A "New Millennium" – Where the hell are we going: "Prosperity" or "Collapse"?

(A slightly edited version of a presentation given at the International Green Forum in Aoyama, Tokyo on 24 March 2001)

Thanks for coming to the forum today. I'll try to keep it short, which means I will paint a big picture with broad brush strokes. Let's get into whatever details you want to in the discussion.

Do we know where we're going? Do the politicians? I don't think so.

First let's look at "prosperity" as represented by currently proposed globalist "New Millennium" futures:
IT, Biotech, & Nanotech

Where's IT taking us? Perhaps you have read Ray Kurzweil's[1] interesting book:

- by 2020, a $1000 (1999 $s) computer will have roughly the computing capacity of a human being, and computers are embedded everywhere in the human environment.
- by 2030, your $1000 computer will have roughly the computing capacity of 1000 human beings. There will be permanent and temporary human implants; neural implants. There will be controversy over the distinction between humans and computers. Computers will routinely pass the Turing Test (meaning that it has become impossible to tell whether your partner in a conversation is human or a computer).
- by 2050, we will have nanoproduced food – no more shortages; Nanobot swarm projections will be used to create visual-auditory-tactile projections of people and objects in real reality ("Nano" is 10^{-9}m)
- by 2072, Picoengineering (10^{-12m})
- by 2100, there will no longer be any clear distinction between humans and computers. Not much carbon-based human life left around; silicon-based people (because of the prevalence of silicon implants, and software people – people who exist only as software in a computer). Femtoengineering (10^{-15}m); engineering at the level of the neutrino. Implants have already started: Kevin Warwick, at the University of Reading, UK, is already putting implants in himself.[2] When he arrives at the university, a computer recognizes him and opens doors, turns on lights and so on.

So, IT is not just about getting the latest chip, surfing the net, downloading music, and seeing your favourite game go faster…the future IT agenda is much more than that.

Where's Biotech (inc. Genetic Engineering) taking us?

- **GE crops & food**, the corporate control of seeds (the world's agriculture) and the world's food supply for corporate profit
- **Reprotech business** – basic materials of human reproduction commodified for profit; babies from mothers and fathers who were never born[3]
- **Cloning business** – clones for what? – will it stop with babies for infertile couples? So then where is it leading? A new slave society?
- **GE people** [designer babies business] – better babies for those who can pay, for profits for those who control the technology. Eventually, new species of humans with extra chromosomes for those special traits
- **Organ transplant business** – interesting how Japan suddenly changed the law on brain death a few years ago. Lots of dry runs to perfect the technology of organ transplant, organs later becoming available through GE animals, the use of stem cells and clones…
- **Medical applications** – Serious problems with gene therapy and stem cell therapy for Parkinson's disease (15% of patients have severe side-effects according to research at New York's Columbia University)[4]. Yes, it would be nice to pull a few (medical application) chestnuts out of the fire, but can you have one part of biotech without all the others?? How about healthy lifestyles?? How about people just accepting life as it is instead of clutching at the next (for-profit) technofix straw that comes along?? Are we ready physically, mentally, spiritually, ethically, legally to deal with the biotech agenda?

Where's Nanotech taking us?

Molecular nanotechnology is "*thorough, inexpensive control of the structure of matter based on molecule-by-molecule control of products and byproducts; the products and processes of molecular manufacturing, including molecular machinery.*"[5] So basically, it's what you get if you could build something by assembling it one atom/molecule at a time.

Drexler[6] explains how manipulation of matter at the atomic level could create a utopian future of abundance, where just about everything could be made cheaply, and almost any imaginable disease or physical problem could be solved using nanotechnology and artificial intelligences. In a world where we had molecular-level "assemblers," they could make possible incredibly low-cost solar power, cures for cancer and the common cold by augmentation of the human immune system, an essentially complete cleanup of the environment, incredibly inexpensive pocket supercomputers – any product would be manufacturable by assemblers at a cost no greater than that of wood - spaceflight would become more accessible than transoceanic travel today; *and* the restoration of extinct species would become possible.

Assemblers (analogous to the way ribosomes construct proteins from the information in RNA – aha we are protein nanomachines!) and replicators (anything that can get copies of itself made: the genes in your DNA) will make it possible to mechanosynthesize anything you want just from the basic chemical elements all around us. No more shortages of fuel, food, clothing or building materials and so on. The interesting point is that we can go into space with this technology and make anything, anywhere just from the basic materials present in asteroids and so on. In order for this technology to really come into its own we would NEED to go out into space.[7] Earth is too limited in terms of space and material resources for this vision. This is the real *Star Trek* scenario – but you never saw this on TV. We're supposed to boldly burst out into space, but we're not even sure we made it to the moon yet! Did the Apollo missions really make it to the moon in 1969?? Do you think so??

