Diary - 2003

John Baez

October 12, 2003

I'd like to start thinking more about economics, so I've decided to write a sort of diary on the subject.

I'm starting with a strong feeling that the world is screwed up in a bunch of closely linked ways. There seems to be a growing concentration of economic power in the hands of organizations and people that aren't concerned with justice: multinational corporations, big investors, the Bush administration, and so on. The institutions that rein in these tendencies seem to weakening. For example, at least in the United States it seems that most successful political campaigns are so dependent on fundraising that the winning candidate winds up beholden to the folks who gave him the money. And this has all sorts of side-effects worldwide: big agricultural subsidies which wind up devastating the economies of poorer countries, rejection of the Kyoto Accord and other measures to reduce pollution and CO_2 emission because they would hurt the petroleum/automobile industry, and so on.

Of course, the world has always been screwed up, so one might ask: what's the big deal? I'm not such an optimist that I think things will ever be *fine and dandy*. In fact, people seem so inherently messed up - myself included - that in some ways it makes more sense to simply get used to it and focus attention on more pleasant things.

However, there are some qualitatively new features to the current situation. Most importantly, we are currently amid a *major extinction* of plant and animal species, one which will probably rank right up there with the Permian and Cretaceous extinctions - but caused by humans rather than an asteroid impact (or whatever it really was). Many species are already gone, and many more are going fast. More than the usual miseries that humanity brings on itself, this will mean an *irreversible loss of precious information*. And what's particularly bizarre is that this is happening right when people are figuring out the mysteries of the genome. Unless we do something quick, we will awaken to the immense *value* of something such as a tiger, a lemur or an orangutan right after we've managed to kill them all off.

There are a few conclusions I draw from this. First of all, if we don't change how economics and politics are done, quite soon, we will ruin the world in a quite permanent way. Second of all, there's something inherently shortsighted about how business is being done now. We don't have adequate mechanisms to ensure decisions take into account the true *value* of something like the continued existence of a species or an undisturbed ecosystem, or the true *cost* of something like polluting the air or destroying an Antarctic ice shelf. In the lingo of economics, these are currently just "externalities" - not part of the balance sheet.

So, I'd like to see if some new ideas on economics and politics could help do something about this.

A lot of people have thought about this stuff, and I need to learn more about what they've thought. However, I want to avoid getting pulled into the game of drawing up plans for a more just economy without paying attention to the immense forces that are arrayed *against* the implementation of such plans. In other words, I want to keep my eye on realpolitik.

In particular, I want to understand *how economic forces corrupt the discipline of economics*, turning it away from an effort to understand and improve things, towards being a tool for the powerful to gain more power.

For example, I want to understand how the "rational agent" that I learned about in my university course in economics - the imaginary person who is always "maximizing his utility" - oversimplifies the behavior of actual living breathing human beings. And I want to understand how this oversimplification plays into the hands of those who have much to gain from the current economic system: how it legitimizes unjust actions.

And I'd really like to see how we could change things a bit - to find some points of leverage where pressure can be applied in an effective way.

Among other things, I want to start by compiling some references that I've found enlightening. Here are a few:

- Amartya Sen, *Rationality and Freedom*, The Belknap Press, Cambridge, Massachusetts, 2002.

This is a wonderful book that would take a long time to summarize. Amartya Sen won the Nobel prize for his work on economics, and it's easy to see why. I'll just mention one thing here: his criticism of "rational choice theory", for example his attack on such underlying assumptions as these:

Self-centered welfare: A person's welfare depends only on her own consumption and other features of the richness of her life (without any sympathy or antipathy towards others, and without any procedural concern).

Self-welfare goal: A person's only goal is to maximize her own welfare.

Self-good choice: A person's choices must be based entirely on the pursuit of her own goals.

A reflective person need only state these assumptions to realize that they are either false or, by clever definition of terms, true but only vacuously. However, many economic theories are based on these assumptions, treating them as both true and non-vacuous. As Sen points out, this has the effect of treating people as "rational fools" who are unable to sympathize with others, deliberately choose *not* to maximize their welfare, or cooperate in pursuing someone else's goals. Policies and ideologies based on these assumptions have a debasing effect on our society: they tend to actually *make people* into rational fools. People are always looking for a framework to justify their actions - a religion, one might say - and rational choice theory based on the above assumptions is one of the particularly pernicious religions of our time.

There's much more to say about this book, but I don't have time now.

- Mary Poovey, Can numbers ensure honesty? Unrealistic expectations and the U.S. accounting scandal, *Notices of the American Mathematical Society*, Vol. 50 No. 1 (January 2003), 27-35. Available online at http://www.ams.org/notices/200301/200301-toc.html

It's unusual to see a hard-hitting piece of socioeconomic criticism in the Notices of the AMS; this comes from a talk given at the August 22, 2002 International Congress of Mathematicians in Beijing. As a mathematician I'm particularly interested in how numbers are used to legitimize activities by giving them a superficial appearance of objectivity, and that's what Mary Poovey is talking about. Let me quote a bit:

> Recent economic events in Asia, South America and the U.S. have made it clear that over the last twenty years a new axis of power has emerged, which is now making itself felt all over the world. This axis runs through large multinational corporations, many of which avoid national taxes by incorporating in tax havens like Hong Kong. It runs through investment banks, through nongovernmental organizations like the International Monetary Fund, through state and corporate pension funds, and through the wallets of ordinary investors. This axis of financial power contributes to economic catastrophes like the 1998 meltdown in Japan and Argentina's default in 2001, and it leave its traces in the daily gyrations of stock indices like the Dow Jones Industrials and London's Financial Times Stock Exchange 100 Index (the FTSE). Intrinsically, this axis of power is neither good nor evil. In some countries, like China, it has helped raise the nation's overall standard of living, and in others, like the U.S., it has allowed some people to retire early or with more money than they ever dreamed possible. But it has also widened the gap worldwide between rich and poor. It has led countries all over the globe to abandon their welfare societies in favor of a U.S.-style shareholder culture, where basic services, like health care, are individual responsibilities. And, as we saw in the spring of 2002, it has permitted - even encouraged - corporate crime on a scale that takes one's breath away, not to mention the life savings of thousands of individual workers as well.
>
> This new axis of financial power has many dimensions, many causes, and many effects. In this essay I will be able to discuss only a small part of what one analyst has called "financialization" and I call the culture of finance. Specifically, I will discuss some of the ways that the culture of finance uses numbers and

> mathematics to reorganize the relationship between value and temporality.
>
> [....]
>
> The starting point for my discussion is an obvious historical observation: the emergent culture of finance differs from an economy of production in that finance generates profit primarily through investment, through moving and trading currencies, and through placing complex wagers that future prices will rise or fall. This is in stark contrast to an economy of production, which generates profits by turning labor power into products that are priced and exchanged in the market. [...] what we have seen in the U.S. since 1995 is a change in the ratio between the wealth generated by production and the wealth generated by finance: in 1995 the sector composed of finance, insurance and real estate overtook the manufacturing sector in America's gross national product. By the year 2000 this sector led manufacturing in profits. Not incidentally, in the same year this sector also became one of the biggest donors to federal elections in the U.S., and its representatives spent enormous sums of money lobbying Congress in Washington.
>
> [....]
>
> In the new culture of finance, value can be created without labor, agency is tranferred to an unstable mixture of mathematical equations and beliefs, and responsibility for disasters is pinned on an individual (a "bad apple") or simply dispersed as analysts blame their investor's losses on flawed computer programs or unforseeable market forces.

The bulk of the article is a description of five financial instruments currently in use, and their dangers:

- Day trading
- Stock options
- Mark to marketing accounting
- Adjustment to bad debt reserve
- Derivatives

October 13, 2003

I showed this diary to a friend and he said it was a bit rambling at the beginning... he also said he was more skeptical than me about the possibility of *doing anything* about this stuff.

As for it being rambling, well, it is a diary after all. But I also looked at what I'd written and realized the discussion of extinctions, collapsing ice shelves and the like may seem to many people like a digression from economics. To me it's not; one of my main interests is the interaction of economy and ecology - two forms of housekeeping if you believe the Greek root of the word - and how we might make the transition from being exploiters of the planet to stewards of the planet. Or might not!

As for being skeptical, well, I'm skeptical too. I didn't feel like starting out this diary on a note of gloom and doom, but I've certainly been pondering a lot of dark possibilities, and I actually do want to talk about them.

For starters, it's quite possible that intellectual theorizing about economics is unable to create changes that go strongly against the existing trends. I read yesterday in Mary Poovey's article that in 2001 the total amount of derivatives sold was *100 trillion dollars* - more than the gross world product over the last millenium. What can anyone do against a financial whirlwind like this? One might as well try to talk a hurricane into changing course. Maybe the language of economics is simply not listened to unless one is describing a way for the rich to get richer - the Black-Shoales equation, for example. Or listened to, but not heeded.

When I get really pessimistic about this sort of thing, I start thinking about how *people are a tool for money to make money*, and imagine a future where just as single-celled organisms have completely merged to form multicellular creatures, people have completely merged into *corporations* - a future in which it makes no more sense to analyze

what's going on in terms of the motives of individual people than it does to analyze the motion of my hand in terms of the motives of individual cells. People unaffiliated with corporations may still exist, just as bacteria exist now, but they just won't be *the point of it all* anymore - instead, it'll be these profit-maximizing entities interacting with each other that count.

Of course, one could argue that this is already the case, or that it's all just a matter of interpretation. But I think most reasonable people realize that *Homo sapiens* can't be the last word in evolution, and this naturally raises the question: *what's next?* People talk about cockroaches taking over, or robots or or nanobots or cyborgs, but why not corporations? So, here's how my favorite science fiction dystopia goes. (It's due in part to this same friend of mine.) After corporations figure out how to mine the asteroids, a bunch of them will begin to spread through the solar system and beyond in the form of self-reproducing machines. In a race to beat the competition, these machines will eventually devour entire stars to power themselves so they can go at nearly the speed of light - and going this fast, they'll be unstoppable. Eventually they'll spread outwards like a forest fire across the galaxy, crushing any life that happens to exist, leaving nothing but ashes and waste in their wake... and if you ask *why* they must do this, the answer will be: because if they didn't, something else would do it first.

See? I told you I could get gloomy about this stuff! But somehow that doesn't stop me from wanting to think about it; I'm basically a happy fellow, so I'm not scared of a little gloom.

October 22, 2003

Here's an interesting article:

- Chasing the dream: why don't rising incomes make everybody happier?, *The Economist*, August 9-15, 2003, p. 60.

This is an interesting article which shows how clueless traditional economic theory is about what makes people happy. Let me quote some:

> Everybody loves a fat pay rise. Yet over the past half-century, as developed economies have got much richer, people do not seem to have become happier. Surveys suggest that, on average, people in America, Europe and Japan are no more pleased with their lot than in the 1950s. This is curious, because at any given time richer people say they are happier than poorer people do. For instance, 37% of the richest quarter of Americans say they are "very happy", compared with only 16% of the poorest quarter. That might lead you to expect that, as a country grows richer and incomes rise, rich and poor alike would become happier. Here lies a paradox: an indvidual who becomes richer becomes happier; but when socieity as a whole grows richer, nobody seems any more content.
>
> In recent years, the study of "happiness" - as opposed to more conventional economic measures, such as GDP per head - have attracted increased attention from economists. In a series of lectures earlier this year, Richard Layard, and economics professor at the London School of Economics, reviewed the various evidence from psychology, sociology and his own discipline to try to solve this paradox. One explanation is "habituation": people adjust quickly to changes in living standards. So although improvements make them happier, the effect fades rapidly. For instances, 30 years ago central heating was considered a luxury; today it is viewed as essential.
>
> A second and more important reason why more money does not automatically make everybody happier is that people tend to compare their lot with that of others. [....] The implication of all this is that people's efforts to make themselves happier by working harder in order to earn and spend more are partly self-defeating: they may make more money, but because others do too, they do not get much happier. The unhappiness that ones person's extra income, argues Lord Layard, is a form of pollution.
>
> [....]

> If government's ultimate goal is to maximise the well-being (i.e. "happiness") of society as a whole, then, says Lord Layard, some highly controversial implications for public policy follow. Convention economic theory argues that taxation distorts the choice between leisure and income. Taxes reduce the incentive to work an extra hour rather than go home, or to put in extra effort in the hope of promotion. But Lord Layard's argument implies that people have a tendency to work too much. Far from being distortionary, taxes are therefore desirable. He suggests a marginal tax rate of 30% to deal with the "pollution" that one person's extra income inflicts on others, and the same again for habituation. The total of 60% is a typical European level of taxation (taking both direct and indreict taxes into account).

Shocking stuff for the pages of *The Economist*! But it raises all sorts of questions not mentioned in this article.

First, an obvious one. *Should it be the goal of government to maximise the average happiness of its subjects?* One can argue for and against this. Opponents of high taxation rates would likely argue that depriving one person of his hard-earned money is not justified by the fact that his wealth makes lots of people unhappy! However, since we are not philosopher kings with the power to run the world as we see fit, it's not clear that it's worth spending much too time on this question. Let's face it: *it never has been the goal of any government to maximise the average happiness of its subjects*. It probably doesn't even make much sense to think of governments as having "goals"! But one can certainly try to understand why there has been a constant governmental push for "economic growth" over the last century, even though this hasn't made people happier on average. And, maybe knowing the answer to this will help us think of some ways to improve things.

Here's another question, one I find more interesting. *To what extent do people behave in a way that maximises their own happiness - and under what circumstances?* The answer is obviously very complicated. Any sort of theory that claims people are rational agents constantly working to maximize their own happiness is, I claim, patent nonsense and an unsound foundation for economics. And yet surely there is *some* tendency for people to try to make themselves happier - at least *sometimes*.

I'd like to learn more about this. I'll start by reading the lectures Layard gave:

- Richard Layard, Happiness: has social science a clue?, Lionel Robbins Memorial Lectures 2003, Centre for Economic Performance, London School of Economics, available at http://cep.lse.ac.uk/layard/

Whoops... I gotta go home - time for dinner.

November 3, 2003

Those essays by Layard were interesting, and I could write a lot about them if I only had time! Alas, I'm way behind on writing a paper about the use of category theory to untangle quantum quandaries - it was due several weeks ago for a philosophy book edited by Steven French. I should even be writing it *now*.

So, I'll just quote some interesting email that Joseph G. Haubrich sent me - he's an economic consultant at the Federal Reserve Bank of Cleveland. He brought this piece to my attention:

- Joseph G. Haubrich, Risk Management and Financial Crises, *Economic Commentary* , available at http://www.clevelandfed.org/research/Com2001/0201.htm

He also wrote:

> What is the behavioral basis for economics? What difference will changing the rationality assumption make? Without denying the often extreme calculating power assumed in many economics models, many parts of economics are based on simpler, more robust assumptions. A classic paper is:
>
> - Gary Becker, Irrational behavior and economic theory, *Journal of Political Economy* **70**, 1962, 1-13.

Even if people behave randomly, if something cost more, on average people must must buy less, since their income won't go as far. A reflection assuming a bit more rationality is:

- Donald N. McCloskey, The limits of expertise, *The American Scholar*, Summer 1988.

If $500 bills are on the sidewalk, people will pick them up. For an analysis of different psychological assumptions still retaining this basic notion of arbitrage, look at this Nobel Prize winner's book:

- George Akerlof, *An Economic Theorist's Book of Tales: Essays that Entertain the Consequences of New Assumptions in Economic Theory*, Cambridge U. Press, Cambridge, 1984.

Finally, for more on the financial end, I recommend:

- Nassim N. Taleb, *Fooled by Randomness: the Hidden Role of Chance in Markets and in Life* , Texere, New York, 2001.

At a minimum, I hope this list shows that the psychological assumptions behind economics have been part of the economics discusssion for quite some time.

(All this expresses Haubrich's personal views, not the position of FRB Cleveland or the Federal Reserve System.)

For my 2004 diary, go here.

... it is important to reclaim for humanity the ground that has been taken from it by various arbitrarily narrow formulations of the demands of rationality. - Amartya Sen

baez@math.removethis.ucr.andthis.edu

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For my 2003 diary, go here.

Diary - 2004

John Baez

January 10, 2004

A small news item in the Los Angeles Times today:

> **Global Warming Study Warns of Extinctions**
>
> Global warming could doom hundreds of land plants and animals to extinction over the next 50 years by marooning them in harsh, changed surroundings, scientists warn.
>
> A new analysis enlisting scientists from 14 laboratories around the world found that more than one-third of 1,103 native species they studied could vanish or plunge to near-extinction by 2050.
>
> The findings were published in the Jan. 8 issue of Nature.

Here's the article:

- Chris D. Thomas *et al*, Extinction risk from climate change, *Nature* **427** (Jan. 8 2004) 145-148.

January 16, 2004

My local paper, the Riverside Press-Enterprise, notes that 2003 was the world's second hottest year on record, beaten only by 2002. The five hottest years on record have all occured since 1997, and the ten hottest since 1990.

April 8, 2004

Darwinian evolution applies at many levels, but in a given situation some levels are more important than others. For example, when single-celled organisms formed permanent colonies, there came a point - a not very precisely defined point - when the survival of the colony became more important than the survival of the individual cells. Around this point, we find it simpler to consider the whole colony as an organism than to consider it as a collection of organisms that happen to be cooperating.

What does it mean to say that the survival of the whole colony is "more important" than that of the individual cells? This is actually a tricky question. But I think there should be some sort of reasonable answer. Maybe it goes something like this. The survival of an individual red blood cell (for example) is so dependent on the survival of its "host" that a Darwinian explanation of what red blood cells do is simpler if we invoke the need for the *host* to reproduce than if we think of the host as a mere "complicated trick for red blood cells to reproduce themselves". The idea here is that what is "important" is that which helps us create a simple model of the situation.

One reason I'm interested in this issue is that evolution can be thought of as a kind of "game" - but not a game in the simple von Neumann-Morgenstern sense, in which there is a well-defined set of players who each choose among a well-defined set of strategies and each try to maximize a specific well-defined function. Instead, it's a "game" in which every type of entity seeks to maximize the number of entities of that type!

Here I say "seeks" in a somewhat anthropomorphizing way, but all I really mean is this: *we find more of those entities whose nature is such that they tend to become common* - the simple yet powerful tautology of natural selection. And when I say "every entity", I really mean *every* entity, from hydrogen atoms, to specific sequences of base pairs, to

mitochondria, to red blood cells, to horses, to corporations, and so on.

Of course, this is taking evolution in a very broad sense - a sense that some people find too broad to be useful, but that's just the mood I'm in now. And when we think of it this broadly, we see that there are a lot of choices to be made in giving an evolutionary explanation of what's going on.

Most fundamental, perhaps is choosing the set of evolutionary "players" - the "replicators", the "units of selection", or whatever. This choice is not always clear: witness the argument between those who favor explanations in terms of "the selfish gene" and those who don't - or between those who find "memes" persuasive, and those who don't. Different ways of parsing the world in terms of "players" may prove more cogent in different contexts, and the issue is most fascinating to me here precisely when it's hardest to make up ones mind! So, I'd like to see work on "games with ill-defined players". In particular, it would be interesting to learn about *games in which coalitions of players can become so tightly bound that it may become simpler to treat them as individual players, which in turn can form higher-level coalitions, and so on* - but where players at any level still can and do "defect".

Believe it or not, I started writing this tonight because I wanted to raise the question: *If corporations gradually replaced people as the fundamental "actors" in politics, how would we notice?* Indeed, could it have already happened long ago? Already in 1886, the United States Supreme Court ruled that corporations count as legal "persons" with 14th Amendment rights to due process. By now one could argue that they control more of the political process than individual humans do, and that even CEOs are to a large extent only "powerful" to the extent that their objectives match those that corporations are optimized for: doing whatever it takes to bring in money in the form of profits and investment.

And the reason I wanted to raise this was the recent flurry of news, shortly before taxes are due in the USA this year, about how little income tax corporations pay compared to individual citizens! Part of this came from a report by the Government Accounting Office showing that in the years 1996 through 2000, roughly 60 percent of U.S.-based corporations paid no corporate income tax at all. About 94 percent of US corporations reported tax liabilities of less than 5 percent of their income in 2000. And US companies paid an average of 1.188 cents in tax for every dollar in gross receipts! The corporate income tax is supposedly 35 percent, but there are so many deductions and other loopholes that this is completely meaningless.

Naturally, people are outraged... but will anything happen? Don't count on it. Given how lobbying and elections work these days, *people* may be less important in making decisions about the tax code than *corporations* are. Who listens to a measly red blood cell?

Here is the GAO report:

- Tax Administation: Comparison of the Reported Tax Liabilities of Foreign- and U.S.-Controlled Corporations, 1996-2000, Government Accounting Office, USA

Amusingly, it seems to have been commissioned (or at least promoted) by Senator Dorgan in order to show that foreign-owned corporations pay less US income tax than US-owned corporations. For example, about 70 percent of foreign-owned corporations pay no US income tax, as opposed to 60 percent of US-owned ones. But, most people have found the difference less shocking than the fact that so few of *any sort* of corporation pays income tax! So, the nationalistic motive behind the report seems to have backfired.

William Greider has written some popular ruminations about the takeover of US politics by corporations:

- William Greider, *Who Will Tell the People?: The Betrayal of American Democracy*, Touchstone Books, 1993.
- William Greider, *One World Ready or Not: The Manic Logic of Global Capitalism*, Touchstone Books, 1998.

I haven't read them, but I should. More recently he has written a book which seems to advocate some ways to try to improve things:

- William Greider, *The Soul of Capitalism: Opening Paths to a Moral Economy*, Simon and Schuster, 2003.

Unrealistic? Again, I haven't read it so I don't know. It would be interesting to read something that explicitly *advocates* giving control of the political arena to corporations... or does this shift in power only work when it proceeds implicitly, at least at this stage? Perhaps for now we'll have to settle for accounts of an earlier revolution: the formation of the eukaryotic cell via the symbiosis of simpler organisms, which have now become "organelles" such as mitochondria, chloroplasts, cilia and flagellae. And for this, one can't beat Lynn Margulis:

- Lynn Margulis, *Origin of Eukaryotic Cells: Evidence and Research Implications for a Theory of the Origin and Evolution of Microbial, Plant, and Animal Cells*, Yale U. Press, 1970.
- Lynn Margulis, *Symbiosis in Cell Evolution: Microbial Communities in the Archean and Proterozoic Eons*, 2nd edition, W. H. Freeman, New York, 1992.

By the way - in case it's not obvious, I know that there are lots of weaknesses in the analogy between cells forming a multi-celled organism and humans forming a corporation. I know there are lots of problems with all the ideas I'm sketching here! I just couldn't resist mentioning them....

April 14, 2004

Here is an email I received from Alan Forrester:

> You say that you want to understand more about economics.
>
> Briefly, the market is an institution for encouraging creativity and criticism. States fundamentally differ from corporations in only one respect. States can levy taxes - you must pay them or be fined go to jail. (Well, the more benevolent states do this, other states openly commit murder, robbery and extortion on a regular basis.) Corporations cannot - you can stop buying their stuff if you don't like any aspect of their policies. States deprive people of choice, corporations do not.
>
> To properly understand the issues involved I recommend:
>
> 'Individualism and Economic Order' and 'The Counter-Revolution of Science' by F. A. Hayek. As a sample:
>
> http://www.fahayek.org/index.php?article=209
>
> http://www.fahayek.org/index.php?article=74
>
> 'Conjectures and Refutations' and 'The Open Society and Its Enemies' by Karl Popper.
>
> After that
>
> 'Price Theory' by David Friedman
>
> http://www.daviddfriedman.com/Academic/Price_Theory/PThy_ToC.html
>
> and the books of Lawrence Boland
>
> http://www.sfu.ca/~boland/
>
> David Friedman's book 'The Machinery of Freedom' and these articles on conspiracy theories are also relevant:
>
> http://www.settingtheworldtorights.com/node.php?id=202
>
> Finally, 'The Skeptical Environmentalist' by Bjørn Lomborg and 'the Ultimate Resource' by Julian Simon.
>
> Alan

Here's my reply:

> States deprive people of choice, corporations do not.

Actually, *any* powerful institution inherently gives people certain choices while depriving them of others. And if you don't like what a corporation is doing, this solution:

> you can stop buying their stuff if you don't like any aspect of their
> policies.

is often less effective than complaining loudly and forcefully. After all, there's no way a corporation can tell *what* you don't like simply from the fact that you don't buy their products!

For example, companies like Nike are more likely to improve the labor conditions in their sweatshops in response to public shaming than just from you and I ceasing to buy their goods - if we do the latter, they may assume we just don't like their sneakers.

In short, I don't think maximizing freedom for corporations, while reducing my means of expression to mere "buying or not buying", will make the world the best possible place.

Best,
jb

I should have added that the market only encourages creativity and criticism if we work to make sure it does that. Individual players in the market may not be particularly interested in creativity and criticism - indeed, they may actively try to prevent it. It takes special conditions for the market to function in the beneficial ways that classical economics envisages, and there is no reason to think these conditions maintain themselves automatically - especially when a rather small number of firms become extremely powerful throughout the globe, and aren't required to pay for "externalities" the damages due to pollution, etc. that they create.

As for "The Skeptical Environmentalist", maybe I'll talk about that some other time.

June 22, 2004

This book sounds interesting:

- Kenneth R. Mount and Stanley Reiter, *Computation and Complexity in Economic Behavior and Organization*, Cambridge U. Press, Cambridge, 2002.

  Reviewed by Stephen J. DeCano in the *Bulletin of the American Mathematical Society* **41** (January 2004), 117-120.

It's about the "bounded rationality" concept originated by Herbert Simon in the 1950s. He wrote:

> Broadly stated, the task is to replace the global rationality of economic man with a kind of rational behavior that is compatible with the access to information and the computational capacities that are actually possessed by organisms, including man, in the kinds of environments in which such organisms exist.

In short, any theory of decision-making that leaves out the *costs of decision-making itself* is incomplete.

I should read this book! It sounds interesting. However, I find the reviewer of this book (Stephen DeCano) has curious opinions about what a successful economic theory should achieve. I have a feeling they're commonly held. If so, I think they should be called into question. He starts as follows:

> Economics has traditionally sought its defining restrictions through the imposition of a strict kind of rationality on the agents who populate its models. (Optimization of production and maximization of utility

> can be thought of as particular consequences of rationality.) Unfortunately, modern economic theory shows that rationality alone does not provide enought structure to model real-world phenomena adequately.

