These are all forms of “vice,” presumably, and are now largely prohibited by colonial rulers.
- Practiced an ethic of sustainability and zero-population growth.

- There have been a few other examples of near-Tikopias throughout history.
- Tokugawa Japan (ca. 1600 AD) *chose* to reverse deforestation; perhaps the disciplined structure of Japanese society made this possible.
- However, societies like Tikopia where people achieved near-sustainability through restraint and wisdom are very rare!

Warning!

- Ecologically driven social collapses (Easter Islands) have occurred many times throughout history!
- Key fact: they are often very sudden!
- Societies often collapse at the height of their complexity and apparent power.
- Often marked by obsession with social or symbolic “reality” at the expense of “natural/physical” reality.
- Are we going to “Easter Island” the whole planet?

Ecological Blind Spot?

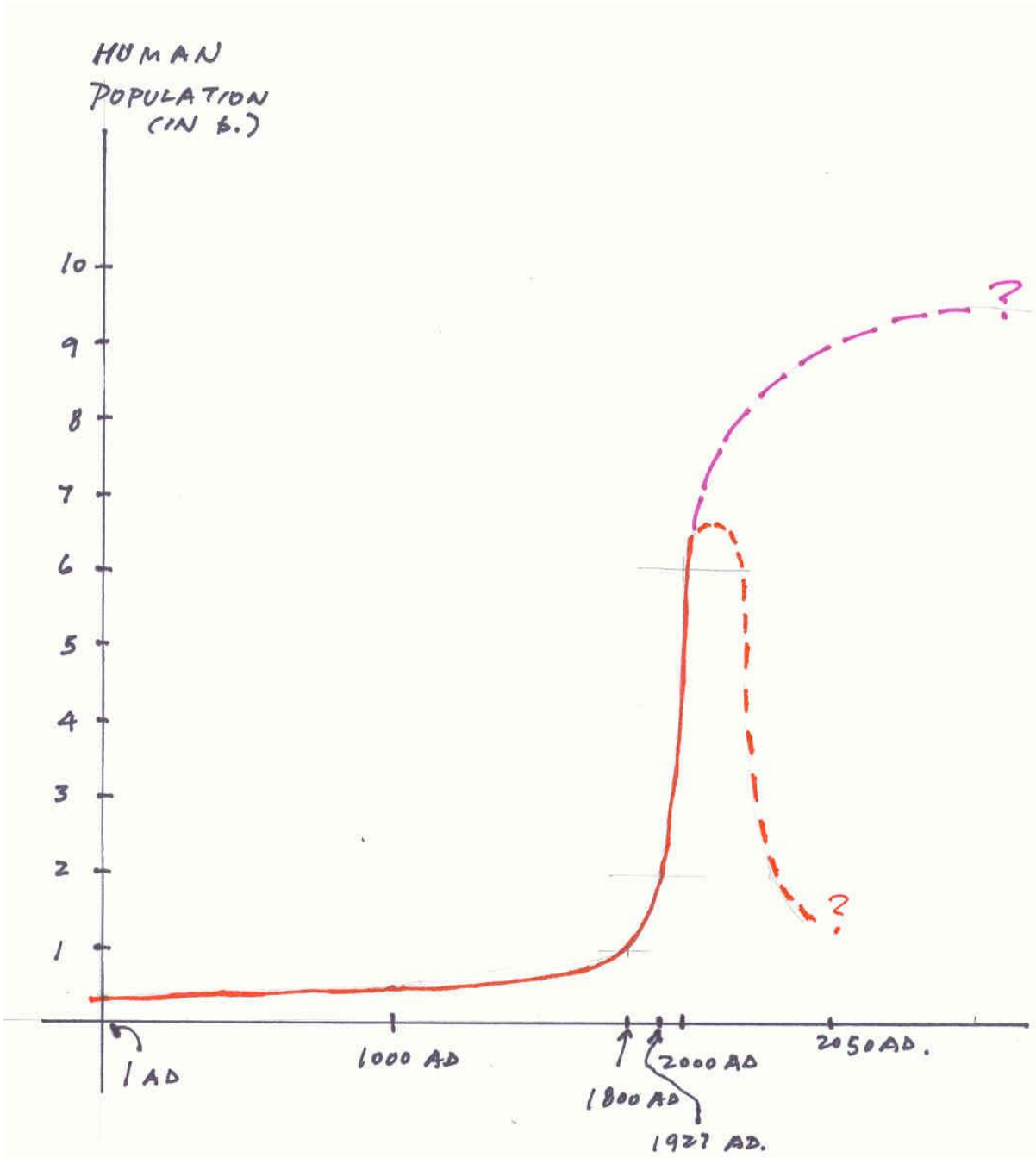
- History suggests that the inability to grasp the risk ("deer in the headlights" effect) may have been a contributing factor to the collapse.
- Jared Diamond: "it is inconceivable that the United States in general…will collapse in the foreseeable future…the United States is now the most powerful country in the world."
  - Hasn't he read his own book!?