(Many people indicated that they thought we had. I pointed out that some people have serious doubts and that there were several websites dedicated to this problem. General laughter. Check http://www.angelfire.com/ut/aylett/eth69.html and http://batesmotel.8m.com/ and see what you think… I asked whether elections are won by the candidate with the most popular votes. The room went a little quieter. I continued with my speech, but was ready with one more question in case anyone in the audience thought I was going too far in doubting Apollo's authenticity. The question was, "Did Shakespeare write Shakespeare's plays?" Many believe "he" didn't. The point is that space travel may actually be a far more problematical proposition than we are generally led to believe,even though the websites casting doubt on the authenticity of the Apollo missions are thought to be hoaxes)

I'm sure you can see that IT, biotech and nanotech are ***not*** three unrelated technologies – in fact they are very much intertwined, almost to the extent of being sub-sets of the same one technology now coming together in its mature form. So what does it all add up to? The agenda, as clearly as we can see it now, is the ***remaking of Nature and the remodelling and reinvention of the human being*** (for corporate profit, of course).

Well, then… is this where we want to go? Assuming we ***WANT*** to go there… ***CAN*** we get there? Yes, maybe… ***if*** we can fuel it. If we can't, then maybe the whole caboose will collapse before we make it there…

So here's the "collapse" scenario: What runs our current economy and society? Oil, natural gas and coal: the fossil fuels, with a little nuclear power, some hydropower, and a few other bits and pieces…
40/20/20/10/10: Oil/Coal/Natural Gas/Nuclear/hydroelectricity + renewables, etc.

Oil is really important for several reasons… It's fairly clean, burns efficiently, it's a liquid, etc.
How much oil are we currently using?

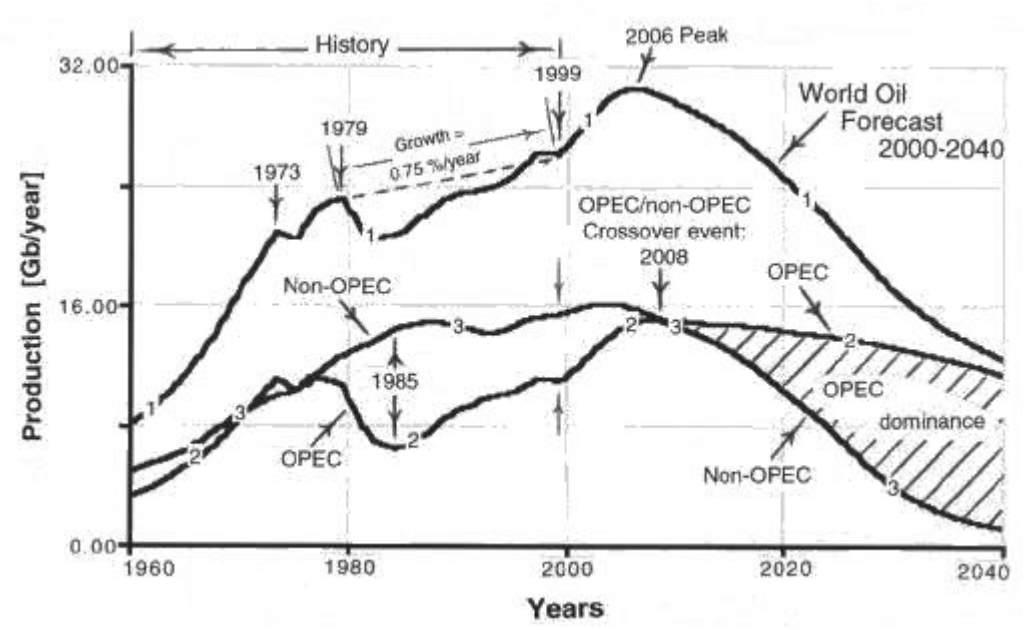
- World oil consumption Oct-Dec 2000 76.4 Mb/d (27.9 Gb/yr) [Up approx. 11 Mb/d since 1990]
- World oil consumption predicted by IEA (1996) for 2010 and 2020: 92-97 Mb/d (33.58 – 35.40 Gb/yr)

In 1996, the IEA forecasted that, "*World demand is projected to rise from 70 million barrels at present to between 92 and 97 million barrels of oil per day in 2010.*" Two years later (1998), the IEA reported, "*Fossil fuels are expected to meet 95% of additional global energy demand from 1995 to 2020.*" Oh, so only 5% is supposed to be from alternative and renewable energy sources??[8] (*See table*)