That much is fine, but then he goes on to say:

> The classical tradition in economics stretching back to Adam Smith and culminating in neoclassical General Equilibrium Theory aims to derive the essential characteristics of the market economy from underlying fundamentals of tastes and technology, but even though rationality is enough to guarantee the existence of an equilibrium, it cannot rule out multiple equilibria and unstable dynamics.

That's a curious complaint! Multiple equilibria and unstable dynamics sound like just the sort of complexities we see in the real world! While theoretically inconvenient, I don't see why a good theory should "rule out" such phenomena.

I also don't see why a good theory should "guarantee the existence of an equilibrium". The world is not in equilibrium! It never has been, and never will be. The appeal of "equilibrium" in economics must stem from its simplicity rather than the desire to fit empirical data. Of course, simplified models can be enlightening even when not completely realistic - as long as we don't use them to make policy decisions. But even if we imagine a fantasy world where "tastes and technology" are held fixed, I can't imagine people settling down into some eternally unchanging equilibrium behavior. They would still jockey for advantage, forming cartels and coalitions that last for a while but then break down under the weight of their own success, and so on. I bet one can see this even in fairly simple real-world multi-person games! No?

August 28, 2004

Guess who said this:

> "No one can be comfortable at the prospect of continuing to pump out the amounts of carbon dioxide that we are at present. People are going to go on allowing this atmospheric carbon dioxide to build up, with consequences that we really can't predict, but are probably not good.
>
> He believes the solution is something called sequestration, in which carbon dioxide from cars and power stations is captured and stored. "Sequestration is difficult," he says. "But if we don't have sequestration I see very little hope for the world."
>
> "You're right, the timescale might be impossible. In which case I'm really very worried for the planet."

It was Ron Oxburgh, the chairman of Shell - the world's seventh largest oil company!

More surprisingly, even the *Bush administration* is finally admitting the reality of global warming caused by manmade greenhouse gases! On Friday August 27, the International Herald Tribune wrote:

> In a striking shift in the way the Bush administration has portrayed the science of climate change, a new report to Congress focuses on federal research indicating that emissions of carbon dioxide and other heat-trapping gases are the only likely explanation for global warming over the past three decades.
>
> In delivering the report to Congress, an administration official, James Mahoney, said on Wednesday that it reflected the "best possible scientific information" on climate change.
>
> [....]
>
> U.S. and international panels of experts concluded as early as 2001 that smokestack and tailpipe discharges were the most likely cause of recent global warming. But the White House had disputed those conclusions.
>
> The last time the administration issued a document suggesting that global warming had a human cause and posted big risks was in June 2002, in a submission to the United Nations under a climate treaty. Bush distanced himself from it, saying it was something "put out by the bureaucracy."

That approach may be harder to take this time. The new report, online at www.climatescience.gov, is accompanied by a letter signed by Bush's secretaries of energy and commerce and signed by his science advisor.

The few remaining shills for big corporations disputing human-caused climate change are looking ever more pathetic, no?

For the scientific consensus on global warming, see the Intergovernmental Panel on Climate Change website.

August 29, 2004

I've just started reading a book which puts the current mass extinction in an interesting perspective:

- Michael J. Benton, *When Life Nearly Died: The Greatest Mass Extinction of All Time*, Thames and Hudson, 2003.

It's about the Permian extinction, which happened about 250 million years ago, and in which about 90% of all species died out. This was much more serious extinction than the "end of the age of the dinosaurs", in which about half of all species died out. But it's also much more mysterious!

I think almost everyone nowadays blames the death of the dinosaurs on an asteroid impact about 65 million years ago. This asteroid was about 10 kilometers in diameter, and it slammed into shallow waters covering what is now the Yucatan peninsula. The resulting crater, called Chicxulub or "Tail of the Devil", is about 150 kilometers across! The resulting tsunami would have hit Texas with a wave 50 to 100 meters high. Millions of tons of material were hurled into the atmosphere, causing wildfires across the world as they landed. Rocks called "tektites" formed from droplets of molten quartz can be found as far as Wyoming. A layer of dust from the impact can be found in rocks world-wide, marking the boundary between the Cretaceous and Tertiary. Scientists guess that this dust made it too dark to see for 1 to 6 months, and too dark for photosynthesis for sometime between 2 months and a year. Carbon dioxide released from heated limestone would have also had effects on the climate.

But this disaster at the end of the Cretaceous was only *one* of the really big mass extinctions, including these, which are called the "Big Five":

- The Ordovician-Silurian Extinction, 440-450 million years ago at the end of the Ordovician Period.

  This was the second biggest extinction of marine life, ranking only below the Permian extinction. There was only life in the seas at this time, and more than one hundred families of marine invertebrates died, including two-thirds of all brachiopod and bryozoan families. One theory is that as the continent Gondwana drifted over the north pole, there was a phase of global cooling, and so much glaciation took place that sea levels were drastically lowered.

- The Devonian Extinction, 375 million years ago at the end of the Frasnian Age in the middle of the Devonian Period.

  By this point there were plants, insects and amphibians on land, fish in the seas, and huge reefs built by corals and stromatoporoids. The extinction seems to have only affected marine life, but 70% of marine species went extinct! Reef-building organisms were almost completely wiped out, so that coral reefs returned only with the development of modern corals in the Mesozoic. Brachiopods, trilobites, and other sorts got hit hard. Since warm water species were the most severely affected, many scientists suspect another bout of global cooling. There may have also been a meteorite impact, but it seems this was not a suffden event.

- The Permian-Triassic Extinction, 251 million years ago at the end of the Permian Period.

  Before this extinction there were many sorts of reptiles and amphibians on land, together with many plants, especially ferns but also conifers and gingkos. There were also complicated coral reef ecologies undersea. After the extinction, we mainly see fossils of *one* species of reptile on land: a medium-sized herbivore called

Lystrosaurus. We also mainly see fossils of just *one* species of sea life, a brachiopod called Lingula. Eventually other species seem to reappear... clearly they were there before, but in very low numbers.

This was the largest disaster that life has ever yet faced on our planet: perhaps 90% or even 95% of all species went extinct! It took about 50 million years for life on land to fully recover its biodiversity, with the rise of many species of dinosaurs. Nothing resembling a coral reef shows up until 10 million years after the Permian extinction, and full recovery of marine life took about 100 million years.

The causes remain controversial: some scientists blame an asteroid impact, while others blame severe global warming and a depletion of oxygen in the atmosphere due to prolonged massive volcanic eruptions in Siberia - we see signs of these in lava beds called the "Siberian traps". On the other hand, Benton and others argue that the rise of carbon in the atmosphere at this time is only explicable if there was *also* a catastrophic release of methane from gas hydrates under the ocean.

Never heard of "gas hydrates"? Hmm, they're interesting! Even today there is a huge amount of methane and other gases trapped in ice on the ocean floor! These so-called "gas hydrates" contain about 10,000 billion tons of carbon - twice as much as in all the fossil fuels on Earth. If this ever gets released in a giant "methane burp", we could be in trouble - this mechanism may have caused more than one drastic climate change. Some people have proposed mining this methane for fuel. But others have suggested stuffing carbon dioxide down there as a way to fight against the rise of greenhouse gases. This is called "sequestration" - and as you can see in my previous diary entry, the chairman of Shell thinks it's the only way to save the world from global warming.

But I digress...

- The Triassic-Jurassic Extinction, 205 million years ago at the end of the Triassic Period.

  By the end of the Triassic there was again a variety of reptiles on land and in sea. But the reptiles were completely different from those at the end of the Permian, and the biodiversity had not completely recovered: for example, there were no truly large predators. There were primitive conifers and gingkos; ferns were not so dominant as before. There were also frogs, lizards, and even the first mammals.

  The extinction at the end of the Triassic destroyed 20% of all marine families, many reptiles, and the and the last of the large amphibians - opening niches for the dinosaurs of the Jurassic. The cause of this extinction remains obscure, but it's worth noting that around this time is when Pangaea split into separate continents, with massive floods of lava in the Central Atlantic Magmatic Province - perhaps one of the largest igneous events in the earth's history.

- The Cretaceous-Tertiary Extinction, 65 million years ago at end of the Cretaceous Period.

  By the Cretaceous there were dinosaurs and flowering plants on land, many new insects taking advantage of the flowering plants, and modern fish. In the disaster at the end of this period, perhaps about 50% of all species went extinct, including all the dinosaurs, many species of plants, diatoms, dinoflagellates, ammonoids, brachiopods, and fish. As explained above, it's widely accepted that this extinction was due to an asteroid impact at Chicxulub. It took 10 million years for biodiversity to recover from this event.

We are now in what may be the middle of yet another mass extinction. The Pleistocene began around 1.8 million years ago, bringing with it an erratic fluctuation between ice ages and warmer periods. The latest of these ice ages ended around 8000 years ago, right around when Homo sapiens was starting to really take over the planet. Starting around 11,000 years ago, most of the large mammals went extinct: mammoths, saber-toothed tigers, dire wolves, elephant-sized ground sloths, and so on. Though there is much debate about the causes, it seems that human hunting contributed to their demise. This is called the "Pleistocene overkill hypothesis".

We're now seeing an intensification of the rate of extinctions as wilderness areas are obliterated throughout the planet. Nobody knows what the extinction rate is: since most species haven't even been catalogued yet, all we have are lower bounds. These are only close to being accurate for the biggest and most charismatic species (e.g. mammals, birds and

trees), but these represent a tiny fraction of all the species that are out there. So, any reasonable guess of the extinction rate requires extrapolation.

Phillip and Donald Levin estimate that right now one species is going extinct every 20 minutes, and that half of bird and mammal species will be gone in 200 to 300 years. Richard Leakey estimates a loss of between 50,000 and 100,000 species a year, and says that only during the Big Five mass extinctions was the rate comparably high. E. O. Wilson gives a similar estimate. In his book, Michael Benton reviews the sources of uncertainty and makes an estimate of his own: given that there are probably somewhere between 20 and 100 million species in total, he estimates an extinction rate of between 5,000 and 25,000 species per year. This means between 14 and 70 species wiped out per day.

Skeptics find these numbers alarmist. For example, in Chapter 23 of this book:

- Bjørn Lomborg, *The Skeptical Environmentalist: Measuring the Real State of the World*, Cambridge U. Press, Cambridge, 2001.

the author does a pretty good job of tearing apart Leakey and Wilson's estimates. However, his *own* estimates *also* point to a high extinction rate! He estimates that over the next 50 years, about .7 percent of all species will go extinct. This may not sound like much until you realize how short 50 years is on a geological time scale. To put things in perspective, note that given Lomborg's guess that there are between 10 and 80 million species in total, a loss of .7 percent of all species would mean between 70,000 and 560,000 extinctions in the next 50 years. This amounts to 1,200 and 10,000 per year, or between 4 and 30 a day - the same order of magnitude as what Benton suggests! Perhaps more to the point, Lomborg says the current extinction rate is about 1500 times the natural background rate.

In short, despite plenty of bickering, there seems to be agreement that humans are causing a vastly elevated extinction rate.

And there's also lots of *other* data pointing to a massive human-caused disruption of the biosphere. One in eight plant species are endangered according to the IUCN Red List of threatened species, along along with one in eight bird species and a quarter of all mammals. Worldwide populations of frogs and other amphibians have been declining drastically, and there has been a startling increase in the number of frogs with extra or missing legs and other deformities. The reasons are unclear, but one possible cause is increased ultraviolet radiation due to a reduction in the ozone layer. As you probably know, in 1985 scientists discovered a hole in the ozone layer over the South Pole, now known to be caused by human-made chemicals such as Freon. There is now also a 70% reduction in ozone over the North Pole during most winters.

In the oceans, 90% of all large fish have disappeared in the last half century, thanks to overfishing. We see the spread of dead zones near the mouths of rivers, where nutrients from fertilizer create blooms of plankton leading to low-oxygen water where few organisms can survive. Coral reefs are becoming unhealthy around the world, with a strong upswing in the bleaching of reefs since the 1970s. "Bleaching" is the loss of algae called zooxanthellae which live in coral and give it its color. It seems to be caused by higher water temperatures due to global warming.

And so on, and on, and on....

So, lots of evidence suggests that are in the midst of a mass extinction. But, it's very different than all previous ones. I don't think we can halt it; it's governed by seemingly unstoppable demographic and economic forces. Until the configuration of these forces shifts, at best we can only ameliorate their effects.

The good news is that's its unlikely to be worse than the Permian-Triassic extinction, so things may get better in 100 million years.

Some things I'd like to read:

- E. O. Wilson, *The Diversity of Life*, W. W. Norton and Company, New York, 1999.
- United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC), *World Atlas*

of Biodiversity: Earth's Living Resources for the 21st Century, University of California Press, 2002.

- A. Hallam and P. B. Wignall, *Mass Extinctions and Their Aftermath*, Oxford University Press, Oxford, 1997.

September 9, 2004

As you can probably see from my last entry, I've been getting really interested in paleontology and the long view of history it provides. Since I'm travelling, I've been doing my reading mainly in the good book stores of Cambridge and London, but I mean to dig deeper when I get back to the university libarary at UCR. There's so much more known about this stuff than when I last checked! I'm just dying to get my paws on these, for example:

- S. Culver and P. Wilson, editors, *Biotic Response to Global Change - the Last 145 Million Years*, Cambridge University Press, Cambridge, 2000.

- J. J. Sepodski, Phanerozoic overview of mass extinctions, in *Patterns and Processes in the History of Life*, edited by D. Jablonski and D. M. Raup, Springer, Berlin, 1986.

- Rachel Wood, *Reef Evolution*, Oxford University Press, Oxford, 2000.

However, I'm not sure how much I should be discussing these things in my *economics* diary. I'm pleased that one reader sent me an email saying it was perfectly appropriate to interpret "eco-" in the broadest possible sense and ponder the extinction of the dinosaurs in these pages. But luckily, I've also been reading a book with a more clearcut connection to traditional themes in economics:

- Bjørn Lomborg, *The Skeptical Environmentalist: Measuring the Real State of the World*, Cambridge U. Press, Cambridge, 2001.

So, I'll talk about this.

I figured I should read this book, because it's often touted by hardnosed business sorts as the scientific antidote to the doomsday scenarios of all those tree-hugging environmentalists - see my April 14 entry for an example. After all, the author says he was an "old left-wing Greenpeace member" who came to doubt these doomsday scenarios when, in his job as an academic statistician, he held a study group to investigate Julian Simon's claims that things were getting better, not worse... and found on that Simon was right! Just the sort of story that catches the attention of the press.

But if his book were just fluff, I wouldn't have bothered with it. It's actually packed with data, which makes it interesting, right or wrong.

The book consists of a bunch of chapters which seek to argue away most of the main worries environmentalists have. It would be fun to go through these one by one and try to make up my own mind. But I happen to be interested in biodiversity and extinction right now, so I focused on the chapter about that. I was interested to discover that in this case - and a few others, like global warming - he doesn't really deny there's a problem. He just disagrees about its magnitude and the proper response:

> An extinction rate of .7 percent over the next 50 years is not trivial. It is a rate about 1,500 times higher than the natural background extinction. However, it is a *much smaller* figure than the typically advanced 10-100 percent over the next 50 years (equal to some 20,000 to 200,000 times the background rate). Moreover, to assess the long-term impact, we must ask ourselves whether it is likely that this extinction rate will continue for many hundreds of years (accumulating serious damage) or more likely will be alleviated as population grown decelerates and the developing world gets rich enough to afford to help the environment, reforest, and set aside parks.

There is a lot one could say about this! For example, one could ask why he speaks of an extinction of .7 percent of all species in the next 50 years, instead of 1,200 to 10,000 extinct species per year, even though the second is a logical consequence of the first and his estimate of the total number of species. Perhaps this is because he just got done

ridiculing the enviromentalists for estimating an extinction rate of 40,000 species per year, and the difference between 40,000 and 10,000 doesn't sound as impressive as the difference between 40,000 and .7 percent? Or is it for a better reason, namely that most of our uncertainty in the total extinction number comes from our uncertainty in the total number of species, so a "percent of total species" figure is something we can get a better handle on?

Similarly, one could ask who is advancing a figure of "100 percent" for the extinction rate over the next 50 years. *All life on earth dead?* That seems a bit extreme.

But, it's very interesting to read his discussion of previous figures, some of which seem to have been simply pulled from a hat. It's also interesting to read the rebuttals in the magazine Grist, especially those by Norman Myers and E. O. Wilson, whose estimates were savaged by Lomborg. Amid all the polemics, there are references to what might be some very interesting data!

I hope to talk about this more soon. Unfortunately I have to go out now and be a tourist in London.

September 13, 2004

Okay, it's been fun wandering the docklands of London - in fact that the Museum in Docklands describing the development of London from Roman times up through the current housing boom makes an interesting economics lesson in itself! Though I'd heard about it in nursery rhymes as a kid and seen it in Arizona, I'd never realized the importance of London Bridge. It was built as a defense against Vikings: it kept them from sailing up the Thames. But for centuries thereafter, it gave Londoners control of all ship traffic into the heart of England... helping build this choke point into the grand city it is today!

But I want to talk about the controversy over the number of species that are going extinct, before I forget the details.

According to the skeptical environmentalist Bjøorn Lomborg, "the original estimate of 40,000 species lost every year came from Myers in 1979":

- Norman Myers, *The Sinking Ark: A New Look at the Problem of Disappearing Species*, Pergamon Press, Oxford, 1979.

Lomborg says that Myers' arguments "make astonishing reading", and quotes this as the "crucial part of the argument":

> Let us suppose that, as a consequence of this man-handling of natural environments, the final one-quarter of this century witnesses the elimination of 1 million species - a far from unlikely prospect. This would work out, during the course of 25 years, at an average extinction rate of 40,000 species per year, or rather over 100 a day.

Lomborg goes on:

> This is Myers' argument in its entirety. If we assume that 1 million species will become extinct in 25 years, that makes 40,000 a year. A perfectly circular argument. If you assume 40,000, you get 40,0000. One naturally refuses to believe that this can be the only argument, but Myers' book provides no other references or argumentation.

At the end of his chapter on biodiversity, he writes:

> The dramatic loss of biodiversity, expressed in the figure of 40,000 species a year, is a dramatic figure, created by models. It is a figure which with monotonous regularity has been repeated everywhere until in the end we all believed it. It has becomne part of environmental Litany. But it is also a figure which conflicts with both observation and careful modeling.

More about the "careful modeling" later - I really want to get to the bottom of this, rather than sink into the mire of reporting polemics. But I should at least give Myers a chance at a rebuttal. He writes:

> Bjørn Lomborg opens his chapter on biodiversity by citing my 1979 estimate of 40,000 species lost per year. He gets a lot of mileage out of that estimate throughout the chapter, although he does not cite any of my subsequent writings except for a single mention of a 1983 paper and a 1999 paper, neither of which deals much with extinction rates. Why doesn't he refer to the 80-plus papers I have published on biodiversity and mass extinction during the 20-year interim?
>
> In this respect as well as others, Lomborg seems to be exceptionally selective. As my 1979 book emphasizes, the estimate of 40,000 extinctions per year was strictly a first-cut assessment, preliminary and exploratory, and advanced primarily to get the issue of extinction onto scientific and political agendas. If Lomborg had checked my many subsequent analyses (totaling one quarter of a million words) in the professional literature instead of taking me to task for providing "no other references or argumentation," he would have found more documented, modified, refined, and generally substantiated estimates.

This makes Lomborg look bad, but it doesn't contain actual *evidence* regarding the number of species going extinct. For that, I'd need to look at some of Myers' papers. Unfortunately I can't easily find these online from the comfort of my friend's flat her in Greenwich... so if I have time, I should hit the library when I get back to UCR!

Lomborg also takes a crack at E. O. Wilson:

> Colvinaux admits in *Scientific American* that the rate is incalculable. Even so, E. O. Wilson attempts to put a lid on the problem with the weight of his authority: "Believe me, species become extinct. We're easily eliminating a hundred thousand a year." His figures are "absolutely undeniable" and based on "literally hundreds of anecdotal reports".

E. O. Wilson has responded online in Grist magazine, and his response contains some actual *data!* An ounce of data is worth a ton of rhetoric! I'd like to discuss his data, but I need to go to bed, so I'll just quote it for now:

> Before humans existed, the species extinction rate was (very roughly) one species per million species per year (0.0001 percent). Estimates for current species extinction rates range from 100 to 10,000 times that, but most hover close to 1,000 times prehuman levels (0.1 percent per year), with the rate projected to rise, and very likely sharply. To wit:
>
> Based on the work of Stuart Pimm of Columbia University's Center for Environmental Research and Conservation, anywhere from one to several bird species go extinct annually out of 10,000 known species -- hence, say 0.01-0.03 percent of living bird species are extinguished per year. But birds are unusual in that threatened bird species receive an extraordinary amount of human intervention: The real figure of observed extinctions would be much higher, very likely 10 (0.1 percent) per year or more, were it not for heroic efforts to save species on the brink of extinction. Captive breeding, strict protection, and maintenance of reserves especially designed for bird and mammal species have many species hanging on that would otherwise have gone globally extinct in the past several decades. See, for example, the special treatment accorded the nine critically endangered but extant psittacids (parrots). If you look at non-bird species -- for example, terrestrial and freshwater mollusks, a relatively unprotected group -- the extinction rates are much higher.
>
> The above consideration confirms the likely current extinction rate of 0.1 percent, 1,000 times greater than prehuman levels. That figure is also supported by the following indirect measures:
>
> 1. Area-species curves. Ecological research across a wide range of habitats shows that the number of species inhabiting a patch of land increases exponentially with the size of that patch. Different studies have produced different estimates for the species-area exponent; the higher the value of the exponent, the steeper the general relationship between land area and species diversity, so that a small change in land area has a large effect on diversity. In *The Diversity of Life*, I use the conservative values of the area-species exponent and rate of tropical deforestation to arrive at about 0.25 percent of tropical forest species extinguished or committed to early extinction annually. Since most species likely occur

in tropical forests, these ecosystems are a good proxy: Even if no extinction occurred elsewhere, the planetary rate would still be 0.1 percent annually.

What do we mean by "committed to early extinction?" Studies from tropical America, New Guinea, and Indonesia (cited in *The Diversity of Life*) show that when forest fragments are reduced to anywhere from one to 27 square kilometers, 10 to 50 percent of the species in the fragment go extinct within 100 years, consistent with the Diamond-Terborgh models of exponential decay. The area-dependent decline in mammal species of the U.S. and Canadian western national parks also accords with the picture of committed extinction by area reduction alone.

2. The velocity of passage of species through the categories in the World Conservation Union (IUCN) Red List of Threatened Species, from less endangered to extinct. This movement is also consistent with an extinction rate of 0.1 percent annually, at least for the best-known animal groups.

3. Population Viability Analyses. These studies assess the risk of extinction for individual small populations. Although not enough species have been studied this way to produce regional or global extinction rate estimates, the high risk evident in the populations that have been examined is consistent with a high ongoing extinction rate.

September 21, 2004

Andrew Nicolaysen recommends this book:

- James Buchan, *Frozen Desire: The Meaning of Money*, FSG, NY, 1997.

Leon Kuunders writes:

> I wonder if you have seen the documentary "The Corporations", broadcast by TVO (TV Ontario). On their website they offer information about the program:
>
> http://www.tvo.org/thecorporation/overview.html.
>
> It is about the question: "If corporations are people, what kind of people are they?"

The webpage offers their answer: "psychopaths".

I haven't seen this documentary. It's by Mark Achbar, Jennifer Abbot and Joel Bakan. It sounds interesting, but I seem to have more time for reading things than watching shows - it's easier to efficiently grab ahold of the bits I want and skip the rest.

September 25, 2004

If you're interested in the operating system wars - Microsoft versus Apple versus Linux and others - you may enjoy this essay:

- Neil Stephenson, In the Beginning was the Command Line.

I enjoy Stephenson's tart sense of humor, for example in this bit about our desire for mediated experience - our feeling that virtual reality is cooler than reality:

> I was in Disney World recently, specifically the part of it called the Magic Kingdom, walking up Main Street USA. This is a perfect gingerbready Victorian small town that culminates in a Disney castle. It was very crowded; we shuffled rather than walked. Directly in front of me was a man with a camcorder. It was one of the new breed of camcorders where instead of peering through a viewfinder you gaze at a flat-panel

> color screen about the size of a playing card, which televises live coverage of whatever the camcorder is seeing. He was holding the appliance close to his face, so that it obstructed his view. Rather than go see a real small town for free, he had paid money to see a pretend one, and rather than see it with the naked eye he was watching it on television.
>
> And rather than stay home and read a book, I was watching him.

He rightly points out that we need to understand the desire for mediated experience to understand the direction technology is going now. He focuses on graphical user interfaces, but the point is more general. The combination of "desire for mediated experience" and "money as frozen desire" explains quite a bit about the economy of rich countries like the US today.

Here's another wickedly charming sample of his wit:

> The word, in the end, is the only system of encoding thoughts - the only medium - that is not fungible, that refuses to dissolve in the devouring torrent of electronic media. The richer tourists at Disney World wear t-shirts printed with the names of famous designers, because designs themselves can be bootlegged easily and with impunity. The only way to make clothing that cannot be legally bootlegged is to print copyrighted and trademarked words on it; once you have taken that step, the clothing itself doesn't really matter, and so a t-shirt is as good as anything else. T-shirts with expensive words on them are now the insignia of the upper class. T-shirts with cheap words, or no words at all, are for the commoners.

This reminds me of:

- Naomi Klein, *No Logo: Taking Aim at the Brand Bullies*, HarperCollins, 2000.

quite a nice book for stirring up outrage at "branding" and other corporate practices. But even more, it reminds me in the widespread popular interest is using "No Logo" as a logo or trademark on t-shirts, skateboards, stickers, etcetera!

October 8, 2004

On September 25, Leon Kuunders recommended a documentry about how pathological corporations would seem if they were people. It turns out that this documentary is based on a book, and he has kindly offered to get me a copy:

- Joel Bakan, *The Corporation: The Pathological Pursuit of Profit and Power*, Free Press, 2004.

I'm looking forward to it.

It may seem eccentric to judge corporations by the standards we judge people, but it's actually a useful exercise.

Why?