Short History of the Human Species

- Early humans such as *homo erectus* seem to have been relatively pacific hunter-gatherers.
- Around 100,000 to 70,000 BC, something happens: large increase in creativity, and aggression.
- Possible explanation: population bottleneck caused by Toba?
- Harsh, variable climate conditions (Toba, Ice Ages) may have favoured adaptability, aggression, curiosity.
- Did we kill off the Neanderthals?

The Population Explosion

- 200-400 million ca. 1 AD
- 1 billion ca. 1800
- 2 billion ca. 1927
- 3 billion ca. 1960s
- 6 billion October 1999
- Now (Nov. 2006) 6.6 billion
- 1.3% growth rate/annum; doubling time ca. 45-50 years.
- It *can't* go on!!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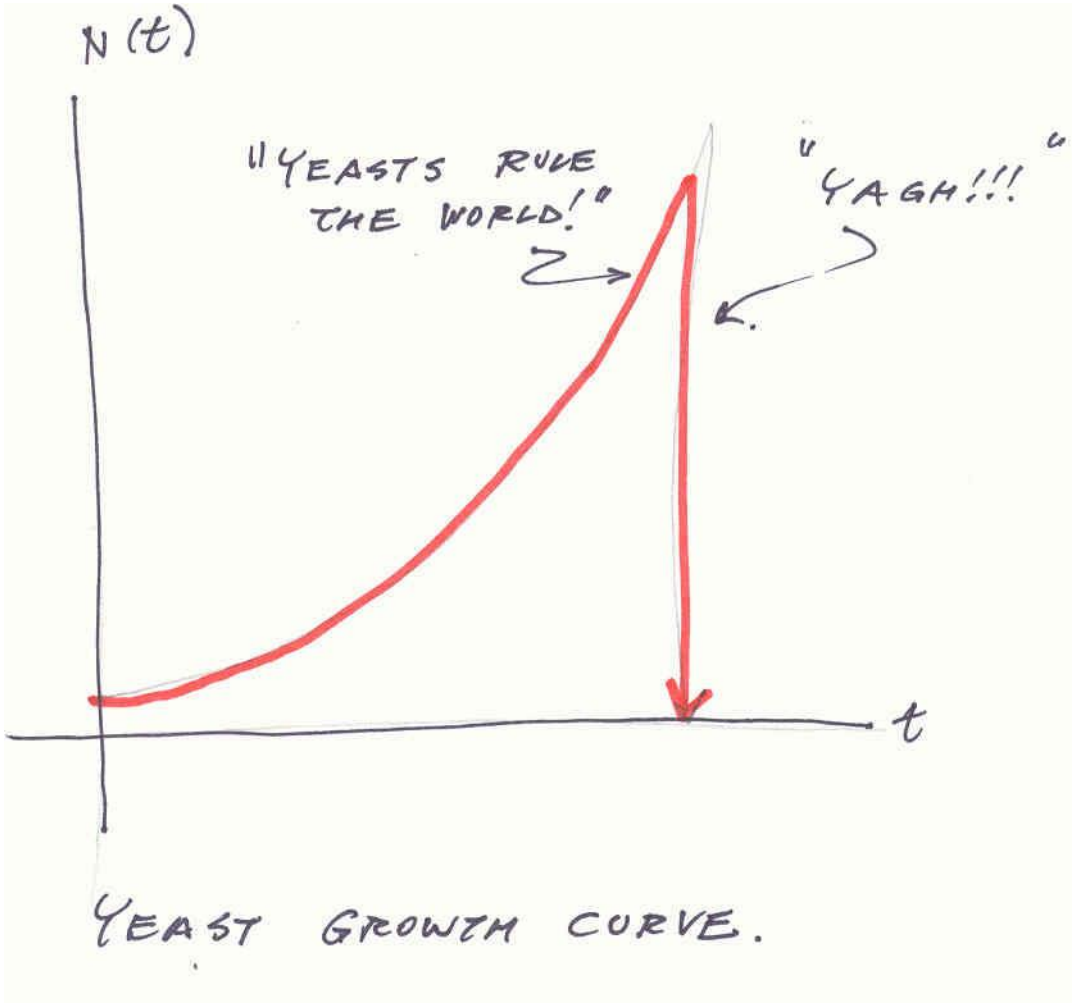
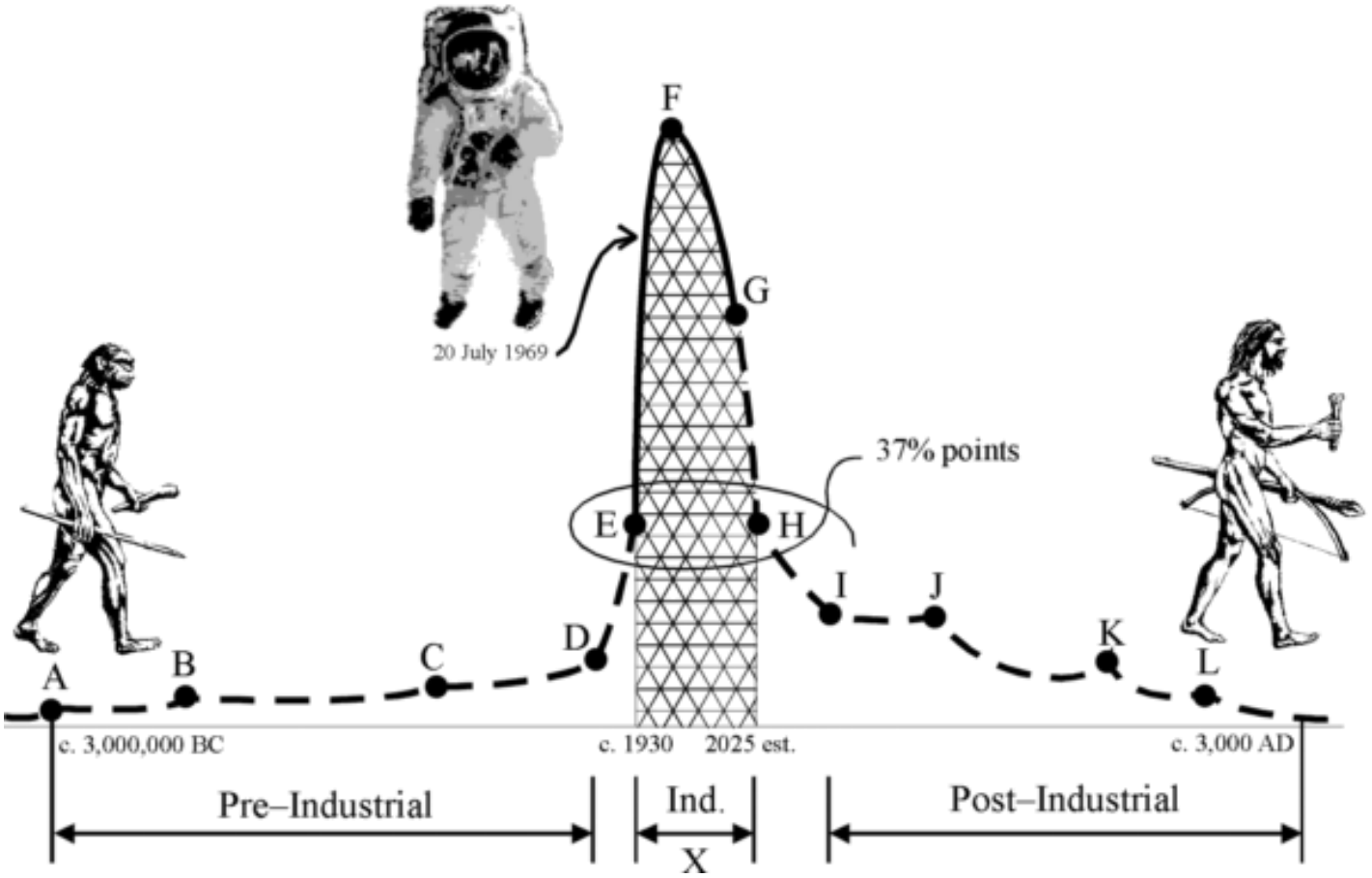


YEAST GROWTH CURVE.