The IEA also says that demand will rise at 1.8% per year to 112 Mb/d by 2020 under a scenario with prices rising to $25/b(!). But if peak production in 2006-2007 is around 32 Gb/yr (87.7 Mb/d), where does that leave us? And look again at the 2020 column; 19.1 Mb/d in "unidentified unconventional". In other words, "non-existent" – a shortfall![9]

Units: Mb/d	1999	2010	2020
Natural Gas Liquids	8	11.3	15.2
Unconventional Oil	2	2.4	2.4
Processing Gains	2	2.1	2.5
*Middle East	18	40.9	45.2
*Non-Middle East	43	38.0	27.0
"Unidentified Unconventional"	0	0	19.1
TOTAL	73	94.7	111.4
ANNUAL TOTAL (Gb/yr)	26.6	34.5	40.6

** Conventional Oil*



World, OPEC and Non-OPEC oil production (*Source:* Duncan, R.C.)

What goes up must come down: The peak of world oil production in five or six years, market predominance of OPEC in about seven years. (*See graph*) Oil certainly won't be cheap then.

That means the end of cheap and abundant (= easily available) oil. Oil production due to decline 3-6% per year. What does that tell you about the prognosis for economic growth? When oil becomes scarce (therefore expensive) aren't there going to be supply disruptions? (Oil shocks, resource wars – remember the Gulf War?)

Perhaps there is some temporary "relief." Gas and non-conventional oil production can be stepped up giving an overall peak of hydrocarbons probably around 2015, maybe 2020. Gas will be useful but needs special management because it depletes very differently from oil on account of its greater mobility. Rather than a peak, as for oil, there is a long plateau, which ends abruptly.[10]

There are all kinds of ways to "recover" more oil from oil fields – enhanced recovery technologies. But we can only continue to take oil from the ground till we need a barrel to bring up a barrel. Thus we will basically stop when the Energy Profit Ratio becomes one – when there is no net gain of energy. Nobody is going to use two barrels of oil to get one out of the ground.

There's coal: CO_2 emissions problem, and although resources appear to be plentiful, the energy profit ratios may make mining impractical rather sooner than the 2-300 years' supply some people seem to be predicting.

There are unconventional (non-conventional) oil: heavy oil deposits, bitumen, tar sands, oil shale. Again, far more difficult than conventional oil to extract. Low energy profit ratios and expensive processing tell us that these are not going to be able to keep the current economic system running in the future. Oil shale may be a *phantom* energy resource anyway.

There are methane gas hydrates… also known as clathrates, these occur as ice-like solids composed of water molecules and molecules of methane in the interstices. They are generally found in arctic and deep ocean localities. The waters around Japan hold a certain amount of gas hydrate deposits: an estimated 2.7 trillion m^3! More than enough to supply Japan at its current usage of all fossil fuels for 1600 years! says a recent newspaper article.[11] However, there are two problems with gas hydrates:

- They occur in dispersed grains or thin laminae of millimeter to centimeter thicknesses
- Being trapped as molecules in a solid, the gas cannot migrate and accumulate in commercial quantities.

Colin Campbell (the well-known oil geologist) claims that the resource is "doomed" because of this.[12] Japanese oil companies and the Japanese Resource and Energy Agency are eager to see that these are exploited. It may turn out, however, that gas hydrates are another phantom energy resource. Japan has been experimenting in waters off Japan for 10 years, American researchers say that commercialization may be possible in 2015. Funny, they never had this problem with oil… you just drilled a hole, put a valve on it, ran the pipeline out to the ship, and when you wanted oil, you just opened the valve and the oil flowed into the tanker under its own pressure.

Nuclear fission, fast breeders, nuclear fusion? Is this what you want? This is what is supposed to keep our economies and societies running after fossil fuels "run out", but there is serious doubt that these technologies can be run without fossil fuels, or can even be made to run at all.

Oh, other energy resources – alternatives, "intermediate" renewables: hydroelectric power, PV solar panels, solar thermal, wind turbines, ocean/wave/tidal power, geothermal energy, hydrogen, fuel cells: some of this might be VERY useful in decentralized, small-scale applications. They won't run our current economic system, but you just wait and see the inventiveness and local innovations that occur when fossil resources become scarce!! (Great ways of "banking" cheap fossil fuels; e.g. "intermediate" but in the long-term impossible to sustain because PV panels and wind turbines probably cannot be made without a fossil fuel-based industry. Finally we will be back with water, wind, and animals for motive power.)

Methanol, ethanol, biodiesel, biofuel: no great energy profit ratio, might compete with human food for cropland, might be useful on a small scale in some localities.

Biomass: oh, sustainable harvesting of forests? Will we be capable of this when oil "runs out"?

Biogas: small-scale applications are VERY eco-friendly. Energy and fertilizer all in one! But there might not be much point if there is no way to actually ***use*** the gas!