First of all, we must remember that at least in the US, corporations *are* persons in the eyes of the law. Technically, they're "artificial persons". This has been the case ever since the 1886 Supreme Court ruling in *Santa Clara County v. Southern Pacific Railroad*. In a clear case of judicial activism if there ever was one, this ruling redefined the concept of "person" to include corporations. In fact, it did so without hearing any arguments on this question, or providing any reason. The details are pretty interesting! According to David Korten:

> In 1886 [...] in the case of *Santa Clara County v. Southern Pacific Railroad Company*, the U.S. Supreme Court decided that a private corporation is a person and entitled to the legal rights and protections the Constitutions affords to any person. Because the Constitution makes no mention of corporations, it is a fairly clear case of the Court's taking it upon itself to rewrite the Constitution.
>
> Far more remarkable, however, is that the doctrine of corporate personhood, which subsequently became a cornerstone of corporate law, was introduced into this 1886 decision without argument. According to the

official case record, Supreme Court Justice Morrison Remick Waite simply pronounced before the beginning of argument in the case of *Santa Clara County v. Southern Pacific Railroad Company* that:

> The court does not wish to hear argument on the question whether the provision in the Fourteenth Amendment to the Constitution, which forbids a State to deny to any person within its jurisdiction the equal protection of the laws, applies to these corporations. We are all of opinion that it does.

The court reporter duly entered into the summary record of the Court's findings that:

> The defendant Corporations are persons within the intent of the clause in Section 1 of the Fourteenth Amendment to the Constitution of the United States, which forbids a State to deny to any person within its jurisdiction the equal protection of the laws.

[....]

The doctrine of corporate personhood creates an interesting legal contradiction. The corporation is owned by its shareholders and is therefore their property. If it is also a legal person, then it is a person owned by others and thus exists in a condition of slavery - a status explicitly forbidden by the Thirteenth Amendment to the Constitution. So is a corporation a person illegally held in servitude by its shareholders? Or is it a person who enjoys the rights of personhood that take precedence over the presumed ownership rights of its shareholders? So far as I have been able to determine, this contradiction has not been directly addressed by the courts.

I look forward to the day when a corporation sues its president for violating its Thirteenth Amendment rights. This is quoted from:

- David C. Korten, *The Post-Corporate World: Life After Capitalism*, Berrett-Koehler Publishers, 2000.

Secondly, corporations have a suspicious resemblance to the oversimplified "persons" that many economists like to study in "rational choice theory". Recall from my October 12, 2003 entry the simplifying assumptions that Amartya Sen's work calls into question:

Self-centered welfare: A person's welfare depends only on her own consumption and other features of the richness of her life (without any sympathy or antipathy towards others, and without any procedural concern).

Self-welfare goal: A person's only goal is to maximize her own welfare.

Self-good choice: A person's choices must be based entirely on the pursuit of her own goals.

Which persons do you know that act like this? Answer: **corporations!**

So, we see an interesting parallel development: the legal system redefining "person" to include corporations, while economists redefine the concept of rationality in such a way that corporations more closely resemble the ideal rational person than actual people do!

I don't think this is the result of some sort of "conspiracy": some bunch of economists and judges in a smoke-filled room scheming to let corporations take over the world. It actually seems like a natural form of evolution. Governments naturally set up the rules to favor powerful political entities. During the last century or two, corporations have become the most powerful political entities. As part of this process, the discipline of classical economics arose to describe *homo economicus*. In other words, it describes human behavior modeled on how a good businessman - or by extension, a well-functioning corporation - would behave. Conversely, people working for corporations imbibe classical economics in school, and this influences how they behave. Eventually this economic paradigm gets applied to government itself and the feedback loop is complete.

So, we have feedback pushing us towards a world in which corporations are the main actors - legally recognized as persons - and ideally they behave as classical economic theory says rational agents should. By this, I mean:

- their utility depends only on their own profits, revenues, market share, etc. -
  without any sympathy or antipathy towards others, and without any procedural concern,
- their goal is to maximize their own utility,
- they make choices based solely on this goal.

Of course, as composite entities, corporations actually behave in a much more complicated manner, determined by the decisions of all their constituents. E.g., the president of corporation X may make decisions based on the fact that he hates the president of corporation Y; the clerk has no qualms about stealing ballpoint pens from the office; the board of directors gives the president of corporation Z a big pay raise because he's done the same for them in his role on the boards of corporations they run. The above is just a kind of ideal.

But, even as an ideal, it's shockingly different from the ideals espoused by various other philosophies of human life!

(By the way, I'm curious about whether corporations are counted as "persons" in all the world's legal systems, and the history of this issue.)

October 9, 2004

A bit of news:

Under a new "temporary rule" issued by Bush administration, the Forest Service will no longer need to maintain viable populations of fish and wildlife in national forests - suspending a policy instituted by the Reagan administration in 1982, in response to the *National Forest Management Act* of 1976. President Reagan approved regulations that require:

1. the Forest Service to maintain viable populations of species in national forests; and
2. that those populations of species be well-distributed throughout the natural forests in which they are present.

Now, with little publicity, enforcement of these regulations has been "temporarily suspended".

October 10, 2004

I'm getting interested in finding out the rate at which the world's oil reserves will get used up. Like the rate of extinction of species, this is an incredibly controversial topic, in part because it's hard to figure out the answer, but also because there are big ideological pressures both ways for people to bend the truth.

Here's one viewpoint:

- Colin J. Campbell, Peak Oil, Presentation at the Technische Universität Clausthal, December 2000.

Briefly, Colin Campbell predicts that oil production will peak around 2005, hydrocarbons as a whole around 2010, and natural gas around 2020. He has started an organization to prepare people for this, and they have a big website:

- Association for the Study of Peak Oil and Gas (ASPO) website.

Here's some fascinating reportage of one of their recent meetings:

- Michael C. Ruppert, Paris Peak Oil Conference Reveals Deepening Crisis.

Of course, the "skeptical environmentalist" Bjørn Lomborg presents a wholly different viewpoint! He emphasizes that there are vast untapped reserves of solar energy, shale oil, uranium, etc. He says that our current energy costs are less

than 2% of the global GDP, so that "even if we were to see large price increases it would still not have significant welfare impact". He emphasizes that we keep on discovering new oil reserves. But he does agree with Campbell in one respect: he says "today we have oil for at least 40 years at present consumption". In other words, not long at all, given how consumption is increasing! This would be completely consistent with oil production peaking soon and going downhill thereafter.

But before I get into this dispute, I should try to wrap up my conclusions about extinctions thus far!

October 15, 2004

Some hard data just in! The Global Amphibian Assessment has come out with a detailed study of the extinction of amphibian species, available online and also published in journal *Science*:

- Simon N. Stuart, Janice S. Chanson, Neil A. Cox, Bruce E. Young, Ana S. L. Rodrigues, Debra L. Fischman, and Robert W. Waller, Status and trends of amphibian declines and extinctions worldwide, *Science*, published online October 14 2004.

It's based on the findings of 500 scientists.

The findings are grim. Of 5743 known amphibian species, 34 have gone extinct, while 122 can no longer be found and are considered "possibly extinct". Even worse, of the 122 possibly extinct species, 113 disappeared after 1980!

This means that 0.6% of amphibian species have certainly gone extinct in the last century, while another 2.1% are probably extinct. Moreover, about 32.6% are either extinct or threatened, while 22.5% are too poorly documented to assess.

You may recall that the "skeptical environmentalist" Bjørn Lomborg estimated a 0.7% extinction rate in the next 50 years. Amphibians may be especially vulnerable to acid rain, increased ultraviolet light and other forms of human-caused environmental degradation - nobody knows for sure what's afflicting them - but it looks like their extinction rate over the next 50 years will exceed Lomborg's estimates by at least an order of magnitude, and probably more.

Amphibians have been around a long time. They arose in the Carboniferous Period about 350 million years ago, weathered the world's biggest mass extinction at the end of the Permian Period 251 million years ago, attained their current forms around 150 million years ago, and survived the downfall of the dinosaurs 65 million years ago. In the words of David Wake of U.C. Berkeley's museum of vertebrate zoology, "the fact that this tough survival group is checking out on our watch should concern us all".

October 23, 2004

A new State of the Birds report by the Audubon Society reports that almost 30 percent of North America's bird species are in "significant decline". Here are the worst-off species for which sample sizes are large:

		Population loss 1966-2003	2003 population estimate
1	Rusty Blackbird	-97.9%	2,000,000
2	Henslow's Sparrow	-96.4%	79,000
3	Common Tern	-90.6%	1,400,000
4	Verdin	-85.6%	8,900,000
5	Sprague's Pipit	-83.8%	870,000
6	Pinyon Jay	-82.5%	4,100,000
7	Short-eared Owl	-80.3%	2,400,000
8	Cerulean Warbler	-79.6%	560,000
9	Black-throated Sparrow	-79.6%	27,000,000
10	Loggerhead Shrike	-77.1%	4,200,000
11	Grasshopper Sparrow	-77.1%	15,000,000
12	Olive-sided Flycatcher	-73.2%	1,200,000
13	Baird's Sparrow	-73.2%	1,200,000
14	Canyon Wren	-70.0%	660,000

15	Field Sparrow	-68.8%	8,200,000
16	Northern Bobwhite	-67.6%	9,200,000

For more details on how this data was collected, try the Audubon website.

November 9, 2004

Today the 8-nation Arctic Council officially released their Arctic Climate Impact Assessment. You can already read an overview.

Here are some interesting charts they released:

- Temperature in Greenland over the last 100,000 years.
- Temperature in the Arctic over the last 100 years.
- Greenland Ice Sheet - Melting as of 1992 versus 2002.

I think these speak for themselves: things are warming up near the North Pole. Of course, we've been in a strange cold spell with intermittent ice ages for roughly the last 1.8 million years - the Pleistocene Epoch. The thin sliver of recent time since the latest ice age called the Holocene Epoch, but this is an arbitrary division geologically speaking, distinguished only by the rise of humans. If we hadn't come along, it seems quite possible that there would be more ice ages until the Earth returned to its normal warmer climate. Our production of greenhouse gases might just be pushing us back to this normal climate more rapidly. But I use the word "just" ironically here: if this return to warmer conditions happens suddenly - over a few hundred years, say - such a drastic change would have an incredible impact on humans and other species. Animals and especially plants take a long time to move north or south and "resettle" as the climate changes; too sudden a change and they just die out.

Switching focus to the South Pole, an article in *Nature* reports that the amount of krill in the southwest Atlantic has fallen by about 80 percent since 1979:

- Angus Atkinson, Volker Siegel, Evgeny Pakhmonov and Peter Rothery, Long-term decline in krill stock and increase in salps within the Southern Ocean, *Nature* **432** (November 4, 2004), 100-103.

Krill are small crustaceans that look a bit like shrimp to the untrained eye. Krill are a crucial link in the food chain: before their recent decline, their biomass exceeded 1 billion tons! Fish, seals, whales, penguins and other birds in the southern Atlantic all eat krill, so an 80% drop in krill would be major blow to the entire ecosystem.

Why such a drastic decline in krill? Atkinson's best guess is global warming. There's been a drop of at least 30 days in how long the sea ice lasts near the Antarctic Peninsula - the main breeding ground for krill. Krill eat algae that grow on sea ice. The average air temperature at the Antarctic Peninsula has gone up by 2.5 degrees Celsius in the last 50 years.

Even more worrisome is that these days, not every winter is cold enough for a good krill breeding season - only every third year or so. Krill live for 5 to 6 years. If the gap between good breeding years reaches 6 years, their numbers will *really* plummet.

There are extra complications. Krill are a "boom and bust" species whose population changes erratically, so Atkinson needed to average the data over a long period to reliably detect a long-term trend. Steve Nicol of the Australian Antarctic Division questions whether the krill population could really have declined so much without their predators dying off at a corresponding rate - and he claims that's not happening. He says that krill may have moved deeper now that the ozone hole over the Antarctic is making for more ultraviolet light... or that rebounding whale populations are feasting on the buggers. "Something's happened," he says. "We're just not quite sure what".

November 10, 2004

You may wonder why this economics diary is focusing on environmental issues and even paleontology. The main reason is that this is what I happen to be interested in right now! But another reason is that I want to get as far as possible from the short-term outlook fostered by quarterly reports and the daily stockmarket ups and downs. At least for now, I want to step back and take the long view - the *really* long view!

This is hard to do, because if you look at the history of the universe, it seems like everything is speeding up, approaching a "singularity" a bit like the big bang, but in reverse - and with humanity doing all the interesting stuff, instead of gravity and elementary particles. The term "singularity" is probably not very accurate; I think "phase transition" is a better metaphor. But, if you've never thought about this before, you have to read stuff by Vernor Vinge, who brought this idea into prominence under the name "The Singularity":

- Vernor Vinge, What is the singularity?
- Wikipedia, The technological singularity.
- Robin Hanson, ed., A critical discussion of Vinge's singularity concept.

As Vinge points out, it goes back at least to John von Neumann. In his 1958 recollections of von Neumann, his friend Stanislaw Ulam wrote:

> One conversation centered on the ever accelerating progress of technology and changes in the mode of human life, which gives the appearance of approaching some essential singularity in the history of the race beyond which human affairs, as we know them, could not continue.

In a very different form, we can trace it back to the Catholic heretic Teilhard de Chardin, who spoke not of a singularity but of the "Omega Point" - the point at which humanity forms a new entity, the "noosphere".

But, to have any chance of understanding this singularity, or phase transition, I think we need to situate it in the large frame of geological time. This is especially true when it comes to the effects of humanity on the biosphere, such as climate change and mass extinction. We can only hope to comprehend these by comparing them to events in the distant past... and viewing them from a perspective where a century passes in the blink of an eye.

This idea isn't new to me, of course: some people are popularizing it under the name of "Deep Time", while others call it "The Long Now". It's really just part of growing up....

November 12, 2004

I'm trying to understand some basic facts about climate change, since this promises to have major economic effects in the next century. One ironic thing is that while people worry a lot about global warming, and rightly so, geologists speak of a gradual "deterioration" of the climate as it cooled down from early Cenozoic temperatures to the current phase of intermittent ice ages. There's no contradiction: the best temperatures for a profusion of life - jungles and the like - will melt the ice caps and flood a bunch of coastal cities. But, it got me wondering why we've been in this cold spell in the first place!

I've been reading various books and also this nice website.

- Manchester Metropolitan University, Global Climate Change Student Guide.

The short answer is: nobody knows why it got cold.

Since "why" is too hard, how about "what" and "when"?

Let's start our story at the beginning of the Cenozoic Era. The Cenozoic - the age of mammals - began with a bang around 65 million years ago when an asteroid smacked into Mexico and the dinosaurs died out. The Cenozoic is divided as follows:

- Paleogene: 65 - 24 million years ago.
    - Paleocene Epoch: 65 - 55 million years ago.
    - Eocene Epoch: 55 - 34 million years ago.
    - Oligocene Epoch: 34 - 24 million years ago.
- Neogene: 24 - 0 million years ago.
    - Miocene Epoch: 24 - 5.3 million years ago.
    - Pliocene Epoch: 5.3 - 1.8 million years ago.
    - Pleistocene Epoch: 1.8 - .01 million years ago.
    - Holocene Epoch: .01 - 0 million years ago.

The division into Paleogene and Neogene is sort of new, replacing the traditional but silly division into the "Tertiary" and the "Quaternary", where the latter included only 5% of the Cenozoic. This was part of an old system which divided the entire history of the Earth into Primary, Secondary, Tertiary and Quaternary periods, each period being vastly shorter than the previous one... reflecting our general present-centered attitude. As Nigel Calder pointed out, the apparent speedup in progress makes us want to divide history into periods that get shorter and shorter as they approach the present - a logarithmic scale, a bit like a carefully landing spacecraft that comes closer and closer to the Earth's surface but never quite touches it!

The scheme above still suffers from this defect: the Pliocene is much shorter than the Miocene, the Pleistocene is shorter still, and the Holocene Epoch started a mere 10,000 years ago - a pathetically thin slice of time from a geological perspective. It includes everything after the last ice age, which is presumably only the "last" in the weak sense that the next one hasn't happened yet! As far as geology and climate goes, we're still in the Pleistocene Epoch: an epoch of many ice ages. The current gap between ice ages only gets a special name because we, humans, started seriously acting up at this time! Of course, we may cause enough global warming to truly end the Pleistocene, in which case we'll deserve our own epoch even by geological standards.

Anyway...

Though the beginning of the Cenozoic was cooler than the maximum temperatures of the Paleozoic, it was much warmer than today. Oxygen isotope ratios show the ocean was 10° to 15° Celsius warmer than today. For Americans who know nothing of metric units, that's 18-27 degrees Fahrenheit. That's *hot!* There were trees growing in Antarctica then, no permanent polar ice caps.

The temperature began to drop as soon as the Cenozoic started. By the Oligocene, 34-24 million years ago, glaciers started forming in Antarctica. The growth of ice sheets led to a dropping of the sea level. Tropical jungles gave ground to cooler woodlands.

What caused this? Some seek the answers in plate tectonics. The Oligocene is when India collided with Asia, throwing up the Himalayas and the vast Tibetan plateau. Some argue this led to a significant change in global weather patterns. But this is also the time when the supercontinent Gondwanaland finally broke up, with Australia and South America separating from Antarctica. Some argue that the formation of an ocean completely surrounding Antarctica led to the cooling weather patterns. There are issues of timing involved here... how do we explain the general cooling pattern starting at the beginning of the Cenozoic?

The beginning of the Miocene, 24 million years ago, is when the first grasses arose. It's sort of amazing that something we take so much for granted - grass - can be so new! But grasslands, as opposed to thicker forests and jungles, are characteristic of cooler climates. And as Nigel Calder has suggested, grasslands were crucial to the development of humans! We grew up on the border between forests and grasslands. That has a lot to do with why we stand on our hind legs and have hands rather than paws. Later, the agricultural revolution relied heavily on grasses like wheat, rice, corn, sorghum, rye, and millet. As we ate more of these plants, we bred them in a way that completely changed their characteristics. So, you could say we coevolved with grasses!

Indeed, the sequence of developments leading to humans came shortly after the first grasses. Apes split off from monkeys 21 million years ago, in the Miocene. The genus *Homo* split off from other apes like gorillas and chimpanzees 5 million years ago, near the beginning of the Pliocene. The fully bipedal *Home erectus* dates back to 1.9 million years ago, near the end of the Pliocene.

Then, at the beginning of the Pleistocene, 1.8 million years ago, the Earth entered an even cooler phase, with jerky temperature variations causing a series of ice ages. Experts call them "glacials".

The latest of these ended around 16 thousand years ago, with temperatures reaching their present levels only around 10 thousand years ago. We can see this from oxygen isotopes in ice from Greenland, and we can see it from the rise of sea levels.

As we get closer to the present the data gets more accurate and we can spot small fluctuations on top of larger trends - this is one reason it feels that things are happening faster. Though things have basically been warming up in the last 16 thousand years, there was a severe cold spell between 12 and 11 thousand years ago: the Younger Dryas event.

(I love that name! Was there also an "Elder Dryas"? If you're interested, you can read more about it here.)

The Younger Dryas lasted about 1300 years. Temperatures dropped dramatically in Europe: about 7°C in only 20 years! In Greenland, it was 15° C colder during the Younger Dryas than today. In England, the average annual temperature was -5° C, so glaciers started forming. We can see evidence of this event from oxygen isotope records and many other things. One favored explanation is that the melting of the ice sheet on North America lowered the salinity of North Atlantic waters. This in turn blocked a current called the Conveyor Belt, which normally brings warm water up the coast of Europe. So, ironically, global warming may have brought on a sudden deep freeze in this region.

But, this theory is quite controversial - see my October 11, 2006 diary entry for an update!

Anyway, the Younger Dryas ended as suddenly at it began, with temperatures jumping 7° C. Since then, the Earth continued warming up until about 6 thousand years ago - the mid-Holocene thermal maximum. The earth was about 1 or 2 degrees Celsius warmer than today. Since then, it's basically been cooling off - not counting various smaller variations.

But as we zoom in towards the present, we see more and more tiny details....

From 6000 to 2500 years ago things cooled down, with the coolest stretch occuring between 4000 and 2500 years ago: the Iron Age neoglaciation.

Then things warmed up for a while, and then they cooled down from 500 to 1000 AD. Yes, the so-called "Dark Ages" were also chilly!

After this came the Medieval climate optimum, a period from about 1000 to 1300 AD during which European temperatures reached their warmest levels for the last 4000 years.

From 1450 AD to 1890 there was a period of cooling, often called the Little Ice Age. This killed off the Icelandic colonies in Greenland, as described in this gripping book:

- Jane Smiley, *The Greenlanders*, Ballantine Books, New York, 1996.

However, the term "Little Ice Age" exaggerates the importance of what's truly a tiny blip in the grand scheme of things. It was nowhere near as big as the Younger Dryas: temperatures may have dropped a measly 0.2 Celsius from the Medieval optimum, and it may have happened only in Europe - though this is a subject of debate.

Since then, things have been warming up. The subject has big political implications, and is thus subject to enormous controversy. But, I think it's safe to say this warming is *much greater* than the other variations I've mentioned over the last 1000 years. For example, this chart:

- Millenial Northern Hemisphere temperature reconstruction, adapted from Mann, Bradley and Hughes by the Intergovernmental Panel on Climate Change for their report *Climate Change 2001: The Scientific Basis*.

shows Northern Hemisphere temperatures rising about 1.1 Celsius from 1900 to 2000. Lots of other studies have been done, and most of them roughly agree.

Of course, this ain't much compared to the 15-20 Celsius cooling throughout the Cenozoic - but it's happening fast, and it's not over yet!

Addendum: I was intrigued and puzzled by the name "Younger Dryas" until Nicola Ambrosetti emailed me this:

> I came across something that reminded me of you: in case you never found out, here's where the name "Younger Dryas" comes from - see the *Dryas Octopetala* article on Wikipedia:
>
> > The Younger Dryas and Elder Dryas stadials are named after *Dryas octopetala*, because of the great quantities of its pollen found in cores dating from those times. During these cold spells, Dryas octopetala was much more widely distributed than it is today, as large parts of the northern hemisphere that are now covered by forests were replaced in the cold periods by tundra.
>
> So apparently there is also an Elder Dryas period!
>
> Best regards,
> Nicola

Indeed, the Elder Dryas was an ice age (or technically, a "stadial") that occured about 1000 years before the Younger Dryas, and lasted 300 years.

November 13, 2004

Now let's think about the economic implications of climate change. I want to show how the big long-term picture - the view from Deep Time, as it were - can actually be relevant to practical decisions. So, if you forget what the "Younger Dryas" event was, go back and read my last entry before reading this.

As you know, the Kyoto Protocol is an attempt to reduce greenhouse gas emissions and lessen global warming. Russia has recently signed on, but the political leadership of the United States has rejected this treaty because of its effects on the economy: since the USA is one of the biggest users of fossil fuels per capita, cutting back on greenhouse gases would "hurt the economy", as they like to say.

Of course, to tell whether this treaty would really hurt the economy, one needs to do a cost-benefit analysis. This is incredibly complicated, and I'm in no position to do it here. There are a bunch of issues involved which make it a highly controversial business.

I'll gladly avoid some of these controversies. For example, in the United States, the "full ostrich position" is popular: global warming is not real; it's just a figment of the imagination of some nuts obsessed with the environment. There are also a variety of half ostrich positions, where you stick your head in the sand but keep one eye out to avoid looking really stupid. For example: global warming is real but not human-caused. Or: it's real, and more research needs to be done to see if it's human-caused, but we shouldn't pay for this research, and in the meantime we should subsidize the sale of gas-guzzling SUVs and open the Arctic wilderness for drilling. The latter seems to be the current position of the Bush administration.

I don't even want to bother arguing against these positions - I have better things to do with my time, like debate physics with crackpots who send me their crazed theories and bet that I can't disprove them.

A more interesting point is made by the "skeptical environmentalist" Bjørn Lomborg. He admits that global warming is real and caused by humans, and admits it will have negative effects that will outweigh the benefits. Indeed, he estimates the total cost at $5 trillion (with costs discounted at a certain unspecified rate per annum). But, he says that the cost of completely preventing global warming would be so outrageous that it's not worth it - and adds quite correctly that the Kyoto Protocol, at least *by itself,* would not limit greenhouse gases enough to make big difference on global warming.

His full position is fairly complex. To summarize with a few quotes:

> Global warming is important. Its total costs could be about $5 trillion. Yet, our choices in dealing with global warming are also important, with few, carefully chosen actions shaving some hundred billion dollars off the global warming price but with many actions which could cose the world trillions and even tens of trillions over and above the global warming cost.
>
> [....]
>
> To give a feel for the size of the problem - the Kyoto Protocol will likely cost at least $150 billion a year, and possibly much more. UNICEF estimates that just $70-$80 billion a year could give all Third World inhabitants access to the basics like health, education, water and sanitation.
>
> [....]
>
> In Figure 166 we see the total income over the coming century for the four main scenarios in the IPCC (Intergovernmental Panel on Climate Change). If we chose a world focused on economic development within a global setting, the total income will be some $900 trillion. However, should we go down a path focusing on the environment, even if we stay within a global setting, humanity will lose some $107 trillion, or 12 percent of the total, poetntial income. And should we choose a more regional approach to solving the problems of the twenty-first century, we would stand to lose $140-$274 trillion or even more than a quarter of the potential income. Moreover, the loss will mainly be to the detriment of the developing countries [....]
>
> Again, this should be seen in the light of a total cost of global warming at about $5 trillion and a cost of all other environmental policies throughout the twenty-first century of $18 trillion. What this illustrates is that if we want to leave a planet with the most possibilities for our descendants, in both the developing and the developed world, it is imperative that we focus primarily on the economy and solving our problems in a global context rather than focusing - in IPCC lingo - on the environment in a regionalized conext. Basically, this puts the spotlight on securing economic growth, especially in the third world, while ensuring a global economy, both tasts of which the wolrd has set itself within the framework of the World Trade Organization (WTO). If we succeed here, we could increase world income with $107-$274 trillion, whereas even if we achieve the absolutely most efficient global warming poliices, we can increase wealth just $0.245 trillion (Figure 164). To put it squarely, what matters to our and our children's future is not primarily decided within the IPCC framework but within the WTO framework.
>
> Yet, one could be tempted to suggest that we are actually so rich that we can afford both to pay a partial insurance premium against global warming (at 2-4 percent of GDP), and to help the developing world (a further 2 percent), because doing so would only offset growth by 2-3 years. And that is true. I am still not convinced that there is any point in spending 2-4 percent on a pretty insignificant insurance policity, when we and our descendants could benefit far more from the same investment placed elsewhere. But it is correct that we are actually wealthy enough to do so.