“Of yeast and men…”

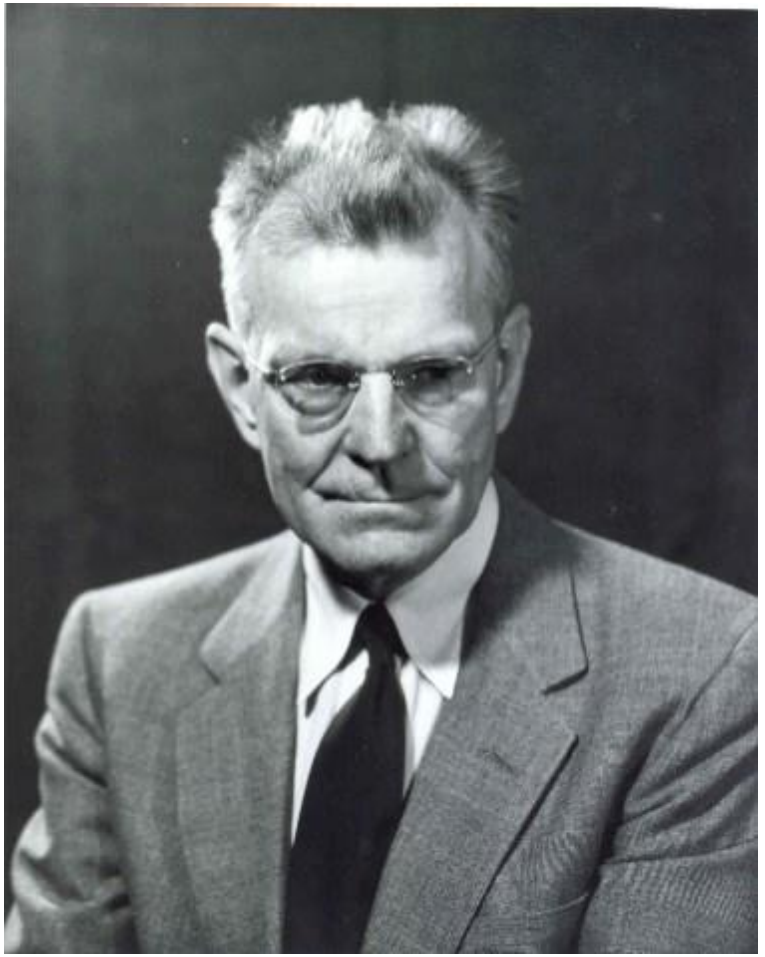
- Yeast seeded in ideal environment (no predators, infinite amount of food) will grow exponentially (as Malthus predicted) until they hit an ecological wall; in this case, they sterilize themselves with their own waste product (alcohol).
- It is humbling to realize how like micro-organisms we humans can be…
- Is the fossil fuel bonanza like a spoon of sugar stirred into a yeast solution?

From “The Olduvai Theory,” by Richard C. Duncan (2006): The current technological phase is an oil-fueled “blip” in the short and sorry history of the human species, and the Moon landing was our Great Pyramid.



M. King Hubbert (1903-1989)

- In 1956, Hubbert accurately predicted U.S. domestic oil peak in 1970.
- We are still trying to determine the Hubbert peak for the world, but it may have already occurred in 2005.
- We get in trouble not longer after the peak, since we have come to depend on a certain rate of flow of the resource.
- "*Our ignorance is not so vast as our failure to use what we know.*"



The Next Bottleneck?

- Will fossil fuels be our next bottleneck?
- Two problems: depletion and climate change.
- Climate change is very real, all denial to the contrary.
- Risks include drought, shift of climate zones, and rapid sea level rise.
- The latter could happen *soon*!

Peak Oil

- Some figures:
- The world uses 80+ million barrels of oil/day.
- OECD countries (1 billion people) use 50 mbl/d = 23 bl/person/year!
- U.S. consumption is 21+ mbl/d
- Rate of discovery is *far* behind rate of consumption; in 2005, 5 bbl discovered, 26 bbl consumed.