But the development of those alternative energy sources will take a long time. The Japanese Resources and Energy Agency estimates that renewable energy will provide 3.1 percent of Japan's primary energy in 2010. The UK government's own target for 2010 is that renewable energy sources should account for just 1.7 per cent of the total quantity of energy now used in Britain. Hardly enough to keep the wheels of industry turning. A detailed study of the switch to renewable energy was published by the LTI-Research Group in Mannheim in 1998. It found that, if the development of renewable energy systems were supported by decisive, well-coordinated action by governments, in a sustained programme lasting for 50 years, renewable sources could provide 35 per cent of the energy used at present.[13]

There are no suitable substitutes in sight for the fossil fuels used in heavy farm machinery, construction and mining equipment, diesel trains and trucks, ocean-going freighters, aircraft. Nuclear and hydroelectricity provide about 18% each of Japan's electricity; 64% is thermal – fossil fuels. The end of cheap oil may mean the beginning of the end of industrial society as we know it.[14]

The critical sectors will be transport and agriculture. For instance. will we be able to eat?
Industrial farming methods: machinery, chemical fertilizers and pesticides; 3-4% of the energy budget.

Processing, packaging. transport, retail, preparation of foods; about 12% of the energy budget
A total of 15-16% of our energy budget on food/eating (but could be more – depends on how you count it. Could be 18-20%.[15]

How about North Korea's (DPRK) food shortage problem?[16] The mid-90s food shortage appeared to have bottomed out in 1999, but worsened in 2000 due to drought.[17] The real problem is:

1. Inability to participate in world trade – inability pay for imports of food, energy and chemicals
2. Inability to manufacture chemicals, maintain and operate machinery (lack of energy)
3. Inability to maintain soil fertility or carry out routine farming procedure sufficiently through human labour (the switch to "modern" farming methods eliminated animals and their manure, leaving North Korea dependent on chemical fertilizers for their soil fertility and machines and fossil fuels for their traction)
4. Weather irregularities (too much or too little rainfall at the right/wrong times)

Japan relies on imports for over 90% of her energy (including nuclear) and 60% of her food calories. What happens if Japan is unable to import food and energy (could happen in the event of a serious world energy crisis that might follow widespread hostilities concerning e.g. the "ownership" of oil resources)?

Agriculture in Japan now: (mha = million hectares)
127 million people on 4.9 mha farmland = 26 people per ha
and 12 mha overseas = 7.5 people per ha
(was 94.3 million on 6.08 mha in 1961 = 15.5 people per ha)
Even now North Korea is 23 million on about 1.8 mha = about 13 people per ha

Japan (and much of the world) is in gross overshoot: the farmland:population ratio is fast approaching physical limits. What's stopping North Korea happening here? The smooth functioning of the global trading system, which is based on the cheap and reliable supply fossil fuels – oil.

Japan could reach a sustainable population:farmland ratio in 2080 at 60 million people and 6 mha of farmland, if there isn't a crash in the meantime.[18]

But farming organically with animals means building up the animal stock. Seen any horses or bullocks pulling ploughs recently? The agricultural system in England in the 17th & 18th century used half the land for animals. OK, so halve the population and you have the population of the latter Edo period – 30 million people eking out an existence here, but now with more knowledge of intensive organic farming (Biodynamics, Permaculture, biointensive horticulture), so they would either have a significantly better standard of living than in the Edo Period, or they would have a higher population and just get by. Which will they choose?

Can we envision an alternative future society different from the two we have looked at so far – i.e. the "New Millennium globalist" world ("prosperity") or the post-oil "collapse"? A Green future?

I think if you wanted to bring the vision of a Green future it down to a specific notion, it would have to be the bioregional vision. A bioregion is: *a life-territory, a place defined by its life forms, its topography and its biota, rather than by human dictates; a region governed by nature, not legislature.*[19]

The interesting thing is, what politics might this future be based upon? The Green ideal, I believe, is of democratic, independent communities, forming themselves into confederations of bioregions.

This is appears to be a realistic, non-technofix, nature-centred, healthy, and sane vision of how life could be if we wanted it to. Is this what you want to replace the "New Millennium globalist" agenda of "prosperity", or is this what you would prefer to economic and social collapse, starvation, and sheer survival of the strongest? If so we will need to start work soon as it will need a ***truly massive popular movement*** to bring this particular outcome into being. Some say it can't be done; that we're headed for either "prosperity" or "collapse" (a "dieoff")[20], but are you ready to surrender to that? I don't think so. I think we would prefer to build an ***International Green Network*** so that we can work together towards a saner, safer, and sustainable future. Thanks.

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Material by Tony Boys can be seen at: http://www9.ocn.ne.jp/~aslan/
Longer papers are available in PDF format. There are Japanese versions of most of the material.

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