All this is very interesting and worth arguing about, but right now I want to say just one thing. This analysis assumes the costs of global warming are roughly understood. I won't go into how he gets the figure of $5 trillion - he actually gets it from here:

- William Nordhaus and Joseph Boyer, *Roll the DICE Again: Economics Models of Global Warming*, MIT Press, Cambridge, Massachusetts, 2000.

but it's mainly based on estimates of the cost to agriculture, forestry, fisheries, the changing cost of energy production, water supply, and infrastructure, the cost of hurricanes, drought, coast protection, land loss, and the loss of wetlands, forests, animal and plant life, and human life.

But, this doesn't take into account lower-probability but higher-damage scenarios like a repeat of the Younger Dryas event!

I talked about the Younger Dryas in my last entry. About 11,000 years ago, global warming caused a meltdown of the glaciers in North America. The resulting vast flow of fresh water into the North Atlantic disrupted a worldwide current pattern called the Great Ocean Conveyor, or more prosaically, the "thermohaline circulation". It's this current that makes Europe warmer than you'd otherwise expect. So when it quit, temperatures plummeted by 7 °C. And this happened fast - in a matter of a mere *20 years!* The average temperature in England dropped to -5° C, and glaciers started forming!

See:

- David Suzuki Foundation, The Great Ocean Conveyor: the Achilles heel of the climate system?
- Terrence Joyce, Abrupt Climate Change: Are We on the Brink of a Little Ice Age?, Woods Hole Oceanographic Institution.
- *Abrupt Climate Change: Inevitable Surprises*, National Academies Press, 2002.

To quote the first website:

> Warm waters are carried north by the Gulf Stream, cooling as they travel. By the time they reach the vicinities of Labrador and Iceland, these waters have grown cold and dense. During winter the coldest, saltiest waters sink thousands of metres below the surface to form North Atlantic Deep Water (NADW). The heat released to the atmosphere during NADW formation is largely responsible for the relatively warm temperatures enjoyed by western Europe.
>
> If not for the North Atlantic loop of the Conveyor, European winters would be much colder. Berlin might have the climate of Edmonton, which lies at the same latitude, while Stockholm might be more like Iqaluit.

This is what it was like during Younger Dryas. It lasted for about a thousand years. Then, when the ice in North America was more or less done melting, the Great Conveyor started up again - and in 20 years the temperature popped back up!

So, climate change is not always gradual. And another event like this could be on its way now! To quote the second website listed above:

> Consider first some observations of oceanic change over the modern instrumental record going back 40 years. During this time interval, we have observed a rise in mean global temperature. Because of its large heat capacity, the ocean has registered small but significant changes in temperature. The largest temperature increases are in the near surface waters, but warming has been measurable to depths as great as 3000 meters in the North Atlantic. Superimposed on this long-term increase are interannual and decadal changes that often obscure these trends, causing regional variability and cooling in some regions, and warming in others.
>
> In addition, recent evidence shows that the high latitude oceans have freshened while the subtropics and tropics have become saltier. These possible changes in the hydrological cycle have not been limited to the North Atlantic, but have been seen in all major oceans. Yet it is the North Atlantic where these changes can act to disrupt the overturning circulation and cause a rapid climate transition.
>
> A 3-4 meter, high latitude buildup of fresh water over this time period has decreased water column salinities throughout the subpolar North Atlantic as deep as 2000m. At the same time, subtropical and northern tropical salinities have increased.

> The degree to which the two effects balance out in terms of fresh water is important for climate change. If the net effect is a lowering of salinity, then fresh water must have been added from other sources: river runoff, melting of multi-year arctic ice, or glaciers. A flooding of the northern Atlantic with fresh water from these various sources has the potential to reduce or even disrupt the overturning circulation.
>
> Whether or not the latter will happen is the nexus of the problem, and one that is hard to predict with confidence. At present we do not even have a system in place for monitoring the overturning circulation.

So, to truly calculate the costs of global warming, we'd need to estimate the probability and cost of events like a repeat of the Younger Dryas - perhaps improbable (who knows?), but incredibly costly if it occurs. We don't know how to estimate such things.

In short, the view from Deep Time suggests that we are messing with things we don't understand - and the stakes could be high. We can try to learn more, and we can try to be careful in the meantime... or we can just go ahead and see what happens.

Messing with things we don't understand is nothing new: it's what humanity has always done. In fact, it's how evolution has always proceeded: organisms try stuff and take the consequences! Sometimes they win, sometimes they lose. Any one species always loses eventually. If we use our intelligence constructively, we might last longer.

November 17, 2004

My friend and grad student Miguel Carrión Álvarez writes:

> I was reading your latest entry in your economics diary. Here's what George Monbiot has to say about Lomborg's arguments:
>
> > The idea that we can attach a single, meaningful figure to the costs incurred by global warming is laughable. Climate change is a non-linear process, whose likely impacts cannot be totted up like the expenses for a works outing to the seaside. Even those outcomes we can predict are impossible to cost. We now know, for example, that the Himalayan glaciers which feed the Ganges, the Bramaputra, the Mekong, the Yangtze and the other great Asian rivers are likely to disappear within 40 years. [15] If these rivers dry up during the irrigation season, then the rice production which currently feeds over one third of humanity collapses, and the world goes into net food deficit. If Lomborg believes he can put a price on that, he has plainly spent too much of his life with his calculator and not enough with human beings. But people listen to this nonsense because the alternative is to accept what no one wants to believe.
>
> The quotation is at the end of this article:
>
> - George Monbiot, Goodbye, Kind World, The Guardian, August 10, 2004.
>
> Reference 15, about Asian rivers drying up, is to:
>
> - Glacier meltdown, *New Scientist*, **182** issue 2446 (8th May 2004).
> - Anil V. Kulkarni, B. P. Rathore and Suja Alex, Monitoring of glacial mass balance in the Baspa basin using accumulation area ratio method, *Current Science* **86** (10th January 2004) 185-190.

November 28, 2004

One thing I don't like about the George Monbiot quote above is that the references he cites do not seem to back up his claim that "We now know, for example, that the Himalayan glaciers which feed the Ganges, the Bramaputra, the Mekong, the Yangtze and the other great Asian rivers are likely to disappear within 40 years.". They *do* describe the

diminishing of glaciers in the Himalayas that feed some important rivers, but not this bold claim. It could be true, but I'd need some evidence! Also, it's unfair of him to suggest Lomborg has factored such a scenario into his estimate of the economic damages of global warming and come up with a figure of only $5 trillion - the real problem is that Lomborg hasn't taken such drastic possibilities into account.

Reading a Scientific American article on abrupt climate change, I found some interesting references:

- Peter Schwartz and Doug Randall, An abrupt climate change scenario and its implications for the United States national security.
- Michael Vellinga and Richard A. Wood, Global climatic impacts of a collapse of the Atlantic thermohaline circulation, in *Climate Change* **54** (2002), 251-267.
- Spencer Weart, Rapid climate change, in *The Discovery of Global Warming*, Harvard U. Press, Cambridge, 2003.
- Richard A. Wood, Michael Vellinga and Robert Thorpe, Global warming and thermohaline circulation stability, *Phil. Trans. Roy. Soc. Lond.* A **361** (2003), 1961-1975.

The first reference is a report commissioned by the U. S. Defense Department!

For my 2005 diary, go here.

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to explain to you, and in reality to others and not least to myself, what has happened to the world we both have loved... - E. O. Wilson

baez@math.removethis.ucr.andthis.edu

home

For my 2004 diary, go here.

Diary - 2005

John Baez

January 2, 2005

Happy New Year! I spent yesterday replacing all the tires on my car, since one had gone flat while I was visiting Paris and my parents in Virginia over the Christmas break.

With my recent obsessive interest in climate change, mass extinctions and the like, I should have something to say about the tsunami in the Indian Ocean. But all I have to say for now is: send some money to help people! I like Doctors Without Borders, so I gave them 200 bucks.

One often wonders, with charities, how much of your money is actually going to the bigshots who run the organization. According to their 2003 financial statement, about 86% of their money goes to program services, while 12% goes to fundraising and 2% goes to management. They get an A rating (though not an A+) from American Institute of Philanthropy, and 3 stars (though not 4) from Charity Navigator.

It reassures me that Doctors Without Borders make their financial information really easy to find on their website: you click "about us" and there it is. Try to find this sort of information for the American Red Cross, starting from their homepage! Click "about us"... and you won't find it. In theory you can find it in just three clicks, but you have to be clever.

Just a couple of small items today...

Here's a book that looks good:

- Jared Diamond, *Collapse: How Societies Choose to Fail or Succeed*, Viking Press, 2004.

According to the review by Alfred W. Crosby in today's *Los Angeles Times*, Diamond is an ornithologist and a UCLA professor of physiology and geography, who has travelled widely, read lots of history, and analyzed many societies to see what makes them collapse - or not. The book goes through lots of examples and compares them on 5 factors:

1. Environmental damage inflicted
2. Climate change
3. Hostile neighbors
4. Friendly neighbors
5. The society's response to all of the above

For example, he talks about how the Greenlanders died out in the 1400s after cutting down all the trees and tearing up the sod for fuel when the "Little Ice Age" hit them, in part because they were hostile to the local Inuit instead of adopting their ways, while support from friendly neighbors dropped off as expanding sea ice blocked trade routes and European demand for walrus ivory declined. Sounds reminiscent of this book I mentioned a while back:

- Jane Smiley, *The Greenlanders*, Ballantine Books, New York, 1996.

However, he goes further by comparing the case of the Icelanders, who *didn't* die out!

Jared Diamond has also thought a lot about why human history unfolded differently on different continents - and he won a Pulitzer for this book, whose title explains his theory quite succinctly:

Jared Diamond, *Guns, Germs and Steel: The Fates of Human Societies*, W. W. Norton and Company, 1999.

You can also read a talk by him about this, on *Edge* - a fun forum for highbrow chat.

Also, alpheccar recommended this site to me:

- Real Climate: climate science discussion forum at http://www.realclimate.org

In this diary I've been avoiding the "trench warfare" over climate change, more or relying on the general consensus of scientists. But this website gets engaged in the nitty-gritty in a well-informed and generally well-mannered way.

For example, you may know that Michael Crichton's new novel *State of Fear* is based on the premise that human-induced global warming is just a bunch of hot air - something like a massive conspiracy of scientists bent on terrifying the public. Some hacks have seized on this book to push their own agendas. For example, George Will writes:

> In today's segmented America, Michael Crichton's new novel "State of Fear" might seem to be just reading for red states. Granted, a character resembling Martin Sheen -- Crichton's character is a prototypical Hollywood liberal who plays the president in a television series -- meets an appropriately grisly fate. But blue states, too -- no, especially -- need Crichton's fable about the ecology of public opinion.
>
> "State of Fear," with a first printing of 1.5 million copies, resembles Ayn Rand's "Atlas Shrugged" -- about 6 million copies sold since 1957 -- as a political broadside woven into an entertaining story. But whereas Rand had only an idea -- a good one (capitalism is splendid), but only one -- Crichton has information. "State of Fear" is the world's first page-turner that people will want to read in one gulp (a long gulp -- 600 pages, counting appendices) even though it has lots of real scientific graphs, and footnotes citing journals such as Progress in Physical Geography and Transactions of the American Geophysical Union.
>
> Crichton's subject is today's fear that global warming will cause catastrophic climate change, a belief now so conventional that it seems to require no supporting data. Crichton's subject is also how conventional wisdom is manufactured in a credulous and media-drenched society.
>
> Various factions have interests -- monetary, political, even emotional -- in cultivating fears. The fears invariably seem to require more government subservience to environmentalists, and more government supervision of our lives.
>
> Crichton's villains are environmental hysterics who are innocent of information but overflowing with certitudes and moral vanity. His heroes resemble Navy SEALs tenured at MIT, foiling the villains with guns and graphs.
>
> The villains are frustrated because the data do not prove that global warming is causing rising sea levels and other catastrophes. So they concoct high-tech schemes to manufacture catastrophes they can ascribe to global warming -- flash floods in the American West, the calving of an Antarctic iceberg 100 miles across and a tsunami that would roar 500 miles an hour across the Pacific and smash California's coast on the last day of a Los Angeles conference on abrupt climate change.
>
> The theory of global warming -- Crichton says warming has amounted to just half a degree Celsius in 100 years -- is that "greenhouse gases," particularly carbon dioxide, trap heat on Earth, causing ... well, no one knows what, or when. Crichton's heroic skeptics delight in noting things like the decline of global temperature from 1940 to 1970. And that since 1970 glaciers in Iceland have been advancing. And that Antarctica is getting colder and its ice is getting thicker.

... and so on. Of course, it's a good sign that people like Will have now been reduced to citing science fiction novels instead of actual scientists to bolster their arguments! And he's just funny when he tut-tuts about "monetary, political, and even emotional" motives for alarmism, while ignoring the vastly greater motives of all three kinds for complacency: the whole geopolitical and economic status quo rests upon the fossil fuel economy, after all. So, in a sane world we

could safely ignore Will. But Crichton presents some surprising actual data in his book, which needs to be analyzed. It's good, therefore that the folks at RealClimate are addressing him point for point:

- Gavin Schmidt, Michael Crichton's State of Confusion.

January 8, 2005

There's a good article in the MIT magazine "Technology Review" about the war that may start between Microsoft and Google:

- Charles H. Ferguson, What's next for Google?, *Technology Review*, January 2005, pp. 38-46.

Summary: will Microsoft crush Google as it did Netscape? Yes, unless the folks at Google are smart and ruthless. Making the currently visible world-wide web easy to search was great - but the real battle is starting now that Google and Microsoft are trying to make *all* digital information eash to search. According to the author, the industry consensus is that this could generate half a *trillion* dollars in cumulative revenues.

While the battle for supreme control over information in this "information age" is fascinating - in a mildly sickening sort of way - my eye was caught by a little chart that showed the amount of information in various forms. It pointed me to this source:

- Peter Lyman, Hal R. Varian, Kirsten Swearingen, et al, *How Much Information? 2003*.

which also referred to this:

- Roy Williams, Data Powers of Ten.

Here's some data from these sources, supplemented by some examples of my own:

- A bit is the information in one binary decision - a no or yes, a 0 or 1.
  - 5 bits: approximate information in one letter of the Roman alphabet.
- A byte is 8 bits.
- A kilobyte is about a thousand bytes (actually 2^{10} of them).
  - 2 kilobytes: a typewritten page.
  - 100 kilobytes: a low-resolution photograph.
- A megabyte is about a million bytes (actually 2^{20} of them).
  - 1 megabyte: a small novel or a 3.5 inch floppy disk.
  - 2 megabytes: a high-resolution photograph.
  - 5 megabytes: the complete works of Shakespeare.
  - 100 megabytes: one meter of shelved books.
  - 500 megabytes: a CD-ROM.
- A gigabyte is about a billion bytes (actually 2^{30} of them).
  - 1 gigabyte: the human genome, or a pickup truck full of books.
  - 20 gigabytes: a good collection of the works of Beethoven.
  - 100 gigabytes: a library floor of academic journals.
- a terabyte is about a trillion bytes (actually 2^{40} of them).
  - 2 terabytes: an academic research library.
  - 6 terabytes: all academic journals printed in 2002.
  - 10 terabytes: the print collections of the U.S. Library of Congress.
  - 40 terabytes: all books printed in 2002.
  - 50 terabytes: all mass market periodicals printed in 2002.
  - 60 terabytes: all audio CDs released in 2002.
  - 80 terabytes: capacity of all floppy discs produced in 2002.

    - 140 terabytes: all newspapers printed in 2002.
    - 250 terabytes: capacity of all zip drives produced in 2002.
- A petabyte is about 10^{15} bytes (actually 2^{50} of them).
    - 1.5 petabytes: all office documents generated in 2002.
    - 2 petabytes: all U.S academic research libraries.
    - 6 petabytes: all cinema release films in 2002.
    - 20 petabytes: all X-ray photographs taken in 2002.
    - 130 petabytes: capacity of all audio tapes produced in 2002.
    - 400 petabytes: all photographs taken in 2002.
- An exabyte is about 10^{18} bytes (actually 2^{60} of them).
    - 1.3 exabytes: capacity of all videotapes produced in 2002.
    - 2 exabytes: capacity of all hard disks produced in 2002.
    - 5 exabytes: all the words ever spoken by human beings.
    - 6 exabytes: information in the genomes of all the people in the world.

You have to be careful interpreting these figures. For example, all the information in the Washington Post newspaper in 2002 is far less than the information *capacity* of all the newsprint put out by the Washington Post of 2002 - because there are thousands of identical copies of each newspaper. I have tried to distinguish between these two by saying "capacity" for the latter sort of figure. For example, when I say 130 petabytes is the capacity of all audio tapes produced in 2002, this includes thousands of identical copies of some album by the Backstreet Boys, and also lots of blank tape. And, it's quite possible that I screwed up on some of the items above, because my source makes it a bit hard to tell what's what.

Furthermore, these figures don't count the fact that information in print, hard drives, DNA and so on is typically not compressed down to the Shannon limit. So, there's not as much info around as this chart suggests. For some figures that try to take compression into account, see *How Much Information? 2003*.

For example, this compression issue is especially important in my guess at the information in the human genome, and the genomes of all the people in the world. I didn't try to take into account the immense overlap in genetic information between different people, nor the repetitive stretches in human DNA. Here's how I did the calculation. Each of us has chromosomes with about 5 billion base pairs. Each base pair holds 2 bits of information: A, T, C, or G. That's 10 billion bits or 1.25 gigabytes. Times the roughly 6.5 billion people in the world now, we get about 8×10^{18} bytes, or 8 exabytes. But, if we wanted to store the complete genetic identity of everyone on hard drives, we could do it using data compression, because a lot of genes are the same from person to person.

And of course, some of these figures are rough order-of-magnitude guesses, like "all the words ever spoken by human beings".

It would be fun to know how much information is in people's brains, but I don't have the knowhow to estimate that!

I just read from an unreliable source that the human eye has a resolution equivalent to that of 127 million pixels (whatever *that* means), and an input rate of 1 gigabit per second. This source also said that the human brain can store 10 terabytes of information. But, I don't trust these figures at all without knowing how they were calculated.

I read somewhere else that the human brain has 10^{14} synapses. If each stored just one bit (not true), that would be about 10 terabytes.

January 11, 2005

I have put the above information on information on a separate webpage, together with a fun calculation: how much information there is in a raindrop! As you can probably tell, I like compiling charts of cool data just as much as I like crusading for social justice and a better way of life. The former keeps me happy.

But, in the same MIT magazine as the article about Google versus Microsoft, there's also an interesting article on "why progress doesn't boost happiness" - a theme I began discussing on October 22nd, 2003:

- James Surowiecki, Technology and happiness: why more gadgets don't necessarily increase our well-being, *Technology Review*, January 2005, pp. 72-76.

It has an interesting reference:

- Richard Easterlin, Does economic growth improve the human lot? Some empirical evidence, in *Nations and Households in Economic Growth: Essays in Honor of Moses Abramowitz*, eds. Paul A. Davis and Melvin W. Reder, Academic Press, 1974.

and it describes a growing interest on the part of economists to understand the factors that lead to human happiness, without the blinding simplifying assumption of perfect rationality. Unfortunately it doesn't go into the question of how this research might actually be used to make people happier! Oh well... maybe someday.

February 5, 2005

My interest in economics hasn't waned... I've just been too busy to write in this diary much, especially when I've been travelling, and more recently when the hard disk on my laptop died after a mysterious stroke. This happened the moment I tried to use the internet after returning from Vancouver; the last time I'd used the internet was in an airport in Seattle. At first I thought I'd picked up a virus there, but now I'm not sure - the disk may have been physically damaged.

All the data on this disk was lost. Luckily, most of it was also on my account on the UNIX system of the U.C. Riverside math department. In the process of setting up my laptop again from scratch, I switched from Internet Explorer to Mozilla Firefox - mainly because it works great, it handles math text better, and it's supposed to be safer - but also because it's nice to see Microsoft getting some competition in this market.

Anyway, I just read some interesting stuff about Joshua Greene, a postdoc in psychology at Princeton who is using functional magnetic resonance imaging to scan people's brains while they deal with ethical dilemmas. In certain dilemmas where ones "gut feeling" wars against more rational calculations - say, where killing a baby could save a town - it turns out that centers of the brain that deal with emotion are very active, but also the anterior cingulate cortex (an area involved in monitoring conflict) and the dorsolateral prefrontal cortex (a region involved in abstract reasoning and cognitive control).

In an article published in *Nature Reviews*:

- Joshua D. Greene, From neural "is" to moral "ought": what are the moral implications of neuroscientific moral psychology?, *Nature Reviews Neuroscience*, Vol. 4, 847-850. Also available at Joshua Greene's website.

Greene describes two ethical dilemmas. In the first, you're driving along in your new car with beautiful leather seats and you see someone who has been run down on the road, his legs bleeding. Do you sacrifice the beauty of your suede seats and take him to the hospital? I think we all viscerally know what we should do here, regardless of whether we'd do it. In the second, you get a letter from a reputable charity asking you to send a $100 check, which could provide vaccine for dozens of infants in some faraway country. Here the visceral response is less strong, even though (Greene and others argue) the situation is morally equivalent. Why? Because the people in trouble are more distant, and it all seems more abstract. Greene suggests that our emotions (and indeed our brains) have evolved to respond immediately to the clearly perceived suffering of someone right at hand, but not to, say, appeals in written text.

All this makes perfect sense to me, and it raises the issue of to what extent we *should* spend more energy to alleviate suffering close at hand, versus those far away. To what extent should we try to overcome our inherited instincts to help relatives and "the tribe", and to what extent are these instincts wise?

Interestingly, Joshua Greene did research with Amartya Sen as an undergraduate.

February 6, 2005

My friend the philosopher David Corfield wrote an interesting reply to my remarks above. I got to know him through his work on the philosophy of "real mathematics", which pays more attention than usual to what actual mathematicians are interested in. He's also interested in the ethics of mathematics - what makes some mathematical work better than others. So, here's what he has to say:

> I see from your economics entry you're getting interested in ethics. The guy to read is Alasdair MacIntyre. *After Virtue* begins by getting us to imagine a time after a period in which science has been systematically destroyed, scientists, equipment, books, etc. Now, all we're left with are fragments of language, papers, pieces of equipment. There are still vestiges of scientific language in daily speech, but they're used totally unsystematically. This, says MacIntyre, is what has happened to moral thinking. A tradition of moral theorising from Socrates, Plato, Aristotle, on to neo-platatonists such as Augustine, interpreters, Jewish and Islamic, of Aristotle, the great reconciliation of Augustine and Aristotle by Aquinas, has been laid to waste. The Enlightenment doesn't come out looking too clever.
>
> A bold thesis certainly. Strangely what he says about flourishing traditions and the necessary virtues rings very true of intellectual traditions:
>
> > A living tradition then is an historically extended, socially embodied argument, and an argument precisely in part about the goods which constitute that tradition. Within a tradition the pursuit of goods extends through generations, sometimes through many generations. Hence the individual's search for his or her good is generally and characteristically conducted within a context defined by those traditions of which the individual's life is a part, and this is true both of those goods which are internal to practices and of the goods of a single life. Once again the narrative phenomenon of embedding is crucial: the history of a practice in our time is generally and characteristically embedded in and made intelligible in terms of the larger and longer history of the tradition through which the practice in its present form was conveyed to us; the history of each of our own lives is generally and characteristically embedded in and made intelligible in terms of the larger and longer histories of a number of traditions. I have to say 'generally and characteristically' rather than 'always', for traditions decay, disintegrate and disappear. What then sustains and strengthens traditions? What weakens and destroys them?
> >
> > The answer in key part is: the exercise or the lack of exercise of the relevant virtues. The virtues find their point and purpose not only in sustaining those relationships necessary if the varieties of goods internal to practices are to be achieved and not only in sustaining the form of an individual life in which that individual may seek out his or her good as the good of his or her whole life, but also in sustaining those traditions which provide both practices and individual lives with their necessary historical context. Lack of justice, lack of truthfulness, lack of courage, lack of the relevant intellectual virtues - these corrupt traditions, just as they do those institutions and practices which derive their life from the traditions of which they are the contemporary embodiments. To recognize this is of course also to recognize the existence of an additional virtue, one whose importance is perhaps most obvious when it is least present, the virtue of having an adequate sense of the traditions to which one belongs or which confront one. This virtue is not to be confused with any form of conservative antiquarianism; I am not praising those who choose the conventional conservative role of *laudator temporis acti*. It is rather the case that an adequate sense of tradition manifests itself in a grasp of those future possibilities which the past has made available to the present. Living traditions, just because they continue a not-yet-completed narrative, confront a future whose determinate and determinable character, so far as it possesses any, derives from the past. (*After Virtue*: 222-3)

February 18, 2005

The Kyoto Protocol on greenhouse gases was signed by 187 countries on Feburary 16th! Notably absent were the United States and Australia.

New research in oceanography warns that global warming might actually cause a repeat of the Younger Dryas Event, in which melting ice reduced the salinity of the North Atlantic enough to shut down the thermohaline circulation that brings warm water to the shores of Northern Europe. I wrote about this possibility already on November 13th. Here is some news, from an article by Clive Cookson in today's Financial Times:

> Scientists from the Scripps Institution of Oceanography in California have been working for several years with colleagues at Lawrence Livermore National Laboratory to analyse the effects of global warming on the oceans. They combined computer modelling with millions of temperature and salinity readings, taken around the world at different depths over five decades.
>
> The researchers released their conclusions on Friday at the American Association of the Advancement of Science meeting in Washington. They found that the warming signals in the oceans could only have been produced by the build-up of man-made carbon dioxide in the atmosphere. Non-human factors would have produced quite different effects.
>
> The latest study to suggest that global warming is a real phenomenon, and one caused by human action, adds further weight to a body of scientific evidence that has been accumulating steadily.
>
> Tim Barnett, the Scripps project leader, said previous attempts to show that human activities caused global warming had looked for evidence in the atmosphere. "But the atmosphere is the worst place to look for a global warming signal", he said. Ninety per cent of the energy from global warming has gone into the oceans and the oceans show its fingerprint much better than the atmosphere.
>
> Prof Barnett added: "The debate over whether there is a global warming signal is over now at least for rational people". He urged the US administration to rethink its refusal to join the Kyoto Protocol, which took effect this week.
>
> The Scripps scientists also looked at the likely climatic effects of the warming they observed. They highlighted the impact on regional water supplies, which would be severely reduced during the summer in places that depend on rivers fed by melting winter snow and glaciers such as western China and the South American Andes.
>
> The conference also heard a gloomy analysis of the way the North Atlantic Ocean is reacting to global warming from Ruth Curry of Woods Hole Oceanographic Institution in Massachusetts. Her new study showed that vast amounts of fresh water more than 20,000 cubic kilometres have been added to the northernmost parts of the ocean over the past 40 years because the Arctic and Greenland ice sheets are melting.
>
> According to Dr. Curry, the resulting change in the salinity balance of the water threatens to shut down the Ocean Conveyor Belt, which transfers heat from the tropics towards the polar regions through currents such as the Gulf Stream. If that happened, winter temperatures in northern Europe would fall by several degrees.