Still More Bad News

- EROI ("energy return on energy investment") was up to 100:1 in the 1930s, may be as low as 1.5:1 in oil sands. (A losing proposition!)
- Natural gas is near peak as well, probably.
- Coal can last longer, but it is very polluting.

More Bad News

- Saudi oil production declines 8%/year
- By 2018, Mid-East production estimated to be half of current production.
- We are increasingly dependent on oil that is very expensive in energy to extract:
- As India and China industrialize, the demand only continues to increase.
- *“There is no Plan B!!!”*

Misplaced effort

- U.S., U.K. spending $100b+/year to seize control of Mid-East Oil (“how did our oil get under their sand?”), while investment in R & D for alternative energy and conservation is miniscule in comparison.
- Manhattan Project scale effort required at several levels.
- Need a sense of urgency, not denial.

Recent expressions of eco-pessimism

- Kurt Vonnegut, when recently asked “if he had any advice for young people who want to joint the increasingly vocal environmental movement.”

  ‘There is nothing they can do,’ he bleakly answered. ‘It’s over, my friend. The game is gone.’
- James Howard Kunstler (*The Long Emergency*): “We will not believe that two hundreds years of modernity can be brought to its knees by a world-wide power shortage.”

How about renewables?

- “The fact that our society cannot survive on alternative energy should come as no surprise, because only an idiot would believe that windmills and solar panels can run bulldozers, elevators, steel mills, glass factories, electric heat, air conditioning, aircraft, automobiles, etc., AND still have enough energy left over to support a corrupt political system, armies, etc. “

  -- Jay Hanson, 2001, www.dieoff.org

Note Added 2017

- I now think that it is possible to be much more optimistic about the prospects for renewables. But I still think that we should not be content with renewables, either. A deeper understanding of physics will open up new possibilities.

- K.P.

Between a rock and a hard place…

- There are two extreme dangers we have to steer between:
  - Malthusian war (as in terminal stages of Easter Island);
  - or the lifeboat regime.

Malthusian warfare…

- Dangers are obvious:
  - Chaos, social breakdown, loss of intellectual capital (as libraries burn and memories of people die as they die…).
  - Squandering of resources (fuel, etc.) and destruction of social capacity to regenerate environment.
  - Could lead to complete extinction of populace, as did happen in some small Polynesian islands.
  - Could go nuclear! – leading to planetary extinction.
  - Not a nice way to solve the population problem.

Dangers of the Lifeboat…

- Lifeboat regime: no resource replacement possible; one lives only on reserves.
- In a true lifeboat regime, the only hope of survival is strict discipline (Cap'n Bligh).
- Problems:
  - Risk of parasitical exploitation of authority by those in charge.
  - Suppression of innovation (because it is risky and threatens authority) guarantees that the lifeboat crisis will continue, possibly until everyone dies.

Keep Bailing…!

- Why I'm still hopeful:
  - There are several technical possibilities that have not been properly explored (e.g., alternative approaches to fusion).
  - Recycling, conservation, next-generation fission can help fill the gap (though cannot fully replace oil).
  - The smoother we can make the transition to lower-energy economy, the less the chance of Malthusian warfare that will block the innovation we need.
  - What if we managed the planet with the same horticultural intensity the Tikopia devote to their 1.8 sq. miles?

Factors in our Favour

- Human ingenuity
  - Women's ingenuity (Sen, etc.) an untapped resource.
- Our track record as survivors (Toba, Ice Ages…); humans are *really* tough animals!
- Human capacity to learn.
- General ecological trend to symbiosis (Margulis, Odum); no guarantees, however!

From Ronald Wright, *A Short History of Progress* (2004)

- *Homo sapiens* is “an Ice Age hunter only half-evolved towards intelligence; clever but seldom wise.”
- We must come to see wisdom as our most essential survival tool.
- But what is wisdom?
  - Among other things, wisdom involves the ability and willingness to think long-term and big-picture.

But…!!

- The opportunity to be wise is itself a fruit of ecological abundance; one must have the luxury to plan ahead.
- If we get too close to the critical point we will no longer be able to afford to be wise, or even clever, and then the game is truly over!