I don't know how bad such an event would be - and I guess nobody does - but during the Younger Dryas, temperatures in Northern Europe dropped 7 degrees Celsius in only 20 years, causing a miniature ice age with glaciers in Europe that lasted for about 1000 years before the Conveyor Belt restarted. So, "several degrees" might be a big deal. Or maybe not.

February 25, 2005

Yay! It seems there's a kind of "movement" of people working on the kind of economics I'd like to see - some of them call it "Post-Autistic Economics":

- The Post-Autistic Economics Network, http://www.paecon.net

They put out a free email journal, and you can also see the back issues online.

I haven't actually read much of this stuff yet to see how much I agree with it, but I like the look of this book they're advertising:

- *A Guide to What's Wrong with Economics*, edited by Edward Fullbrook, Anthem Press, London, 2004.

I also like some of these quotes:

> *Multinationals are everywhere except in economic theories and economics departments.* - Grazia Ietto-Gillies
>
> *The close to monopoly position of neoclassical economics is not compatible with normal ideas about democracy. Economics is science in some senses, but is at the same time ideology. Limiting economics to the neoclassical paradigm means imposing a serious ideological limitation. Departments of economics become political propaganda centers.* - Peter Söderbaum, author of "Ecological Economics"

and best of all:

> *In Smith is a forgotten lesson that the foundation of success in creating a constructive classical liberal society lies in the individuals adherence to a common social ethics. According to Smith, virtue serves as the fine polish to the wheels of society while vice is like the vile rust, which makes them jar and grate upon one another. Indeed, Smith sought to distance his thesis from that of Mandeville and the implication that individual greed could be the basis for social good. Smith's deistic universe might not sit well with those of post-enlightenment sensibilities, but his understanding that virtue is a prerequisite for a desirable market society remains an important lesson. For Smith ethics is the hero - not self-interest or greed - for it is ethics that defend social intercourse from the Hobbesian chaos.* - Charles K. Wilber

I learned about this website from Colin Danby, who wrote:

> Greetings.
>
> Ran across your interesting site. If ucr is UC Riverside there are folks there in econ who might interest you.
>
> Have you read Phil Mirowski's work? *More Heat than Light* is the classic and gives you a sense of the assumptions (19th-century physics) that mainstream econ descends from, but all of Mirowski is interesting.
>
> And there are kinds of econ that start from very different sets of assumptions, for example Post Keynesian theory. Timothy Mitchell's *Rule of Experts* is a very smart exploration of how economic expertise came to do what it does.
>
> You might also like the Post-Autistic Economics site: http://www.paecon.net/
>
> Best, Colin

February 26, 2005

Colin Danby also gave me some other links:

- The History of Economic Thought - a resource on the large variety of schools of thought in economics.
- Steve Keen, Debunking Economics - critiques of neoclassical theory.
- The Heterodox Economics Portal - information on non-mainstream economics, including graduate programs.

Lots of reading for me to do!

Last night I read this short paper:

- Shaun Hargreaves Heap, Living in an affluent society: it is so "more-ish" *Post-Autistic Economics Review* **26** (August 2004).

It's a retrospective on John K. Galbraith's book *The Affluent Society*, which back in the 1950s raised for the first time a bunch of questions which puzzle us still, like: *why does life in the affluent societies of Europe and America resemble life on a squirrel wheel, with its endless quest for more consumable goods?*

Quoting the aptly named Shaun Heap:

> Few cannot be puzzled by the appetite of the affluent. The absence of any measurable effect of income growth on happiness is only one part of what is strange here. The failure to take measures that will address the global warming that has been and continues to be generated by output growth increasingly appears like some form of death wish. There are also more local pathologies. The highest earners in the UK and the US actually work longer hours than their counterparts 20 years ago. So the pursuit of more stuff is seemingly ornamental because the getting of it is now cutting into the time that we have left to play with it. To put the issue bluntly, if we could for one moment step outside the squirrel wheel, surely we would conclude that we are interested in output growth to an extent which casts doubt on whether we actually know where our interests lie anymore. For these reasons, the subject of Galbraith's book is even more timely now than it was in the late 1950s.
>
> How relevant, though, is Galbraith's analysis of the dynamics of the squirrel wheel for the contemporary world?
>
> I have two criticisms here. The first is perhaps best summarised as a failure to anticipate the problem of identity. I believe that this holds the key to understanding why consumption is so central to our lives. There are two parts to this observation. One is that while one kind of insecurity does disappear with full employment, the collapse of traditional bonds of one kind or another in the modern world has made personal identity more fluid and with this fluidity comes another kind of insecurity. It is no coincidence that people talk now of identity politics. The term reflects the way in which identity has become problematic. So Galbraith was wrong to assume that full employment pushes insecurity into the background.
>
> At the same time, consumer goods have more clearly come to form a language system. This is the important insight that anthropology gives economics. We use consumer goods to say things about ourselves and as our identity has become less well fixed through traditional bonds of one kind or another, we have had increasing recourse to the world of goods to do it for us. (Incidentally, this means that advertising is not so much a conspiracy, as Galbraith seems to hint: it actually works with the grain of human nature. And while making parenthetic remarks, it is perhaps worth adding that it is not just the advertising industry which plays such a crucial role, it is the whole set of mass media industries.)

This leads us right into some deep issues which I've been trying mince around so far in this diary, precisely because of their bottomless depth. It's hard to say just a *little bit* about these issues, but let me try.

There's a feeling of inexorability to the current economic system. Corporations feel obliged to maximize their short-run profits and keep their stock prices high, almost as if this were a law of physics. People keep trying to earn more money, buy more stuff. Any thought of changing this system seems laughably impractical. Even if we needed to change the system to prevent a mass extinction of species, or the melting of the polar caps, we'd have trouble believing it possible. One might as well try to talk a falling rock out of its course.

Neoclassical economics, with its utility-maximizing rational agents, offers a nice story to explain why things must work this way... or why they *should* work this way - and would, if we could only get rid of those annoying "market inefficiences". But, the world didn't always work this way - and it still doesn't, if you look carefully.

Especially in an affluent society, the job of maximizing our utility is just one side of the story. An equally important and difficult job is determining our utility function - or in less tortured language, *figuring out what we want*. When we are starving and cold, this is not so hard. But it gets harder and harder as we become more wealthy and mere survival ceases to be such a big issue. We wind up flailing around, searching for meaning, or happiness, or at least a good time, or... something!

Indeed, for many of us, this problem is so intractable that we latch on to whatever plausible goals and desires are on offer - at least some of the time, anyway. Corporations are eager to define happiness for us: *if you buy our product, you will be happy*. And we are eager to accept these definitions, or at least give them a try. But of course, when we try to *buy* happiness, it costs money.

Working hard to make money so we can buy more things - this has a plausible ring to it if we're trying to figure out what will make us happy. It's concrete and fairly well-defined. It may not seem very noble, but in our culture that makes it seem all the more "natural". Almost as if it were a law of nature: *everyone wants more, no matter how much they have*. The fact that this doesn't make us more happy past a certain point - we're actually quite willing to turn a blind eye to this. After all, life becomes very complicated when we try to figure out what really makes us happy: it's a slippery, endlessly elusive question!

And so, there's a sense in which the rigid rules of neoclassical economics do a very good job of saving us from chaos, by structuring our lives and our society, and by making our behavior as *homo economicus* seem sensible and natural. But there's a huge price to pay for this.

February 27, 2005

By coincidence, the day after writing the above stuff about economics and our slippery sense of identity, I bumped into a interesting article about the neurobiology of consumer decisions:

- Robert Lee Hotz, Mapping the mind: searching for the why of buy, Los Angeles Times, February 27, 2005.

Let me quote a bit:

> Children are exposed to 40,000 commercials every year. By the age of 18 months, they can recognize logos. By 10, they have memorized 300 to 400 brands, according to Boston College sociologist Juliet B. Schor. The average adult can recognize thousands.
>
> "We are embedded in an enormous sea of cultural messages, the neural influences of which we poorly understand," said neuroscientist Read Montague, director of the Human Neuroimaging Laboratory at Baylor College of Medicine in Houston. "We don't understand the way in which messages can gain control over our behavior."
>
> That is starting to change. By monitoring brain activity directly, researchers are discovering the unexpected ways in which the brain makes up its mind.
>
> Many seemingly rational decisions are reflexive snap judgments, shaped by networks of neurons acting in concert. These orchestras of cells are surprisingly malleable, readily responding to the influence of experience.
>
> Moreover, researchers suspect that the inescapable influence of marketing does more than change minds. It may alter the brain.
>
> Just as practicing the piano or learning to read can physically alter areas of the cerebral cortex, the intense, repetitive stimulation of marketing might shape susceptible brain circuits involved in decision-making.

These inquiries into consumer behavior harness techniques pioneered for medical diagnosis: positron emission tomography, which measures the brain's chemical activity; magneto-encephalography, which measures the brain's magnetic fields; and functional magnetic resonance imaging, which measures blood flow around working neurons.

"This is a way of prying open the box and seeing what is inside," said psychologist Jonathan Cohen, director of Princeton University's Center for the Study of Brain, Mind & Behavior.

Inside the Caltech scanner, faces flashed before the subject's eyes.

Each one was famous — an easily recognized emblem of celebrity marketed as heavily as any designer label.

Each triggered a response in the volunteer's brain, recorded by Steven Quartz and Anette Asp with Caltech's $2.5-million functional magnetic resonance imager (fMRI) and then weighed against the volunteer's responses to a 14-page questionnaire.

Uma Thurman. *Cool.*

Barbra Streisand. *Uncool.*

Justin Timberlake. *Uncool.*

Al Pacino. *Cool.*

Patrick Swayze. *Very uncool.*

The volunteer's brain cells became a focus group.

In his mind's eye, the celebrities triggered many of the same circuits as images of shoes, cars, chairs, wristwatches, sunglasses, handbags and water bottles.

For all their differences, objects and celebrity faces were reduced to a common denominator: a spasm of synapses in a part of the cortex called Brodmann's area 10, a region associated with a sense of identity and social image.

"On first pass, there might seem to be nothing in common between cool sunglasses, cool dishwashers and cool people," Asp said. "But there is something that these brains are recognizing — some common dimension."

None of these neural responses come consciously to mind when a shopper is browsing brand labels.

Much of what was traditionally considered the product of logic and deliberation is actually driven by primitive brain systems responsible for emotional responses — automatic processes that evolved to manage conflicts between sex, hunger, thirst and the other elemental appetites of survival.

In recent years, researchers have discovered that regions such as the amygdala, the hippocampus and the hypothalamus are dynamic switchboards that blend memory, emotions and biochemical triggers. These interconnected neurons shape the ways that fear, panic, exhilaration and social pressure influence the choices people make.

As researchers have learned to map the anatomy of behavior, they realized that the brain — a 3-pound constellation of relationships between billions of cells, shaped by the interplay of genes and environment — is more malleable than anyone had guessed.

> Lattices of neurons are linked by pathways forged, then continually revised, by experience. So intimate is this feedback that there is no way to separate the brain's neural structure from the influence of the world that surrounds it.
>
> In that sense, some people may indeed be born to shop; but others may be molded into consumers.
>
> "We think there are branded brains," Asp said.
>
> The Caltech experiment, funded with a $1-million grant from the David and Lucille Packard Foundation, seemed to detect a part of the brain susceptible to such influences.
>
> After analyzing test data from 21 men and women, Quartz and Asp discovered that consumer products triggered distinctive brain patterns that allowed them to classify people in broad psychological categories.
>
> At one extreme were people whose brains responded intensely to "cool" products and celebrities with bursts of activity in Brodmann's area 10 — but reacted not at all to the "uncool" displays.
>
> The scientists dubbed these people "cool fools," likely to be impulsive or compulsive shoppers.
>
> At the other extreme were people whose brains reacted only to the unstylish items, a pattern that fits well with people who tend to be anxious, apprehensive or neurotic, Quartz said.
>
> The reaction in both sets of brains was intense. The brains reflexively sought to fulfill desires or avoid humiliation.
>
> Asp, a Swedish researcher who once majored in industrial design, volunteered for the fMRI probe. The scanner revealed a personality quite at odds with her own sense of self.
>
> She searched the scanner's images for the excited neurons in her prefrontal cortex that would reflect her enthusiasm for Prada and other high-fashion goods. Instead, the scanner detected the agitation in brain areas associated with anxiety and pain, suggesting she found it embarrassing to be seen in something insufficiently stylish.
>
> It was fear, not admiration, that motivated her fashion sense.
>
> "I thought I would be a cool fool," she said. "I was very uncool."

Unfortunately but inevitably, the people most interested in this research are... advertisers! Quartz and his Caltech colleagues have been negotiating with a marketing company called Lieberman Research Worldwide to sell brain-scanning services to advertisers.

For much more, check out the reading material for Steve Quartz's course on the Neural Foundations of Social Science!

March 12, 2005

Here's an interesting article on Richard Thaler's work on "behavioral economics":

- Can behavioral economics save us from ourselves?, University of Chicago Magazine, February 2005.

Thaler studies how actual human behavior differs from the "rational" behavior posited in classical economics, and has thought about how taking this into account can help us design better economics policies. He's written a couple of books on it:

- Richard Thaler, *The Winner's Curse: Paradoxes and Anomalies of Economic Life*, Princeton University Press, Princeton, New Jersey, 1992.
- Richard Thaler, *Quasi Rational Economics*, Russell Sage Foundation, New York, 1991.

Both are reprint collections, and the latter is more technical. More stuff to read! I'm going to the library right now.

April 14, 2005

This is drifting from economics into sociology and psychology, but it's way too interesting not to include:

- John Gottman, The Mathematics of Love, *Edge*.

Let me quote some:

> Psycho-physiology is an important part of this research. It's something that Bob Levenson brought to the search initially, and then I got trained in psycho-physiology as well. And the reason we're interested in what was happening in the body is that there's an intimate connection between what's happening to the autonomic nervous system and what happening in the brain, and how well people can take in information - how well they can just process information - for example, just being able to listen to your partner - that is much harder when your heart rate is above the intrinsic rate of the heart, which is around a hundred to a hundred and five beats a minute for most people with a healthy heart.
>
> At that point we know, from Loren Rowling's work, that people start secreting adrenalin, and then they get into a state of diffuse physiological arousal (or DPA), so their heart is beating faster, it's contracting harder, the arteries start getting constricted, blood is drawn away from the periphery into the trunk, the blood supply shuts down to the gut and the kidney, and all kinds of other things are happening - people are sweating, and things are happening in the brain that create a tunnel vision, one in which they perceive everything as a threat and they react as if they have been put in great danger by this conversation.
>
> All of which are really great conditions for running away from a predator, or fighting aggressively to protect the tribe. And survival. So when you have less blood in the periphery you create what Malcolm Gladwell calls a bloodless armor that lets you strike without really bleeding too much, or run away without hurting yourself too much. But in the context of a discussion with somebody you love clearly this DPA is not very functional. And we found in fact that physiological arousal is one of the best predictors of what happens to that relationship. That's why it predicts.
>
> And men and women are somewhat different, not a lot, but enough, which is another fascinating puzzle, because we find that if the woman is driving the husband's heart rate, that predicts the dissolution of the relationship - and not the other way around. Now why should that be? Why should it be that DPA, the general physiological arousal of men is a worse indicator of the fate of a heterosexual relationship than that of the woman? Unless she's been abused, physically or sexually, when the arousal of both of them is a really good indicator.
>
> Because men are different. Men have a lot of trouble when they reach a state of vigilance, when they think there's real danger, they have a lot of trouble calming down. and there's probably an evolutionary history to that. Because it functioned very well for our hominid ancestors, anthropologists think, for men to stay physiologically aroused and vigilant, in cooperative hunting and protecting the tribe, which was a role that males had very early in our evolutionary history. Whereas women had the opposite sort of role, in terms of survival of the species, those women reproduced more effectively who had the milk-let-down reflex, which only happens when oxytocin is secreted in the brain, it only happens when women - as any woman knows who's been breast-feeding, you have to be able to calm down and relax. But oxytocin is also the hormone of affiliation. So women have developed this sort of social order, caring for one another, helping one another, and affiliating, that also allows them to really calm down and have the milk let-down reflex. And so - it's one of nature's jokes. Women can calm down, men can't; they stay aroused and vigilant.

So it's a real challenge, now that relationships, in the last couple of centuries, have started becoming important in terms of affection and nurturance and support - and we're having fathers come back into the equation in a big way in baby's life. Physiology becomes really critical in this whole thing. A provocative finding from Alyson Shapiro's recent dissertation is that if we take a look at how a couple argues when the woman is in the sixth month of pregnancy, we can predict over half the variation in the baby, the three-month-old baby's vagal tone, which is the ability of the vagus nerve, the major nerve of the parasympathetic branch of the autonomic nervous system, which is responsible for establishing calm and focusing attention. That vagus nerve in the baby is eventually going to be working well if the parents, during pregnancy, are fighting with each other constructively. That takes us into fetal development, a whole new realm of inquiry.

And if they're not, if they're fighting destructively, that fetus, that baby is on a different longitudinal course - its neurological development is already handicapped - from the time it's born. The fetal development is really affecting the function of this vagus nerve, the tenth cranial nerve. Now this destructive process that happens to two thirds of all couples can be reversed, just in a 10-hour workshop the parents take in the last trimester of pregnancy. One of the things that's very interesting is that with psychological interventions you can change neurological growth and development, and emotional growth and development in the baby. This makes for more empathetic children - and more empathetic infants as well. Daniel Siegel is beginning to help us understand how this happens, how to integrate attachment theory, relationship science and brain neurophysiology and growth. It's a rich and exciting new field, what Jaak Panksepp calls this "affective neuroscience."

We find that there are differences between men and women and the way you to study these differences is independent of sexual orientation. You have to study gay and Lesbian couples who are committed to each other as well as heterosexual couples who are committed to each other, and try and match things as much as you can, like how long they've been together, and the quality of their relationship. And we've done that, and we find that there are two gender differences that really hold up.

One is that if a man presents an issue, to either a man he's in love with or a woman he's in love with, the man is angrier presenting the issue. And we find that when a woman receives an issue, either from a woman she loves or a man she loves, she is much more sad than a man would be receiving that same issue. It's about anger and sadness. Why? Remember, Bowlby taught us that attachment and loss and grief are part of the same system. So women are finely tuned to attaching and connecting and to sadness and loss and grief, while men are attuned to defend, stay vigilant, attack, to anger. My friend Levenson did an acoustic startle study (that's where you shoot of a blank pistol behind someone's head when they least expect it). Men had a bigger heart rate reactivity and took longer to recover, which we would expect, but what even more interesting is that when you asked people what they were feeling, women were scared and men were angry.

April 22, 2005

It's weird how when you get interested in something, all of a sudden you keep seeing it all over the place. Here's another interesting article about work on "neuroeconomics":

- Gregory T. Huang, The economics of brains, Technology Review, May 2005.

It's about attempts to use studies of the human brain to help figure out what people actually do when making decisions. This is obviously sensible - at least part of a bigger multi-pronged strategy to understand human behavior and use our understanding of it to improve our lot. However, we can count on fairly slimy marketers and politicians to take a lot of interest in this research and be among the first to apply it. All the more reason to avoid watching TV!

Here are more detailed papers on this subject that you can get online:

- B. Douglas Bernheim and Antonio Rangel, Addiction and cue-triggered decision processes, *The American Economic Review*, December 2004.
- Colin Camerer, George Loewenstein and Drazen Prelec, Neuroeconomics: how neuroscience can inform

economics, *Journal of Economics Literature*, March 2005.
- Brian Knutson and Richard Peterson, Neurally reconstructing expected utility, *Games and Economic Behavior*, in press.
- Andrew W. Lo, The adaptive markets hypothesis: market efficiency from an evolutionary perspective, *The Journal of Portfolio Management*, 30th anniversary issue, 2004.
- Samuel M. McClure, David I. Laibson, George Loewenstein and Jonathan D. Cohen, Separate neural systems value immediate and delayed monetary rewards, *Science*, October 14, 2004.
- B. Shiv, G. Loewenstein, A. Bechara, H. Damasio and A. R. Damasio, Investment behavior and the dark side of emotion, *Psychological Science*, in press.
- G. Loewenstein, and T. O'Donoghue, Animal spirits: affective and deliberative processes in economic behavior. Working paper.

George Loewenstein has lots of other interesting papers that you can download from his website.

May 22, 2005

I deliberately avoid getting involved in the "culture wars" and "war on terrorism" that are tearing up the United States right now. So, I *won't* comment on the Terry Schiavo euthanasia case, or Bill Frist's attempt to eliminate filibusters of controversial judicial nominees, or the controversy of Newsweek's reports about a Koran flushed down a toilet, or the battle over allowing the Ten Commandments to be posted in courtrooms, or the battle over gay marriage, or the leaked British memo proving that Bush had made up his mind to invade Iraq by July 2002....

However, I *will* say this. I'm glad people are noticing that this crap makes the US a less desirable place to live for many people - especially the creative sorts who play such a big role in our economy:

- Richard Florida, *Flight of the Creative Class: the New Global Competition for Talent*, HarperBusiness, 2005. Interview available at National Public Radio; reviews available at the creativeclass.org website.

I think about this whenever promising graduate students from China who want to study at UC Riverside can't get visas to come here, thanks to the tough new attitude of the Immigration and Naturalization Service. I think about it whenever some commentator like David Gelernter comes up with a brainy idea like eliminating public education in the United States, or when Max Boot suggests dealing with the shortage of US soldiers by allowing foreigners to gain US citizenship by joining the army. I sometimes get the impression that these guys are downright *eager* for a dumbed-down, militarized society. (Did Boot read about the fall of the Roman Empire due to the rising power of foreign mercenary soldiers and decide this was a *good* thing?)

And most of all, I think about it whenever I read the paper and see ideological battles between liberals and conservatives sucking away energy from more important things.

June 8, 2005

Here's an book about how socially responsible firms can survive in competitive environments:

- Robert H. Frank, *What Price the Moral High Ground? Ethical Dilemmas in Competitive Environments*, Princeton U. Press, Princeton 2005. Sample chapter available free online.

It has an interesting chapter on how students of classical economics become less cooperative than other people!

The Amazon jungle is burning:

> **Rain Forest Myth Goes Up in Smoke Over the Amazon**
> By Henry Chu
> Los Angeles Times Staff Writer

June 8, 2005

REMANSO TALISMA, Brazil - The death of a myth begins with stinging eyes and heaving chests here on the edge of the Amazon rain forest.

Every year, fire envelops the jungle, throwing up inky billows of smoke that blot out the sun. Animals flee. Residents for miles around cry and wheeze, while the weak and unlucky develop serious respiratory problems.

When the burning season strikes, life and health in the Amazon falter, and color drains out of the riotous green landscape as great swaths of majestic trees, creeping vines, delicate bromeliads and hardy ferns are reduced to blackened stubble.

But more than just the land, these annual blazes also lay waste to a cherished notion that has roosted in the popular mind for decades: the idea of the rain forest as the "lungs of the world."

Ever since saving the Amazon became a fashionable cause in the 1980s, championed by Madonna, Sting and other celebrities, the jungle has consistently been likened to an enormous recycling plant that slurps up carbon dioxide and pumps out oxygen for us all to breathe, from Los Angeles to London to Lusaka.

Think again, scientists say.

Far from cleaning up the atmosphere, the Amazon is now a major source for pollution. Rampant burning and deforestation, mostly at the hands of illegal loggers and of ranchers, release hundreds of millions of tons of carbon dioxide into the skies each year.

Brazil now ranks as one of the world's leading producers of greenhouse gases, thanks in large part to the Amazon, the source for up to two-thirds of the country's emissions.

"It's not the lungs of the world," said Daniel Nepstad, an American ecologist who has studied the Amazon for 20 years. "It's probably burning up more oxygen now than it's producing."

Scientists such as Nepstad prefer to think of the world's largest tropical rain forest as Earth's air conditioner. The region's humidity, they say, is vital in climate regulation and cooling patterns in South America and perhaps as far away as Europe.

The Amazon's role as a source of pollution, not a remover of it, is directly linked to the galloping rate of destruction in the region over the last quarter-century.

The dense and steamy habitat straddles eight countries and is home to up to 20% of the world's fresh water and 30% of its plant and animal species.

Brazil's portion accounts for more than half the entire ecosystem. Official figures show that, on average, 7,500 square miles of rain forest were chopped and burned down in Brazil every year between 1979 and 2004. Over the 25 years, it's as if a forest the size of California had disappeared from the face of the Earth.

Such encroachment on virgin land is theoretically illegal or subject to tough regulation, but the government here lacks the resources some say the will to enforce environmental protection laws.

Loggers are typically the first to punch through, hacking crude roads and harvesting all the precious hardwoods they can find. One gang of woodcutters, in cahoots with crooked environmental-protection officials, cut down nearly $371 million worth of timber from 1990 until it was busted in the biggest sting operation of its kind in Brazil, authorities said last week.

Close on the loggers' heels are big ranchers and farmers, who torch the remaining vegetation to clear the

way for cattle and crops such as soy, Brazil's new star export, which is claiming ever larger quantities of land.

Prime burning period in the Amazon runs from July to January, the dry season. In 2004, government satellite images of the forest registered 165,440 "hot spots," fires whose flames can shoot as high as 100 feet and push temperatures beyond 2,500 degrees.

These tremendous blazes spew about 200 million tons of carbon emissions into the atmosphere each year, which translates into several times that amount in actual carbon dioxide. In contrast, Brazil's consumption of fossil fuels, the chief source of greenhouse gases worldwide, creates less than half what the fires send up.

During burning season, dark palls of smoke settle over parts of the jungle for days.

"It becomes hard to see, and your eyes have problems. The kids all get sick and have trouble breathing," said Joaquim Borges da Silva, 42, a rural worker who lives in a small encampment here in Remanso Talisma, on the forest's outskirts.

Smoke grew so thick at one point last year that two cars on the road into the camp barreled into each other head-on, killing two people, Borges da Silva said. The fires also kill the game that workers and small settlers rely on for food.

He pointed out a charred tract of land, littered with stumps and felled trees that looked like so many toothpicks, where tractors working 24 hours a day for a month cleared 1,000 acres last year. Trucks rumbled in and out, loaded down with mahogany and cedar.

Farmers subsequently burned the area. Two months later, at the first rain, a small plane swooped in and dropped seeds.

Even with the burning of the rain forest, Brazil's annual output of carbon pollutants is tiny compared with that of the U.S., which produces nearly 6 billion tons.

[...much omitted...]

Researchers are trying to determine what role the Amazon plays in keeping the region cool and relatively moist, which in turn has a hugely beneficial effect on agriculture ironically, the same interests trying to cut down the forest.

The theory goes that the jungle's humidity, as much as water from the ocean, is instrumental in creating rain over both the Amazon River basin and other parts of South America, particularly western and southern Brazil, where much of this country's agricultural production is concentrated.

"If you took away the Amazon, you'd take away half of the rain that falls on Brazil," Moutinho said. "You can imagine the problems that would ensue."

A shift in climate here could cause a ripple effect, disrupting weather patterns in Antarctica, the Eastern U.S. and even Western Europe, some scholars believe.

This is what worries ecologists about the continued destruction of the rain forest: not the supposed effect on the global air supply, but rather on the weather.

"Concern about the environmental aspects of deforestation now is more over climate rather than [carbon emissions] or whether the Amazon is the 'lungs of the world,'" said Paulo Barreto, a researcher with the Amazon Institute of People and Environment.

"For sure, the Amazon is not the lungs of the world," he added. "It never was."

June 15, 2005

The Amazon forests are burning as loggers and agriculture take over. On the bright side, sugar cane plantations in Brazil have largely freed this country from dependence on foreign oil! I don't know how much forest is being torn down to plant sugar cane, but it goes to show how everything in this world is a muddled mix of good and bad.

Homegrown Fuel Supply Helps Brazil Breathe Easy

By Marla Dickerson
Los Angeles Times Staff Writer

June 15, 2005

SAO PAULO, Brazil - While Americans fume at high gasoline prices, Carolina Rossini is the essence of Brazilian cool at the pump.

Like tens of thousands of her countrymen, she is running her zippy red Fiat on pure ethanol extracted from Brazilian sugar cane. On a recent morning in Brazil's largest city, the clear liquid was selling for less than half the price of gasoline, a sweet deal for the 26-year-old lawyer.

"You save money and you don't pollute as much," said Rossini, who paid about $18 to fill her nearly empty tank. "And it's a good thing that the product is made here."

Three decades after the first oil shock rocked its economy, Brazil has nearly shaken its dependence on foreign oil. More vulnerable than even the United States when the 1973 Middle East oil embargo sent gas prices soaring, Brazil vowed to kick its import habit. Now the country that once relied on outsiders to supply 80% of its crude is projected to be self-sufficient within a few years.

Developing its own oil reserves was crucial to Brazil's long-term strategy. Its domestic petroleum production has increased sevenfold since 1980. But the Western Hemisphere's second-largest economy also has embraced renewable energy with a vengeance.

Today about 40% of all the fuel that Brazilians pump into their vehicles is ethanol, known here as alcohol, compared with about 3% in the United States. No other nation is using ethanol on such a vast scale. The change wasn't easy or cheap. But 30 years later, Brazil is reaping the return on its investment in energy security while the U.S. writes checks for $50-a-barrel foreign oil.

"Brazil showed it can be done, but it takes commitment and leadership," said Roland Hwang, vehicles policy director for the Natural Resources Defense Council in San Francisco. In the U.S. "we're paying the highest prices at the pump since 1981, and we are sending over $100 billion overseas a year to import oil instead of keeping that money in the United States. Clearly Brazil has something to teach us."

Much of Brazil's ethanol usage stems from a government mandate requiring all gasoline to contain 25% alcohol. Vehicles that ran solely on ethanol fell out of favor here in the 1990s because of an alcohol shortage that pushed drivers back to gas-powered cars. But thanks to a new generation of vehicles that can run on gasoline, ethanol or any combination of those two fuels, more motorists like Rossini are filling up with 100% alcohol again to beat high gas prices.

The exploding popularity of these so-called flex-fuel vehicles is reverberating across Brazil's farming sector. Private investors are channeling billions of dollars into sugar and alcohol production, creating much-needed jobs in the countryside. Environmentalists support the expansion of this clean, renewable fuel that has helped improve air quality in Brazil's cities. Consumers are tickled to have a choice at the filling station.

Officials from other nations are flocking to Brazil to examine its methods. Most will find Brazil's sugar-fuel

strategy impossible to replicate. Few countries possess the acreage and climate needed to produce sugar cane in gargantuan quantities, much less the infrastructure to get it to the pump.

Still, some Brazilians said their government's commitment to ditching imports and to jump-starting homegrown energy industries were the real keys to Brazil's success.

"It's a combination of strong public policy and the free market," said Mauricio Tolmasquim, president of a federal energy research agency based in Rio de Janeiro. "That's the Brazilian secret."

Brazil's fortunes have been tied to sugar since the Portuguese conquerors found that their tropical colony boasted ideal conditions for cultivating the tall, grassy plant. Brazilians produce and eat more cane sugar than any people on the planet, so the notion of using it to power their vehicles was a natural. After all, Henry Ford once viewed ethanol, which can be made from corn, barley and other crops, as a strong contender to fuel the Model T.

But the discovery of cheap, abundant petroleum changed everything. Like much of the rest of the world, Brazil guzzled imported crude until the 1970s oil shocks put its economy over a barrel. So totally reliant was Brazil on foreign oil that surging prices wreaked havoc on its balance of trade. That led to massive borrowing, huge deficits and, eventually, hyperinflation and a devaluation of its currency.

Thus the Brazilian government, then a military dictatorship, launched efforts in the mid-1970s to wean the nation off imports. Those efforts included its National Alcohol Program, known as Proalcool.

"To become less dependent was a matter of life and death," said Jose Goldemberg, secretary of the environment for the state of Sao Paulo.

With the help of public subsidies and tax breaks, farmers planted more sugar cane, investors built distilleries to convert the crop to ethanol and automakers designed cars to run on 100% alcohol. The government financed a mammoth distribution network to get the fuel to gas stations and kept alcohol prices low to entice consumers. It worked. By the mid-1980s, virtually all new cars sold in Brazil ran exclusively on ethanol.

But a 1989 shortage coupled with low gas prices soured many on the renewable fuel. Sales of alcohol-only cars tumbled in the 1990s, and the government gradually withdrew its subsidies and lifted price controls on ethanol. Demand stalled.

Some critics at the time chalked it up to the inevitable consequences of government meddling. But today many laud Brazil's Proalcool program for creating a viable domestic market for ethanol, and for spawning an industry with tremendous export potential that now employs more than 1 million Brazilians.

Meanwhile, ethanol remains little more than a boutique fuel in the United States. Although the U.S. is the world's second-largest ethanol maker, producing 3.4 billion gallons last year compared with around 4 billion gallons for Brazil, ethanol's main use is as a gasoline oxygenate to boost air quality rather than as a serious replacement for foreign oil. However, high gas prices have some farm belt legislators pushing Congress to mandate greater use of domestic corn-based ethanol in the nation's fuel supply to reduce oil consumption.

Virtually all cars sold in the U.S. since the early 1980s can run on gasoline containing as much as 10% ethanol. In addition, there are an estimated 5 million flex-fuel vehicles already on U.S. roads that can burn a mixture as high as 85% ethanol. But big logistical and political hurdles remain. Only a few hundred of the nation's approximately 169,000 retail gas stations are equipped to sell so-called E85 fuel. Nationwide distribution would require station owners to invest hundreds of millions of dollars in special tanks and pumps.

Although U.S. ethanol makers say they could easily double their output to meet any increase in demand,

experts say that's still a drop in the bucket compared with the tens of billions of gallons that would be needed annually to displace meaningful amounts of oil. The U.S. industry is loath to give up tariffs that protect it from cheaper alcohol from Brazil.

Meanwhile, some environmentalists say feedstock such as grasses and municipal waste offer much more promise than corn. But huge investments in research are needed to get the costs down for this so-called cellulosic ethanol.

What most can agree on is that Brazil is an example of what might have been if America had seriously committed itself 30 years ago to renewable energy.

"If we would have spent one-hundredth of the money that we have spent to send tanks around the world to protect our oil supplies we would already be using cellulosic ethanol," said Michael Bryan, chief executive of BBI International, a Colorado-based bio-fuels consulting company.

Although public support was crucial in getting Brazil's program up and running, the private sector is now driving growth with flex-fuel cars.

At Volkswagen's sprawling Anchieta plant near Sao Paulo, the gleaming Fox and Polo models inching down the assembly line look just like regular cars. The only immediate clue that they are revolutionizing the Brazilian auto market is the TotalFlex logos on their back windshields.

The company was the first to unveil dual-fuel vehicles in Brazil in March 2003. The technology has proven to be such a hit with consumers that in a little more than two years the company has shifted nearly 90% of its domestic production to flex-fuel capability.

"It was a big bang in the market," Volkswagen spokeswoman Junia Nogueira de Sa said.

Equipped with a single fuel system, these vehicles employ sensors that allow the engine to adjust to gasoline and alcohol in any combination. Flex-fuel vehicles don't cost any more than regular gasoline-powered models. The only visible difference under the hood is a tiny auxiliary fuel tank that holds a bit of gasoline to aid starting on cold days, a common problem with the old alcohol-only models.

Today, a half dozen carmakers, including General Motors Corp. and Ford Motor Co., offer dual-fuel versions of their vehicles in Brazil, and more are on the way. Consumers bought around 48,000 of the vehicles the first year they were available in 2003, representing about 4% of total car sales. That figure quickly jumped to 328,000 cars, or 22% of the total volume, in 2004, and last month nearly half of the new cars sold were flex vehicles. Analysts predict that dual-fuel technology will easily dominate the market within a few years.

Cars aren't the only things being powered by ethanol in Brazil. Small planes such as crop-dusters are converting to alcohol. And Brazil's electrical grid, which experienced a severe shortage in 2001 because of a drought in its vital hydroelectric sector, is getting a charge from sugar.

In contrast to U.S. corn-based ethanol, which requires substantial amounts of fossil fuel to plant, harvest and distill, Brazil's industry uses crushed sugar cane stalks known as bagasse to feed the steam boilers that power its mills and distilleries. The process is environmentally friendly and so efficient that these centers are generating more energy than they can use. Ethanol producers are supplying Brazil's grid with more than 600 megawatts of electricity. The near-term potential is at least 10 times that.

[more stuff....]

There are also complicated issues involving subsidies for the sugar industries in Brazil, Argentina and elsewhere:

- Katherine H. Sheaff, Why is sugar a sticky topic in Mercosur? - see especially the section on Cane sugar and the

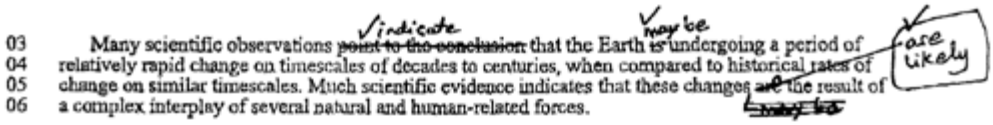
Proalcool program.

June 16, 2005

The big reason the United States is doing so badly on environmental issues is that the Bush administration is in bed with polluting industries - in a truly shameless, egregious way.

You may have read how Bush hired Philip Cooney, a lobbyist from the American Petroleum Institute, to be the chief of staff for the White House Council on Environmental Quality.

And you may have read how Cooney doctored scientific reports to downplay the effects of global warming:



You can see more examples here and here:

- Paul Rauber, See no evil: how the White House edits out global warming, *Sierra*, January-February 2006, pp. 36-37.

You may also have read how Cooney suddenly resigned when this was discovered - for "completely unrelated" reasons, of course: "He has accumulated many weeks of leave, and so he decided to resign and take the summer off to spend some time with his family", according to presidential spokeswoman Erin Healy, who thinks we're a pack of idiots.

And now, what has Cooney done while spending time with his family? He's started to work for Exxon Mobil!

The main reason we know about Cooney's dirty tricks is that earlier this spring, Richard Piltz resigned in disgust from the U. S. Climate Change Science Program - and sent out a memo explaining why. He explained how the Bush administration has systematically suppressed the findings of the National Assessment of the Potential Consequences of Climate Variability and Change. In particular, he explained how Cooney changed a document to "create an enhanced sense of scientific uncertainty about climate change and its implications".

And what *were* the findings of the National Assessment? Read them here:

- US National Assessment of Climate Change. Overview: Key Findings.

Here's yet another example of how Exxon is subverting US environmental policy with the help of the Bush administration:

> **Revealed: How Oil Giant Influenced Bush**
> **White House sought advice from Exxon on Kyoto stance**
>
> By John Vidal
> Environment Editor for The Guardian
>
> June 8, 2005
>
> President's George Bush's decision not to sign the United States up to the Kyoto global warming treaty was partly a result of pressure from ExxonMobil, the world's most powerful oil company, and other industries, according to US State Department papers seen by the Guardian.
>
> The documents, which emerged as Tony Blair visited the White House for discussions on climate change before next month's G8 meeting, reinforce widely-held suspicions of how close the company is to the administration and its role in helping to formulate US policy.

In briefing papers given before meetings to the US under-secretary of state, Paula Dobriansky, between 2001 and 2004, the administration is found thanking Exxon executives for the company's "active involvement" in helping to determine climate change policy, and also seeking its advice on what climate change policies the company might find acceptable.

Other papers suggest that Ms Dobriansky should sound out Exxon executives and other anti-Kyoto business groups on potential alternatives to Kyoto.

Until now Exxon has publicly maintained that it had no involvement in the US government's rejection of Kyoto. But the documents, obtained by Greenpeace under US freedom of information legislation, suggest this is not the case.

"Potus [president of the United States] rejected Kyoto in part based on input from you [the Global Climate Coalition]," says one briefing note before Ms Dobriansky's meeting with the GCC, the main anti-Kyoto US industry group, which was dominated by Exxon.

The papers further state that the White House considered Exxon "among the companies most actively and prominently opposed to binding approaches [like Kyoto] to cut greenhouse gas emissions".

But in evidence to the UK House of Lords science and technology committee in 2003, Exxon's head of public affairs, Nick Thomas, said: "I think we can say categorically we have not campaigned with the United States government or any other government to take any sort of position over Kyoto."

Exxon, officially the US's most valuable company valued at $379bn earlier this year, is seen in the papers to share the White House's unwavering scepticism of international efforts to address climate change.

The documents, which reflect unanimity between the company and the US administration on the need for more global warming science and the unacceptable costs of Kyoto, state that Exxon believes that joining Kyoto "would be unjustifiably drastic and premature".

June 19, 2005

Speaking of Exxon - I ran into a great series of articles in the magazine *Mother Jones* on how Exxon Mobil has been raising doubts about global warming by paying fake "experts" to question its existence. While nobody outside the United States takes this crap seriously, American public discourse has been seriously distorted by it. Check it out!

- As the world burns, *Mother Jones*, May-June 2005.
    - Chris Mooney, Some like it hot, *Mother Jones*, May-June 2005. Details on how Exxon Mobil funds forty public policy groups that question the existence of global warming.
    - Put a Tiger in Your Think Tank. A chart showing how much money different organizations and fake "experts" are getting from Exxon Mobil.

If you don't have much time, just look at the above chart. For more, try these:

- Environmental Defense, Global Warming Skeptics: A Primer. A rogues' gallery of fake "experts" showing how much they've been paid by Exxon Mobil to muddy the waters on global warming.
- Exxon Secrets - How Exxon Funds the Climate Change Skeptics. See which organizations are funded by Exxon Mobil and what they're doing.

Using this information, you can see how Exxon is bankrolling bogus "experts" like these:

Click on the photos to see what these guys are saying. Then see how much Exxon is paying them to say it.

June 20, 2005

A bit more about the three rascals shown above. If we want to understand how economic forces run the world, one thing we need to think about is people like these:

- The first guy's name is Myron Ebell. He's a serious nuisance. After running an organization devoted to eliminating protection for endangered species, he switched to heading the Global Warming and International Environmental Policy project at the Competitive Enterprise Institute, which is funded by Exxon Mobil in order to throw sand in our eyes about global warming. He has his fingers in many pies. For example, connived with the chief of staff for White House council on environmental policy, Philip Cooney, in rewriting scientific reports on climate change in order to play down the risks of global warming.

  The Competitive Enterprise Institute is a front for corporations opposed to safety and environmental regulations. It has received $870,000 from Exxon Mobil since 2002.

- The second guy's name is James Glassman. It seems he's mainly interested in investment strategies, with disinformation as a small side hobby. In an article entitled "The Global Warming Hoax" he agrees with Senator James Inhofe's claim that global warming is a hoax perpetrated by nasty environmentalists.

  He's the founder of techcentralstation.com, which received $95,000 for "climate change support" in 2003. He's also a resident fellow at the American Enterprise Institute, which has received $485,000 from Exxon since 2002.

- The third guy's name is Ross McKitrick. He teaches economics at the University of Guelph. After spending some time battling endangered species in Canada, he switched to pretending that global warming is a hoax. He wrote a book about this called Taken By Storm. Read how he mixed up degrees and radians, computed averages incorrectly, and made other basic math errors in this failed attempt to "debunk" global warming.

  He's a senior fellow at the Fraser Institute, which received $60,000 from Exxon in 2003; he's a writer at techcentralstation.com, which received $95,000 for "climate change support" from Exxon in 2003, and he's a contributing writer for the George C. Marshall Institute, which received $185,000 for "climate change public information and policy research" in 2002-2003.

These are just a few of the people paid by Exxon Mobil to confuse the American public on the issue of global warming. It would be interesting to know in more detail how this game works.

June 22, 2005

Summer's here, and it's hot - about 96 in Riverside today, they say. That's actually nothing much for around here, but it's been a cool wet year so far, so it comes as a bit of a shock. With lots of plant growth earlier in the spring, I'm mainly worried about when the autumn, when things dry out and we get fires. If it doesn't get too hot and windy, we may not have a repeat of the 2003 fires.

Anyway - while hot, it's very beautiful and peaceful in my garden next to the hills. The baby hawks are practicing gliding.

This diary has been pretty downbeat so far, as I become aware in more and more detail of what I'd already known: a feedback loop of economic forces is pushing us down the road to disaster. But, the universe has passed through many crises before - look at the Permian extinction, for example!

So, to me the question is not whether we'll make it through this, but how. In what style? Surprisingly well, or severely damaged?

I use the term "we" in the broadest sense here, from paramecia to people to cyborgs... we're all in it together.

Here's a hopeful vision by a true visionary:

- Bruce Sterling, Can technology save the planet?, *Sierra*, July/August 2005.

Sterling argues that:

> If we handle the huge transition correctly, it will be worth cheering. In 50 years, nature will be less oppressed, culture will be wiser, government will take new and improved forms, industrial systems will be more efficient and capable, and business will be less like a rigged casino. Purveyors of art, fashion, and design will see what went on nowadays and bust a gut laughing in derision. Our children and grandchildren will get up in the morning, look at the news, and instead of flinching in terror, they will see the edifying spectacle of the world's brightest people transparently solving the world's worst problems. This sounds utopian, but it could soon be everyday life.
>
> To achieve this victory, we need to understand technology with a depth of maturity that humans have never shown before. We tend to obsess over newfangled discoveries: the radio age, the space age, the atomic age, the computer age. We need to stop fussing over these tiny decades-long "ages" and think historically and comprehensively, employing technology as a means to preserve the web of life rather than for its own sake. The Iroquois considered the impacts of their decisions on seven generations, and so can we.

As for "bust a gut laughing" we don't need to wait 50 years for *that*. But anyway, Sterling says that over the long timeline he's imagining, there are only 3 technologies worth our attention - none of which has been invented. He writes:

1. The first and most sensible technology is one that does its work and then eventually rots and goes away by itself. Its core materials and processes are biodegradable, so it's self-recycling. Writer Janine Benyus talks about "biomimetic" technologies; architect William McDonough describes "cradle to cradle" production systems. This means harnessing the same biochemical means of production that built the natural world and using them to create industries, cities, products, everything. It means the industrial use of new materials with the sturdy, no-nonsense qualities of spider silk, mussel glue, coral, seashell, horn, bone, and timber. It means room-temperature industrial assembly without toxics: no foundries, no pesticides, no mercury. When an object made by these processes is abandoned or worn out, it becomes part of the biosphere.
2. The second kind of technology is monumental. These are artifacts built to outlast the ages artifacts with the honest, solid design demanded by, say, craftsman William Morris and art critic John Ruskin. In theory, monuments reduce the human load on the environment because they are "consumed" only over many generations.
3. Then there's the third kind of decent technology, a cybernetic industrial base. Imagine a fully documented, trackable, searchable system in which the computer revolution has permeated manufacturing, inventorying, and transporting. Every manufactured object is bar-coded, scanned, and tracked throughout its lifetime. Consider a Dell computer: It doesn't even exist until you place your order, setting in motion a tightly controlled manufacturing and delivery process. (On a smaller scale, I can keep track of my writing¥material stored on my hard disk using a Google search. Eventually I hope to be able to Google my misplaced car keys.) While this sounds like Big Brother, when it comes to managing the resources that go into industrial processes, such hyper-control creates great economic and environmental efficiency. Imagine a whirring technology that would keep full track of all its moving parts and, when its time inevitably came, recycle itself.

I most of all agree that we need the first sort of technology. There's a low-tech road to this: use existing sustainable farming practices to create recyclable products with minimum damage to the environment. And there's a high-tech road, which Sterling is imagining: use biotechnology and nanotechnology to figure out how to *grow whatever we want*.

I'm sure the high-tech road is possible. Heck, we already have tomatoes that contain a vaccine against SARS, and scientists have figured out how to hack the genetic code in E. Coli to allow genes that code for an amino acid that's not one of the usual twenty. These innovations are just the tip of an enormous iceberg. The question is how to go down this "high road" in a reasonably safe way.

I would add " ...and whether we even should try", but I figure that's inevitable - I want to be practical here. A bunch of environmentalists seem too eager to clutch to a glorious past that we can never get back to - if it was ever really there. I have little use for "the ancient future", except as a delightful romantic vision. I'm glad the Sierra Club isn't too hidebound to let Sterling ponder the high-tech road in their magazine!

They also have a nice feature on inventors who are doing good things:

- Dashka Slater, Earth's Innovators, *Sierra*, July-August 2005.

And while you're at it, check out Stewart Brand's article on "environmental heresies" -

- Stewart Brand, Environmental Heresies, *Technology Review*, May 2005.

To whet your interest, I'll give you the first sentence:

> Over the next ten years, I predict, the mainstream of the environmental movement will reverse its opinion and activism in four major areas: population growth, urbanization, genetically engineered organisms, and nuclear power.

July 5, 2005

The air is thick with smoke and occasional bits of ash as the fire season begins here in Southern California. There are big fires in Yucaipa and Chino tonight. There weren't so many last year, but the year before it was even worse... though later in the year: it could still get a lot worse than it is now, this year, since heavy rains created a lot of plant growth. It reminds me a bit about the burning of the Amazon rainforest, though it's very different: it's very arid here.

David Corfield emailed me an interesting link on the maximum power usage in a sustainable economy:

- David MacKay, Order of magnitude morality.

As of 1998 the world used an average of 2 kilowatts per person. This was divided very unevenly, of course: people in the US used 13 kilowatts on average. Most sustainable power sources are ultimately derived from solar power, so MacKay does some rough but interesting calculations to see whether we could sustain this sort of power usage on solar power alone. Some conclusions:

- If we turned over all habitable land to solar panels which had 100% efficiency, each human could get 1 megawatt.
- If we turned over 7% of all habitable land with solar panels which had 15% efficiency (a realistic efficiency), each human could get 10 kilowatts.

Of course, even the latter more realistic alternative would require a mind-boggling change in our habits - *lots* of solar panels, and energy conservation in the power-hogging USA.

MacKay's site lists all sorts of caveats which might invalidate or at least modify his conclusions, but I think the basic point is an absolutely vital one: we're on an unsustainable course and will eventually be forced to change our habits in unpleasant ways if we don't do it more gracefully starting sooner.

I'm about to hog some power of my own: I'm flying to Sydney tomorrow, and then Canberra, and later Beijing. Then I'll wander around China and come back on August 16th. This diary will probably remain dormant until then, unless I find some time at a nice internet cafe. See ya! When I get back, I hope to have something to say about life in China.

July 29, 2005

Beijing is a huge city, mostly rather ugly, but dynamic and expanding, with a construction project on every block. On Tuesday I wandered around the ramshackle residential neighborhoods in the old downtown, especially a bunch directly north of Liulichang, a street where they sell inkstones, brushes, scrolls and jade.

These old neighborhoods are called "hutongs". They looked like slums to me, but I was assured they're not. The real slums are on the outskirts of town, outside the fifth ring road. The land these hutongs occupy is valuable and centrally located! The houses don't have private toilets, but there are public toilets ever few blocks. The buildings date to Ching or even Ming times; they're falling apart and ugly, not romantically old-fashioned as I had foolishly hoped. But, they're kept reasonably clean and lots of people grow vines in front. There are also lots of little hole-in-the-wall eateries which remind me of the less posh parts of Hong Kong: old folks sit there playing Chinese chess or chatting....

Some of the hutongs are getting torn down to make way for towering apartment complexes, but others are getting gentrified. Either way, they seem to be on their way out. So, I took a lot of pictures, some of which will eventually appear on my website.

My travel partner (Lisa Raphals) told me this is a civilization on its way up, bursting with energy, growing... while America is in decline. There's definitely some truth to this. People don't work as late here as they do in Hong Kong, where lots of little businesses stay open until midnight. But there's construction going on at all hours. People who come back to Beijing after a few years have trouble finding their way around anymore. Even the taxi drivers don't seem to know their way around that well. (Two tries to take a taxi to the Wudaokou stop on Line 13 both failed miserably. On the other hand, it turned out to be pretty hard to reach this stop by car.)

Unlike Hong Kong, there are lots of beggars here, at least in the more tourist-infested parts of town. Among the beggars are some scary-looking cripples, including a girl whose feet seem to have rotted away. I'm told these people are all run by Uighur gangs.

I also occasionally see families of a husband, wife and child begging for money, apparently down on their luck, but in a rather dramatically staged way that made me a bit suspicious the second or third time I saw them. The man, usually wearing wire-rimmed glasses and an outfit that brand him as a white-collar worker, bows in shame while holding his child, whose head lolls back as if ill. The wife sits motionless beside them, also bowed in shame. Their story is written out neatly on a piece of paper on the pavement in front of them. Some people stop to read it; most walk by. I don't give them any money - it could be a scam - but I feel pretty guilty about this. I do give some money to a blind fellow I see two days in a row playing an erhu in the subway.

(An erhu is a two-stringed Chinese fiddle.)

However, far more widespread than begging is hawking: if you walk past any store in the touristy part of town, you'll instantly have someone come out and try to lure you in. Some of this is quite annoying, some merely charming, but it's all impressively determined. In the US this sort of initiative is only found in TV ads, junk mail and spam.

I expected to see lots of bicycles, but while most major roads have bike lanes or even separate bike roads parallelling them, the bike traffic was less intense than the cars. People are buying lots of cars, pushing up the price of oil worldwide, polluting the city, and doing their bit to help global warming. There are also lots of new drivers, which might help excuse the terrifying tendency for cars to weave back and forth between lanes, jockeying for advantage and cutting off other drivers. Pedestrians routinely jaywalk across major multi-lane roads packed with cars moving at 40 miles per hour: it's almost necessary, because there aren't enough stoplights. I've heard there are lots of accidents, but I haven't actually seen any. I haven't even been run over myself, yet.

I still need to write about an interesting book that Leon Kuunders gave me... but here are two other book recommendations I just got.

Atte Marko Saarela from Finland writes:

> If you're interested in the relation between psychology and politics, you might want to read a book called "What's the Matter with Kansas", which is about why so many people with middle and low income vote Republican against their own best interest.

Sean Donovan Downes, a physics major at the University of Hawaii, writes:

> I've been a reader of your site (math & physics) for a while, and have recently turned to your economics pages. Specifically
>
> > "See how Exxon is bankrolling 40 public policy groups and bogus 'experts' like these:"
>
> Almost immediately after reading Mr. Ebell's bio, I was reminded of a book that came out not more than a year ago: "Confessions of an Economic Hit Man" by John Perkins. It was a pretty good read, and I learned a bit more than I expected to from it. Have you seen it? If not, I recommend it. I picked it up at Borders.
>
> Aloha,
> Sean

August 10, 2005

After visiting Beijing I spent 8 days in Chengdu, the capital of the province of Sichuan - better known to American fans of Chinese food as "Szechuan". Since my knowledge of Chinese geography was deplorably vague until this trip, I won't assume yours is any better! Sichuan is in the southwest of China, bordering Tibet, and Chengdu is a standard stop for tourists going to Tibet - which is a kind of restricted zone, since the Chinese government doesn't like Westerners who support the "free Tibet" policies of the Dalai Lama.

Chengdu itself is thoroughly Chinese, and more charming and relaxed than Beijing. It's hot and humid during the summer - downright steamy! - and it's packed with teahouses where people while away the hours playing mah jong. The downtown has some quite comfortable neighborhoods; poverty sets in as you enter the surrounding countryside. But when you go up into the misty mountains of northern or western Sichuan, you find lots of Tibetan communities, complete with yaks and compounds of houses bunched together and surrounded by prayer flags.

I took a tour of Huang Long and Jiu Zhai Go, two surreally beautiful parks in the north of Sichuan, and got a tiny little glimpse of this world. Check out my photos! Huang Long is famous for its terraced pools made out of travertine (calcium carbonate deposited by the water) - sort of an open-air cave. Jiu Zhai Go is famous for lakes with incredibly blue waters - perhaps the result of dissolved copper compounds? Near the parks everything was *jam-packed* with tourists, but *almost all of them Chinese*: I only saw about 5 whites there besides myself and my travel partner. So, while I experienced nothing at all like a "traditional Tibetan lifestyle", I did experience a traditional "Chinese-tourist-gawking-at-ethnic-minorities" lifestyle, which was almost as exotic to me, though less romantic.

The evening of local entertainment provided by the tour was somewhere between amusing and sad: some truly virtuosic singing and musicianship featuring some circular breathing, some updated versions of traditional dances - and some truly silly stuff, like 12 sexy maidens shimmying their hips while suggestively pumping butter churns to a feverish techno beat. In short, something for everyone.

It was all done in a spirit of good fun, and the locals even got their symbolic revenge by staging tug-of-war contests between male audience members at the end of the show, in which the top prize was to get married to one of the sexy maidens! The poor winner had to kiss her and carry her off stage... all in fun, of course. But, it reminded me of how subjugated peoples everywhere wind up eking out an existence by entertaining the conquerors with their quaint local customs. It's a kind of trivialized existence, sort of like a once-proud lion pacing back and forth in a cage. Alas, there's

no turning back the hands of time, so I suppose one can only hope the Tibetans learn to ride the tide of change. In California the native Americans now make lots of money running casinos... though I'm not sure how much of this money the average folks living on the reservations ever wind up seeing.

There was an enlightening little argument between the tour guide (a very nice Tibetan guy) and a member of the tour who said that the Chinese needed a firm presence in Tibet because there was a lot of crime in Lhasa. (Yeah, right.) Later the tour guide said he was not at all in favor of Tibetan independence - a hopeless cause and a mess of trouble. Instead, he favored learning to work within the system.

I was also amused by how the international language of rap and techno featured in these touristic dance performances. *Now that Tibetan variety shows for tourists in the backwoods of Sichuan play rap music, how can anyone consider this stuff "cutting-edge" or "rebellious" in the United States?* I guess all that matters is that there are still plenty of Americans who hate it.

Anyway, I left Chengdu on Monday the 8th. Now I'm in Shenzhen, a busy boom town in the "special economic zone" in Guangdong Province, on the coast right next to Hong Kong. Free enterprise runs rampant here! It's not at all like charming old Chengdu, but it's getting nicer, I think, as people set up parks and other nice things. Certainly it's nowhere near as scary or seedy as the Lonely Planet guide makes it out to be. Maybe their writer never left the tourist zone near the railway station, or maybe it's just gotten better since the 1996 edition was written. I took a long walk through a big park one night and saw old folks walking around and kids playing after dark. In a big US city everyone would be too scared for this.

A lot of people in Shenzhen live in so-called "villages". These are big tall apartment complexes right in the thick of the city, but they have their own shops, restaurants, swimming pools, ping pong tables, little parks, and so on - and some even show free movies! It's a clever way to bring some of the charms of a village (or hutong) to modern urban life. I'm staying in a hotel that's attached to one of these villages - apparently residents can rent a room when they have visitors.

Why don't Americans set up living arrangements like these? Too individualistic?

Right now my travel partner and her grad student are shopping for clothes while I write this from the comfort of a huge, dim "web bar", lit by futuristic blue-glowing metal arches and traditional Chinese lanterns. You can use a computer in a private room here for only 8 yuan per hour (1 dollar per hour), but I'm using the bare-bones basic option which costs even less - just 5 yuan per hour.

I've seen no sign of the supposed Chinese crackdown on internet cafes, though you do have to show them your identity card (or passport, in my case). At first I thought Google was being censored, because I got a lot of other sites to work but not this one. What a pain! But now it's working. So, while I hear a lot of websites are blocked by the Chinese government, I haven't yet come across one.

Let's see if I can get the Amnesty International website... hmm, no. But it's hard to know what this means: yesterday I couldn't get the math/physics archive at http://www.arxiv.org, but I could get it at http://xxx.lanl.gov. Erratic censorship or just flaky internet connections?

August 19, 2005

Back from China, I'm still recovering from jetlag. My mom called and recommended this book:

- Clyde Prestowitz, 3 Billion New Capitalists: The Great Shift of Wealth and Power to the East, Basic Books, 2005

August 20, 2005

Still recovering from jetlag - I'm waking up at 5 am these days, which isn't natural for me.

Out of the blue I feel like talking about the coming revolution in biotechnology. This will go much further than most

people realize. Pretty soon, we won't just be tinkering with the DNA of existing creatures, modifying it a little here or there. We'll be creating completely new creatures and even new genetic codes.

This is called "synthetic biology". The First International Meeting on Synthetic Biology was held in the summer of 2004, with talks like "Rewiring cell signaling pathways", "Programming cells and synthetic gene networks", and "Biological property rights".

But in fact, Thomas Knight has been teaching classes on synthetic biology for several years - back at my old grad school, MIT. The kids in these classes use a toolkit of standardized parts called Biobricks to build new biological systems. It's sort of like building electrical circuits from resistors, capacitors, and transistors. They do this for fun during the Independent Activities Period - a kind of free-for-all that takes place each January between semesters.

Check out some of their projects! You'll see stuff like:

> The objective of the project is to design a bacteria that when cultured will produce a recognisable polka dot pattern in the culturing medium. Our design attempts to achieve this by hijacking the quorum sensing mechanism employed by bacteria such as *Vibrio fischeri* and more particularly in our case *Pseudomonas aeruginosa* used to regulate group behaviour. We are attempting to use the las/rhl quorum sensing system used by the latter, in conjunction with a heat trigger to cause small clumps of bacteria to turn on the LacZ colour expression gene and hopefully get a small selection of polka dots in a tasteful display of purple.

Some people will find this amusing. Some will find it exciting. Some will find it terrifying. I mainly just wish more people knew this kind of stuff is going on!

A while back I mentioned that scientists figured out how to expand the genetic code to create a new codon in *E. coli* bacteria. If you don't know what that means, you won't realize how far-out it is. The "letters" in DNA are grouped in "words" of 3 letters each, called codons. Each codon is like a word saying to insert a specific amino acid into a protein. A gene is a "sentence" built from these words, which describes a specific sequence of amino acids that get strung together to form a protein molecule. Since there are four letters - A, T, C, and G - there are potentially $4^3 = 64$ codons. However, a bunch of different codons stand for the the same amino acids, and some potential codons don't get used at all. So in fact, most of the organisms on Earth only create 20 different amino acids. This leaves room for expansion - and scientists have created a new codon that lets *Escherichia coli* create an amino acid that's not one of the usual twenty.

In an even more radical move, some other scientists have introduced new "letters" into the genetic code - that is, new base pairs besides the familiar A (adenine), T (thymine), C (cytosine) and G (guanine)!

When I read this, it reminded me of Greg Egan's scary story "The Moat" in his book *Axiomatic*, where some radical secessionists genetically engineer themselves to have different base pairs and then... introduce a virus that kills off the rest of us? But, the original experiment came two years before Egan's tale:

- S. A. Benner, S. E. Moroney, and C. Switzer, Enzymatic incorporation of a new base pair into DNA and RNA, Jour. Amer. Chem. Soc. **111** (1989) 8322-8323.

You can find a nice review of this and other work here:

- Philip Ball, Synthetic biology: starting from scratch, *Nature*, October 7 2004.

Where will all this lead? Start imagining it now. Then read my October 27th entry.

August 22, 2005

I'm teaching a minicourse on gauge theory and homotopy theory up in Calgary, and I bumped into an interesting article on the flight up yesterday. It's about Islamic economics, and it's by the author of this book:

- Timur Kuran, *Islam and Mammon: The Economics Predicaments of Islamism*, Princeton U. Press, 2004.

Here's the article:

Money, Morals and Islam

By Timur Kuran

Los Angeles Times

August 21, 2005

Mistrust among Shiites, Sunnis and Kurds is only partly to blame for last week's delay in drafting a new Iraqi constitution. Tangled up in the tension between sects and ethnicities is a fundamental ideological conflict between secularists and Islamists. To understand the constitutional battles, observers must grasp not only the principles of Islamic law, or Sharia, but also Islamic economics an esoteric modern doctrine that would befuddle Karl Marx, Adam Smith and even the Muslim jurists who, a millennium ago, developed the principles on which it claims to be based.

Secularist Iraqis believe that Prime Minister Ibrahim Jafari's Dawa Party, Iraq's largest and best-organized Shiite Islamist organization, aims to establish a theocracy in which Islam serves as an overriding, supra-constitutional source of authority. Overwhelmingly Arab, it leads the United Iraqi Alliance - the "clerics' coalition" that captured a majority of the seats in the post-Hussein National Assembly. Growing out of a diffuse movement of opposition to secularist forces - the British in the 1920s, Arab nationalism and international communism from the 1930s onward - it was formally founded in 1957 under the spiritual leadership of the late Mohammed Baqir Sadr, whose opinions remain a source of authority.

Until his fall in 2003, Saddam Hussein persecuted Dawa as a conspiracy bent on dragging Iraq back to the Middle Ages. His dictatorship is said to have killed hundreds of thousands of Dawa adherents. Yet it has never been clear what policies Dawa would pursue if it achieved power. Its leaders agree that Iraq should be governed under Islamic law, yet they are of many minds on what Islamization would actually entail.

Sadr's intellectual legacy has facilitated the present ideological diversity. In his writings, Sadr laid out a vision, developed ideals and made sweeping predictions about the benefits of Islamization. He did not provide a blueprint for action, order priorities or grapple with the tactical aspects of social transformation.

Nevertheless, Shiite Islamists still consider him their leading authority on economic matters and the most gifted founder of "Islamic economics," a school of thought that aims to restructure the economy according to Islamic teachings. Among Sunni Islamists, his reputation as an economic scholar remains limited because Sunni-dominated Islamic research centers in Arabia, Pakistan and elsewhere habitually ignore his works. Still, among today's Islamist intellectuals, including Sunnis, Sadr's economic works are viewed as the clearest expression of why an "Islamic economy" would outperform its alternatives. His ideas are often reiterated, though in the case of Sunni Islamists usually without attribution.

Sadr's economic vision is developed in "Our Economics", his masterwork published in 1961. The purpose of "Our Economics" is to discredit both capitalism and socialism as flawed and alien systems, offer Islamic economics as a vastly superior alternative and demonstrate that Islam harbors solutions to a panoply of vexing economic problems. In both capitalism and socialism he finds virtues. Islamic economics, he says, embodies all of these virtues while escaping their numerous vices.

An ideally operating Islamic economy would find a golden mean between personal rights and collective responsibility. Islam shares, Sadr says, the socialist goal of providing decent material opportunities to one and all. The difference is that it pursues this goal without trampling on basic freedoms or crushing individual creativity. In an Islamic economy, the state does not control every facet of an individual's economic life. By the same token, it helps to limit inequalities rooted in selfishness and greed.

How is the golden mean to be reached? It will easily be found, Sadr claims, in a society infused with Islamic morality. In such a society, selfish and acquisitive impulses would be tamed, and the typical person would pursue material gain only within internalized limits imposed by Islamic ethics. This moral reconstruction would enable socialist egalitarianism to coexist with liberties characteristic of capitalism.

Most Islamic economists expect their readers to accept such thinking essentially on faith. Sadr aimed to convince broader audiences, including Muslims predisposed to think in categories rooted in secular ideologies. Inviting his readers to consider the challenge of preventing alcohol consumption, he observes that the United States failed at prohibition in spite of enormous efforts at enforcement. The fundamental reason, he claims, is that prohibition conflicts with a key capitalist tenet, the legitimacy of satisfying individual wants. An Islamic economic system would overcome alcohol consumption by liberating the individual from the preference for alcohol. The state would play merely a supportive role, and insofar as it resorted to compulsion, its policies would succeed by virtue of their harmony with the dominant ethos of society.

Personal restraint grounded in Islamic morality is Sadr's answer to diverse social issues. Take poverty elimination, which a socialist society pursues through mandatory wealth transfers. Islam exhorts its adherents to assist the disadvantaged, and it teaches those of means to participate in a decentralized transfer system called zakat. In Sadr's Islamic economy, the poor are fed and clothed largely through the voluntary zakat payments of believers seeking to draw closer to God. By the same logic, in this ideal economy every worker earns a decent wage because Islamic morality restrains employers from treating their workers unjustly. The state's role in wage determination is limited to corrective measures. Inequalities that a capitalist state tolerates as the outcome of an invisible hand and a socialist state tries to lessen through an iron hand are limited through the guiding hand of God, working through both Islamic norms and leaders steeped in Islamic doctrine.

Like practically every other modern Islamist, Sadr considers interest illegal, in the belief that the Koran bans it categorically, regardless of form, purpose or magnitude. At the same time, he repeatedly praises the market mechanism, arguing that the pressures of supply and demand should be respected, not resisted. "Our Economics" seeks to overcome the contradiction through moral training aimed at removing wants liable to produce un-Islamic outcomes. If Islamic education makes people equate interest with unearned income, demand for interest income will disappear; hence, there will be no interest-based lending. People will lend to consumers suffering cash-flow problems without expecting a return. And they will lend to businesses on the basis of "profit and loss sharing" by accepting not a fixed return but, rather, a portion of any profit from the financed venture in return for part of any loss. By this logic, an Islamic economy may remain interest-free while respecting the market freedoms associated with capitalism.

Sadr's economic agenda could not be put to the test in Baath-ruled Iraq. But similar agendas have been pursued elsewhere, most notably in Pakistan and Iran. Pakistan has prohibited interest, but its people have continued to give and take interest, usually disguised as a "bank fee," "financial commission" or "service charge." Voluntary zakat donations have been minimal. A government-run zakat system that requires the wealthy to contribute essentially at the rates of 7th century Arabia has failed to dent either poverty or inequality. In Iran, likewise, interest remains common, and there is no evidence of a reduction in poverty attributable to some distinctly Islamic policy.

In neither country have attempts at economic Islamization alleviated economic conflict measurably. Employers and employees have continued to differ over the morally just wage, and neither side has had trouble justifying its positions in Islamic terms. Likewise, clerics passing judgment on economic conflicts have disagreed among themselves. Instituting Islamic economic rules has thus proved to be anything but a mechanical process. Well-meaning interpreters of Islam, or of Islamic economics in particular, have encountered vast zones of moral ambiguity.

Such disappointments have led many Islamists to conclude that a properly Islamic economy cannot be attained without first improving the moral fiber of the average Muslim. Ambitious plans have been quietly

shelved.

The Pakistani and Iranian experiments have shown that Sadr was right to treat the creation of "Islamic man" as a prerequisite for the ideal Islamic economy. These experiments also point, however, to the virtual impossibility of accomplishing a Sadrist moral transformation. If the moral fiber of Pakistanis and Iranians has not improved, as judged by Islamist leaders themselves, this is not for lack of trying.

For all the lip service Dawa's current leaders pay to Sadr's wisdom, they have given no indication of how they would succeed where others have failed. They have not elucidated what his teachings imply for wage policy or assistance to the downtrodden, to say nothing of policies on oil, the environment or foreign trade. Curiously, the Islamists among Iraq's constitutional framers are drawing moral and intellectual authority from a man whose thinking is of no practical help in resolving Iraq's vast policy challenges. The significance of Sadr's intellectual legacy lies, then, less in the particularities of its policy proposals than in the justification that it provides for giving the Dawa leadership a voice in Iraqi governance, including economic policy-making.

Notwithstanding Dawa's claim to provide a revolutionary economic agenda, as a matter of practice, Sadr's legacy serves two political goals. First, it provides a manifesto for placing a clerical seat at Iraq's national bargaining table. And second, it serves as a rhetorical device with mass resonance. At a time when most Arabs consider Islam under siege, a policy can be tainted merely by making it seem un-Islamic. A proposal categorized as un-Islamic will fail no matter how sound the utilitarian arguments in its favor.

Accordingly, secularist anxiety about Dawa goes well beyond the substance of its current policy positions. In the rough-and-tumble of Arab politics, Islamist parties will enjoy an advantage in any national debate by virtue of their ability to frame their own position, whatever its content, as uniquely Islamic and rival positions as evil.

The Sadr mentioned here, Ayatollah Muhammad Baqir al-Sadr, was repeatedly tortured and eventually executed in 1980 by the regime of Saddam Hussein. His brother, Mohammad Sadeq al-Sadr, was a prominent Shiite cleric in Iraq, and was killed by Saddam's Hussein's regime in 1999. His brother's son, Muqtada al-Sadr, is the firebrand who has been making headlines since the US invaded Iraq.

For more on Islamic economics try these:

- Islamic economics, Wikipedia.
- Islamic banking, Wikipedia.

I find it interesting, because since the collapse of the USSR and the conversion of China to a form of capitalism, Islamic economics may be the main challenge to capitalism as practiced in the US and Europe.

The very interesting Grameen Bank is popular in some Muslim countries but is not a form of Islamic banking, and indeed has incurred a boycott by Islamic fundamentalists who object to the bank's focus on improving the status of women.

August 29, 2005

Now I'm in Montreal visiting Lisa's mother, her brother Philip, his wife Shelley, and his charming, sweet but slightly spoiled five-year-old son Victor. Philip Raphals is the executive director of the the Helios Centre, a nonprofit green energy research group which provides expert help to various clients and publishes a free online news bulletin (in French). I should ask Phil a lot of questions about energy policy in Canada, but so far our conversations have mainly revolved around Victor, who is going to school for the first time starting this week, and just learned to tie his shoes.

In response to my June 22nd entry, Allan Erskine sent me the following email:

Seeing as you are now talking about the "good guys" in your economics diary, I thought you might be

interested in this place:

- Chicago Climate Exchange

The CEO, Richard Sandor, "father of futures" and founder of the world's first interest rate derivatives markets at the Chicago Board of Trade, just gave a very interesting talk where I work (a large hedge fund).

His premise was that if you enact the right structural changes, in this case restricting the shared "resource" of being allowed to pollute, and design the right contracts to encourage liquidity, you can potentially grow very sizable markets in a short space of time.

Using the existing SO_2 market growth as an example, and assuming protocols such as Kyoto are successfully backed with appropriate regulatory changes (which he and others are lobbying for), he claimed that a trillion dollar carbon emissions market by 2012 would not be an unreasonable projection, with a derivatives market of between 6-20 times the size of this (based on existing sizes of derivatives markets in relation to underlying markets).

He also claimed to have a couple more "tricks up this old man's sleeve" re indexes on everything - from indexes on sustainable development (he helped design this: http://www.sustainability-index.com) to futures trading in biodiversity (! nothing concrete as yet, but check the wee logo on the Chicago Climate Exchange homepage).

Fresh water is also one of the big future commodities apparently - not sure what I thought about this one.....!!

So could this heavyweight capitalist really be one of the good guys? For: he wore shiny blue puma pumps, and talked of lecturing stoned canines while at Berkeley. Against: his smile is a lot like Jack Nicholson's in *Witches of Eastwick*.

If you are interested in judging for yourself, I could send a link to his talk (.wmv)

Apologies as ever for emitting into your doubtless polluted inbox.

Allan

P.S. - one more thing: unlike normal resources, Sandor stressed that part of the point of "anti-resources" such as emissions caps is to "use them up" (e.g. through competition from innovative technologies) as quickly as possible! And then move onto creating markets in the next big "anti-resource"....

August 31, 2005

Hurricane Katrina struck New Orleans the day before yesterday. As I watch the waters of Lake Pontchartrain slowly engulf New Orleans, I'm wondering why none of the news reports mention this big two-word phrase: *global warming*.

Of course we can never point to a single tropical storm and say it was caused by a change in climate. But, warmer ocean temperatures cause increased ocean evaporation, which causes bigger and more frequent tropical storms. Recently a professor at MIT published a paper in *Nature* giving evidence that the destructiveness of tropical storms has roughly doubled over the last thirty years, thanks to global warming, and that this trend would continue:

- Kerry Emanuel, Increasing destructiveness of tropical cyclones over the past 30 years, *Nature*, July 31, 2005.

There's definitely been a greater-than-average number of hurricanes in the Atlantic in recent years. Even sensible people - not just the ignorable sock puppets of ExxonMobil - can argue about how much of this is due to global warming. But we should at least be discussing this issue. Have you seen the TV news on hurricane Katrina even mention it? I haven't. But maybe that's just the US news?

Of course, if we're into root causes, we could also ask why most of New Orleans is below sea level, below the level of the Mississippi River and the nearby Lake Pontchartrain. It's protected from flooding only by a system of levees and pumps... which has now failed. A disaster like the one happening now had been long foreseen. In June of this year, a TV miniseries even envisioned a category 5 hurricane hitting New Orleans that forced residents to evacuate and hide out in the Superdome, destroying refineries, and ultimately leading to a national economic collapse due to decreased oil supply. But *how did New Orleans get below sea level in the first place?*

As far as I can tell, the basic story goes something like this:

The French settled the low-lying swamps of New Orleans because they were perfectly located for a port: as far up the Mississippi as you could sail against the flow of the Mississippi. Over time, people gradually built levees to protect the city whenever this river overflowed its banks, as it regularly did.

But this had an unintended consequence. The Mississippi is a muddy river that keeps flooding its banks and changing its course, like the Yellow River in China. When the Mississippi floods, it spreads silt that raises the level of the soil! When levees were built, this natural process was stopped, and the soft muddy ground began to subside. The sinking process accelerated around 1910 when people began pumping water out of the ground to drain the city. In the 1920s, the Army Corps of Engineers built a much more comprehensive system of levees to protect the city against flooding. This *completely prevented* new silt from raising the level of the soil.

The city now averages 8 feet below sea level, with a subsidence rate to 3 feet per century. Meanwhile, global warming raised the sea level about 1 foot in the last century and somewhere between 1 and 20 feet in the next (estimates vary wildly). As if this weren't enough, surrounding wetlands that protect New Orleans against storm surges have been decimated by development, oil and gas drilling, and erosion.

Now the city is sunk.

September 1, 2005

My friend the philosopher David Corfield writes:

> Hi -
>
> There is linkage of Katrina and global warming in the UK media. Rather worrying if it's not happening in the US. It ought to be the kind of event to spur some changes. The pictures of hordes of SUVs leaving the area, while impoverished blacks get left behind, doesn't present a great image.
>
> Re your piece on Islamic economics, the comment
>
> > The Pakistani and Iranian experiments have shown that Sadr was right to treat the creation of "Islamic man" as a prerequisite for the ideal Islamic economy. These experiments also point, however, to the virtual impossibility of accomplishing a Sadrist moral transformation. If the moral fiber of Pakistanis and Iranians has not improved, as judged by Islamist leaders themselves, this is not for lack of trying.
>
> suggests that solutions can't come from the nation state. Working up from smaller social communities might prove a better route, as argued by my favourite opponent of modern liberalism, Alasdair MacIntyre.
>
> It's interesting to see Islamic thinkers studying MacIntyre, e.g., this review:
>
> - Muhammad Legenhausen, review of *Whose Justice? Which Rationality?* by Alisdair MacIntyre, al Tawhid Islamic Journal **14 (2)**.
>
> Best, David

Here's my reply, which I polished up a bit before posting here:

> Hi -
>
> >There is linkage of Katrina and global warming in the UK media.
>
> Good.
>
> >Rather worrying if it's not happening in the US.
>
> Yes - I've seen not a single word, except one paragraph in a small article I found somewhere on the web. There's been a huge suppression of the idea of global warming in the US, thanks in large part to Exxon and its paid-for flunkies (e.g. most of the Bush administration).
>
> >It ought to be the kind of event to spur some changes.
>
> I'm mostly curious as to whether they plan to rebuild New Orleans in the same place, below sea level - if they're *that* dumb, how can they possibly deal with a gradually growing problem like global warming?
>
> >The pictures of hordes of SUVs leaving the area, while
> >impoverished blacks get left behind, doesn't present a great image.
>
> Right now, the evacuation of the Superdome has been suspended due to shots being fired at the helicopters. I can imagine how that will play on the world stage! Baghdad comes to New Orleans!
>
> (New Orleans is the city with the highest murder rate in the US, and Louisiana is famous for its political corruption, so everything will play out worse than one would naively expect.)
>
> >It's interesting to see Islamic thinkers studying MacIntyre,
> >e.g., this review [...]
>
> I still hope some real good will come of Islam's presence as a counterweight to the Western system - or what you call "liberalism", which means something very different to MacIntyre than it does in contemporary US politics. Like it or not, it's one of the few forces with enough adherents to keep the world from becoming a kind of monoculture. Right now the West only sees the worst side of Islam: fundamentalist jihad. There are a lot of better aspects - one can see a few on the website you found that review on:
>
> - Ahlul Bayt Digital Islamic Library Project
>
> Like many people, I'd been hoping for a kind of "reformation" in Iran which would lead to an Islamic but non-fundamentalist state; it seems to have stalled, but it could still happen. These things take a long time.
>
> I'm reading a fascinating book on Andalusia, which sheds some light on these issues:
>
> - Maria Rosa Menocal, The Ornament of the World: How Muslisms, Jews and Christians Created a Culture of Tolerance in Medieval Spain, Little, Brown and Company, Boston, 2002.
>
> I want to learn more about Andalusian artists, scientists and writers!
>
> Best,
> jb
>
> PS - I think I'll stick this into my diary, hence the slightly pompous tone of certain sentences.

September 2, 2005

Here are some articles and editorials about Katrina and global warming:

- Jeffrey Kluger, Is global warming fueling Katrina?, *Time Online Edition*, August 29, 2005.
- Ross Gelbspan, Katrina's real name, *Boston Globe*, August 30, 2005.
- Katrina should be a lesson to US on global warming, *Spiegel Online International*, August 30, 2005.
- Andrew Buncombe, King: Global warming may be to blame, *The Independent*, August 31, 2005.

David King is the British government's chief scientific advisor.

Of course, past a certain point, it doesn't make sense to argue about whether a single given event was caused by an effect which might raise the probability of such an event. But, a single event is marvellously able to focus the attention.

September 3, 2005

My former grad student Miguel Carrión Álvarez wrote the following about Andalusia:

> Hello,
>
> I just read the latest entries in your economics blog. A little book I found very instructive is:
>
> - Richard Fletcher, *Moorish Spain*, University of California Press, 1993.
>
> Curiously, most of the best historians of Spain are British, and this is a good example. I also suggest this novel:
>
> - Tariq Ali, *Shadows of the Pomegranate Tree*, Verso, 1993.
>
> On a related note, Spaniards naturally prefer to highlight the examples of religious tolerance in the Christian realms, not in moorish Andalusia, and so we are most familiar with Toledo at the time of Alfonso X. Unfortunately, Spain was declared a "crusade" shortly thereafter, and that was that.
>
> Regards,
> Miguel

Besides this book I mentioned on September 1st:

- Maria Rosa Menocal, The Ornament of the World: How Muslisms, Jews and Christians Created a Culture of Tolerance in Medieval Spain, Little, Brown and Company, Boston, 2002.

there are a lot of other books on Moorish culture that might be fun. I'm especially interested in the transmission of classical Greek science through Muslim culture to Europe. People like to allude to this, but my curiosity about it got piqued by attending a big conference on the history of science in Beijing this summer, and you can read more details in "week221" of *This Week's Finds*.

My last big historical kick was studying the Silk Route and cities in the Taklamakan Desert, like Kashgar, Khotan, and Turfan. I admit that my studies of history these days are partially motivated by romantic reasons. I like learning about ancient cities, rich in philosophy, poetry and song, now long gone... destroyed by crusades, wars, or encroaching deserts... but still echoing in the distance for anyone who listens closely.

Anyone who likes that kind of stuff should read this:

- Peter Hopkirk, *Foreign Devils on the Silk Road: The Search for the Lost Cities and Treasures of Chinese Central Asia*, University of Massachusetts Press, Amherst, 1980.

September 4, 2005

Montreal is a fascinating city. While less beautiful, it somewhat resembles Paris in its coziness. We're staying in

Outremont, which I guess is considered a fairly nice area. But what I like is not any special poshness but the way there are lots of apartments and townhouses on calm, tree-lined streets, with little grocery stores ("dépanneurs") on the corner and cafes, restaurants, bakeries ("boulangeries") and greengrocers ("epiceries") on the bigger streets.

This setup means that you meet a lot of your neighbors as you walk to the store, cafe or restaurant. Also, you can easily shop daily for fresh fruits, vegetables and baguettes instead of shopping weekly for flavorless foodstuffs that have been designed to have long shelflives.

I read that 12% of US workers belong to unions, about 30% of Canadian workers, and about 40% of workers in Quebec. This too seems French. And they probably pay a similar price in higher unemployment.

William Woods writes:

> On the hurricane / global warming controversy, Kenneth Chang of the New York Times writes:
>
> > Because hurricanes form over warm ocean water, it is easy to assume that the recent rise in their number and ferocity is because of global warming.
> >
> > But that is not the case, scientists say. Instead, the severity of hurricane seasons changes with cycles of temperatures of several decades in the Atlantic Ocean. The recent onslaught "is very much natural," said William M. Gray, a professor of atmospheric science at Colorado State University who issues forecasts for the hurricane season.
>
> Gray seems to be the go-to guy for predictions of hurricane-season severity.
>
> Michael Bustillo of the Los Angeles Times writes:
>
> > Is the rash of powerful Atlantic storms in recent years a symptom of global warming?
> >
> > Although most mainstream hurricane scientists are skeptical of any connection between global warming and heightened storm activity, the growing intensity of hurricanes and the frequency of large storms are leading some to rethink long-held views.
> >
> > Most hurricane scientists maintain that linking global warming to more-frequent severe storms, such as Hurricane Katrina, is premature, at best.
> >
> > Though warmer sea-surface temperatures caused by climate change theoretically could boost the frequency and potency of hurricanes, scientists say the 150-year record of Atlantic storms shows ample precedent for recent events.
>
> A paper by William Gray and Philip Klotzbach includes these remarks:
>
> > **The 1995-2005 Upswing in Atlantic Hurricanes and Global Warming**
> >
> > Many individuals have queried whether the unprecedented landfall of four destructive hurricanes in a seven-week period during August-September 2004 and the landfall of two more major hurricanes in the early part of the 2005 season is related in any way to human-induced climate changes. There is no evidence that this is the case. If global warming were the cause of the increase in United States hurricane landfalls in 2004 and 2005 and the overall increase in Atlantic basin major hurricane activity of the past eleven years (1995-2005), one would expect to see an increase in tropical cyclone activity in the other storm basins as well (ie., West Pacific, East Pacific, Indian Ocean, etc.). This has not occurred. When tropical cyclones worldwide are summed, there has actually been a slight decrease since 1995. In addition, it has been well-documented that the measured global warming during the 25-year period of 1970-1994 was accompanied by a downturn in Atlantic basin major hurricane activity over what was

> experienced during the 1930s through the 1960s.
>
> We attribute the heightened Atlantic major hurricane activity between 1995-2005 to be a consequence of the multidecadal fluctuations in the Atlantic Ocean thermohaline circulation (THC) as we have been discussing in our Atlantic basin seasonal hurricane forecasts for several years. Major hurricane activity in the Atlantic has been shown to undergo marked multidecadal fluctuations that are directly related to North Atlantic sea surface temperature anomalies. When the Atlantic Ocean thermohaline circulation is running strong, the central Atlantic equatorial trough (ITCZ) becomes stronger. The stronger the Atlantic equatorial trough becomes, the more favorable are conditions for the development of major hurricanes in the central Atlantic. Since 1995, the THC has been flowing more strongly, and there has been a concomitant increase in major hurricanes in the tropical Atlantic.

Also see the FAQ put out by the Atlantic Oceanographic and Meteorological Laboratory entitled What may happen with tropical cyclone activity due to global warming?

So, it seems some scientists *don't* think global warming is contributing to the (well-documented) increase in Atlantic hurricanes. The Los Angeles Times article mentioned above is worth reading in its entirety for a sense of the controversy:

> **Storm Turns Focus to Global Warming**
>
> By Miguel Bustillo
> Los Angeles Times Staff Writer
> August 30, 2005
>
> Is the rash of powerful Atlantic storms in recent years a symptom of global warming?
>
> Although most mainstream hurricane scientists are skeptical of any connection between global warming and heightened storm activity, the growing intensity of hurricanes and the frequency of large storms are leading some to rethink long-held views.
>
> Most hurricane scientists maintain that linking global warming to more-frequent severe storms, such as Hurricane Katrina, is premature, at best.
>
> Though warmer sea-surface temperatures caused by climate change theoretically could boost the frequency and potency of hurricanes, scientists say the 150-year record of Atlantic storms shows ample precedent for recent events.
>
> But a paper published last month in the journal Nature by meteorologist Kerry Emanuel of the Massachusetts Institute of Technology is part of an emerging body of research challenging the prevailing view.
>
> It concluded that the destructive power of hurricanes had increased 50% over the last half a century, and that a rise in surface temperatures linked to global warming was at least partly responsible.
>
> "I was one of those skeptics myself a year ago," Emanuel said Monday.
>
> But after examining data on hurricanes in the Atlantic and typhoons in the Pacific, he said, "I was startled to see this upward trend" in duration and top wind speeds.
>
> "People are beginning to seriously wonder whether there is a [global warming] signal there. I think you are going to see a lot more of a focus on this in coming years."
>
> Hurricane activity in the Atlantic has been higher than normal in nine of the last 11 years, said the National

Oceanic and Atmospheric Administration.

This month, the agency raised its already-high hurricane forecast for this year to 18 to 21 tropical storms, including as many as 11 that would become hurricanes and five to seven that would reach major-hurricane status. That could make 2005 one of the most violent hurricane seasons ever recorded. A typical storm year in the Atlantic results in six hurricanes.

But the agency believes that the increase in hurricanes is most likely the result of a confluence of cyclical ocean and atmospheric conditions that tend to produce heightened tropical storms every 20 to 30 years. If global warming is playing any role in the hurricanes, it is a minor one, the federal agency maintains.

Computer models have shown for years that rising sea-surface temperatures resulting from global warming could create more ideal conditions for hurricanes.

Yet before Emanuel's research there were few indications that hurricanes had become stronger or more frequent, despite well-documented increases in surface temperatures.

Moreover, skeptical hurricane scientists were quick to point out that worldwide weather records were too inadequate for a thorough examination of such trends. They said that would require an analysis of storm activity going back hundreds if not thousands of years.

"There is absolutely no empirical evidence. The people who have a bias in favor of the argument that humans are making the globe warmer will push any data that suggests that humans are making hurricanes worse, but it just isn't so," said William Gray, a Colorado State University meteorologist who is considered one of the fathers of modern tropical cyclone science and who sharply questions Emanuel's conclusions.

"A lot of my colleagues who have been around a long time are very skeptical of this idea that global warming is leading to more frequent or intense storms," Gray said. "In the Atlantic, there has been a change recently, sure. But if you go back to the 1930s, you see a lot of storms again. These are natural cycles, not related to changes in global temperature. I can't say there is no human signal there, but it's minute."

Nonetheless, some scientists have maintained that the rise in mean global temperatures over the last half a century a well-documented trend widely linked to human activities such as the burning of fossil fuels will inevitably have an effect on storms, if it hasn't already.

"It's the ocean temperatures and sea-surface temperatures that provide the fuel for hurricanes," said Kevin Trenberth, a climate scientist at the National Center for Atmospheric Research who recently published a paper in the journal *Science* contending that climate change could cause hurricanes to produce more rain and thereby become more dangerous.

"It's the big guys, the more intense storms, that have been increasing," Trenberth said. Hurricane scientists have been "unduly influenced by what has been happening in their corner of the world in the Atlantic. But if you look more broadly, at what has been happening in the Indian Ocean and the Pacific Ocean, there is a clear trend."

Such views remain controversial among veteran hurricane scientists.

Chris Landsea, a hurricane expert with the National Oceanic and Atmospheric Administration, withdrew this year from the Intergovernmental Panel on Climate Change, an international scientific group that periodically sums up the consensus on global warming. Landsea said in a letter to scientific colleagues that he resigned because he strongly disagreed with public statements made by Trenberth, who was also part of the panel, suggesting that last year's Atlantic hurricanes were linked to global warming.

Despite the dispute among scientists, the prospect of stronger hurricanes has alarmed some insurance companies, which are concerned that disaster losses could increase in years to come.

> Munich Re, the world's largest insurer of insurance companies, said that global warming was at least partly responsible for a rise in worldwide insurance losses over the last 50 years, including $114.5 billion in losses last year, the second-highest total ever.
>
> Critics, including Roger Pielke Jr., a University of Colorado science professor, have attributed the losses to a simpler cause: more people living in harm's way in areas such as Florida and Louisiana.
>
> Still, some experts believe that hurricane scientists will have to consider climate change more seriously if the streak of Atlantic storms persists.

Christopher Landsea is the author of the tropic cyclone FAQ pointed out above by William Woods. So, as we dig into the question of whether global warming is causing an increase in hurricanes, we see a heated debate in which certain names keep popping up: for example, Christopher Landsea, William Gray, Kerry Emanuel, Kevin Trenbreth and Roger Pielke. In fact, Kerry Emanuel and Roger Pielke wrote a joint letter to the editor correcting a *Fortune* magazine article on this subject.

To go further we'd need to carefully study their papers....

September 13, 2005

The Sierra Club has launched a campaign called Exxpose Exxon, which seems like a good thing to me, for obvious reasons. Check out this report:

- Alison Cassady, ExxonMobil Exposed.

The cover picture is outdated - gasoline is about $3 per gallon now, not a measly $2.25 - but the facts are worth knowing.

September 23, 2005

More books are coming out on "peak oil" - how oil production will start dropping soon, and what the effects of this will be, combined with the rapidly rising oil consumption in China and elsewhere. I read hunks of this book in the local Borders bookstore while grocery shopping last weekend. It's fascinating in a way, but it seems unbalanced in its alarmism, so I don't recommend it:

- James Howard Kunstler, *The Long Emergency: Surviving the Converging Catastrophes of the Twenty-First Century*, Atlantic Monthly Press, 2005.

- Review by Bryant Urstadt: The get-ready men, Technology Review (October 2005), 72-74.

Yes, oil production may peak anytime between now and 2040. Yes, oil prices gradually spiralling upwards to infinity will drastically affect our economy. I don't even mind calling this an emergency! Yes, we use oil not just for fuel but also to make the fertilizer essential to modern commercial agriculture. Yes, it's perfectly suited to making the plastic we use for everything - though we burn two-thirds of it.

But: will civilization really collapse to the point where we see subsistence farming - little farms for each household - in what were once the suburbs of major American cities? That's what Kunstler contemplates. Somehow this scenario seems to assume no resourcefulness in our response to this challenge.

For power, there will be coal and uranium for many more years to come. Yes, these both have nasty side-effects - and many people who have studied these issues think coal is worse: more deaths per kilowatt, not even counting global warming and acid rain. But, we can count on people doing whatever they can to preserve some semblance of the status quo, and then deal - half-heartedly, a bit too late - with the nasty sideffects.

So, my fear is not that people will roll over and give up our current lifestyles as oil starts running out. My fear - or hope, it's hard to know - is that they won't. I think people in the US and China would rather drive a car powered by a fuel cell powered by a dirty coal-powered electric plant than no car at all. Global warming? We'll probably just suffer through it. The environment? It'll keep getting worse.

Who knows: maybe I'm a deluded optimist. Maybe Kunstler is closer to the mark.

But I think the problem is that he has just one bee in his bonnet - one trend on his mind. He ignores a pile of other trends that will combine to make the future more complicated and interesting than we can imagine. For example, he seems to ignore the exponential growth of computers, nanotechnology, genetic modification, and other mind-boggling technologies. Another futurist, focusing on these trends and not very interested in "peak oil", would project a very different future. In fact, one has:

- Ray Kurzweil, The law of accelerating returns, at his website KurzweilAI.net.

To quote a bit:

> An analysis of the history of technology shows that technological change is exponential, contrary to the common-sense "intuitive linear" view. So we won't experience 100 years of progress in the 21st century -- it will be more like 20,000 years of progress (at today's rate). The "returns," such as chip speed and cost-effectiveness, also increase exponentially. There's even exponential growth in the rate of exponential growth. Within a few decades, machine intelligence will surpass human intelligence, leading to The Singularity -- technological change so rapid and profound it represents a rupture in the fabric of human history. The implications include the merger of biological and nonbiological intelligence, immortal software-based humans, and ultra-high levels of intelligence that expand outward in the universe at the speed of light.

Wow! One guy's future has beleagured people growing corn in their backyards a century from now, while another's has ultra-high levels of intelligence expanding outwards at the speed of light. I guess why it's called the future: because we don't know what's going on there yet.

I think we should at the very least imagine a messy blend of these two scenarios. You can probably get the idea by reading some good cyberpunk fiction.

September 26, 2005

Here's another book on "peak oil":

- Kenneth S. Deffeyes, *Beyond Oil: the View from Hubbert's Peak*, Hill and Wang, 2005.
- Kenneth S. Deffeyes, links to related information.

Deffeys predicts the maximum of oil production will come very soon, perhaps even this Thanksgiving, and certainly in less than 5 years. I have no idea if this is true, but he's an emeritus professor of geosciences at Princeton, so maybe he knows something. Check out the links on his web page!

September 30, 2005

People outside the US, and perhaps even most Americans, may not realize what lies behind the indictment of House Majority Leader Tom DeLay. Three powers have formed an unholy alliance: corporate lobbyists, the federal government and the Republican party. This is what I was complaining about in my very first entry in this diary... but I scarcely knew the extent of it all. The Republicans increasingly run "K Street" - slang for the gang of corporate lobbyists in the US capital, since that's the street where most of them have their offices. In return, they do the bidding of big corporations. It's all very systematic and deliberate. And, the person chosen to replace Tom Delay now that he has stepped down - namely, Roy Blunt - is the person DeLay chose to run this operation!

To quote today's Los Angeles Times:

> The revolution in corporate behavior began with the Republican takeover of Congress in 1994, when DeLay was among the most outspoken of several GOP leaders demanding that business groups support the party - not only by contributing to Republican campaigns but by helping GOP leaders round up voters and selecting party faithful to run trade associations.
>
> When the National Assn. of Securities Dealers hired a former Clinton administration official, John Hilley, as a vice president in 1998, DeLay told the industry publication *Traders Magazine* that the hiring was a "very big mistake."
>
> "For an organization to hire a highly partisan Democrat gives me great concern, because I won't deal with such organizations," he said. (Hilley stayed and was later promoted.)
>
> Now, prominent Republicans head some of the city's most influential trade groups: Former Michigan Gov. John Engler leads the National Assn. of Manufacturers, and former Commerce Secretary Don Evans, a friend of President Bush, runs the Financial Services Forum. Marc Racicot, a former Montana governor who was once chairman of the Republican National Committee, leads the American Insurance Assn.
>
> Lobbyists who have their offices in the glass-and-steel buildings that line K Street say that DeLay's effort has had real impact.
>
> Many of the Republicans who have taken lobbying and trade association jobs recently owe their positions to GOP benefactors in Congress. About two dozen former DeLay staffers work as lobbyists. In these jobs, they often have access to funds they can use as donations to campaigns and conservative causes. The corporate world also supplies contacts in congressional districts that can help Republican candidates with grass-roots campaigns.
>
> The Bush administration has sought to take advantage of these ties in building unified support for judicial nominees, the president's Social Security proposal and, more recently, immigration overhaul - issues that in the past did not draw much trade association activity. DeLay and other GOP leaders used business contacts to push for passage in 2003 of the new Medicare prescription drug benefit, which was a priority of the pharmaceutical industry.
>
> Before Republicans won control of the executive and legislative branches in 2000, Washington lobbying had been studiously bipartisan. Contributions from many industry groups were close to evenly divided between Republicans and Democrats.
>
> But DeLay and his allies had been working several years to change that. To keep pressure on businesses to shift toward the GOP, DeLay and his allies in 1995 compiled a list of the 300 or so largest business-affiliated political action committees, along with a breakdown of their campaign donations by party. Lobbyists were told their ranking, and DeLay pressed those low on the list to give more to Republicans. Over time, contribution patterns changed.
>
> The accounting profession, for example, gave more than half of its campaign donations to Democrats in 1994. So far this year, 71% has gone to Republicans, according to the Center for Responsive Politics, a nonpartisan research organization. The insurance industry increased the share of donations to Republicans from 55% to 68% in the past decade. Energy interests increased the share going to Republicans from 64% in 1994 to 75% a decade later.
>
> To monitor business hiring in Washington, DeLay and conservative activist Grover Norquist launched the "K Street Project," which tracks K Street jobs and who fills them.
>
> Norquist assigns a full-time staffer to keep up with hiring changes, which are then posted on a website. This

> week, for example, the site says that a liquor manufacturer has tapped a new corporate affairs chief who has made contributions to Democrats, including Senate Minority Leader Harry Reid (D-Nev.). A separate item reports that a Washington lobbying firm has promoted an executive who had donated to the Bush-Cheney 2004 campaign fund.
>
> Norquist said House and Senate GOP leaders consulted the database to review hiring decisions by K Street firms.

So, the difference between corporate lobbyists and the Republican party has been thoroughly eroded, while remaining technically legal for the most part. DeLay pushed his luck a little too far, and broke one law too many. But the system he built will not fall with him.

October 27, 2005

I've been too busy helping my grad students Derek and Jeff work on their theses, and going with them to Loops '05 (a quantum gravity conference near Berlin) to keep up this diary. Sorry! But here's something my grad student Mike Stay brought to my attention.

On August 20th I gave a little intro to synthetic biology: the art of drastically modifying organisms. When this becomes cheap, the economic consequences could equal those of the computer revolution. But it won't stop there... people will make brand new life forms.

In fact, they're already trying!

- Bob Holmes, Alive! The race to create life from scratch, NewScientist.com news service, February 12, 2005.
- Other news stories available from ProtoLife.

Briefly: Norman Packard is a guy who helped start The Prediction Company, which seeks to make money on financial markets using complex systems theory, based on the idea that the market is *not* in equilibrium and never gets close. Here's a book about that:

- Thomas A. Bass, *The Predictors*, Henry Holt, 1999.
- *The Predictors*, a review with extra references by Ian Kaplan. See also Kaplan's retrospective written two years later.

I'm not sure how well this venture is doing - the retrospective above doesn't sound too happy, and the Prediction Company's website doesn't include any media coverage from after 1999!

(After I posted this, I got an email from Packard saying his company was doing fine.)

But anyway, now Packard has founded a company called ProtoLife, which is trying to create a new living organism from scratch. He's working with Steen Rasmussen of Los Alamos National Laboratory, who in October 2004 got a big grant to develop an organism called the Los Alamos Bug. The idea is to keep everything as simple as possible. Here are a few key features:

- Instead of a complicated cell membrane, the Los Alamos Bug will be contained in a simple droplet of fatty acids, suspended in water.
- Instead of RNA or DNA, it will contain PNA - a peptide nucleic acid, which has the same four "letters" in its genetic code as DNA, but which comes in two forms, fat-soluble and water-soluble. This is supposed to help PNA self-replicate without the complicated machinery that existing organisms use. In its double-stranded form, PNA is fat-soluble so it should move to the center of the fatty acid droplet. But, above a certain temperature its two strands separate, and it should migrate to the edge of the droplet. This allows a kind of replication cycle.
- The Los Alamos Bug will be "fed" with fatty acid precursors.
- Evolution should select for PNA sequences that reproduce the fastest.

You may be skeptical. That's probably wise. As Pier Luigi Luisi notes in the *New Scientist* article, "It's certainly interesting from the conceptual point of view. But nature with nucleic acids and enzymes is so much smarter, because these are products that have been optimised over billions of years of evolution. To pretend to do life with simple chemistry is a nice ambitious idea, but it's probably not going to be very efficient."

However, even if this idea doesn't work, and even if ProtoLife goes belly-up in a few years, I bet *something* will work. In fact, I bet *lots of things* will work. The *New Scientist* article also talks about some other teams pursuing other approaches:

- PACE: Programmable Artificial Cell Evolution - a European consortium trying to develop "distributed intelligent technical systems with self-organizing and evolvable life-like properties".

- The Nobel laureate Hamilton O. Smith, heading the Synthetic Biology group of the Craig Venter Institute, is trying to create a new life form by replacing the genome of an existing bacterium by a stripped-down genome.

- Pier Luigi Luisi and his Supramolecular Chemistry group at Rome and Zürich are working on a "minimal cell project": starting with a simple vesicle, his team will try to add enzymes and other components until they assemble the simplest possible working cell.

- Jack Szostak and his lab at Harvard are trying to build a synthetic life form using an RNA-like molecule that is able to catalyze its own replication. (This is reminiscent of the "RNA world" theory of how life started in the first place: in this theory, instead of DNA coding for enzymes that catalyze the reproduction of DNA, life started with RNA catalyzing its own reproduction.)

December 11, 2005

Who is better at making predictions: experts in politics or economics, or dart-throwing monkeys?

Well, when I put it like *that*, you can probably predict the answer... but you can read the gory details here:

- Philip Tetlock, *Expert Political Judgment: How Good Is It? How Can We Know?*, Princeton U. Press, 2005.

or for a short version, you can read this review online:

- Louis Menand, Everybody's an Expert, *New Yorker*, October 10, 2005, pp. 98-101.

Here's a quote that gives the basic idea:

> "Expert Political Judgment" is not a work of media criticism. Tetlock is a psychologist - he teaches at Berkeley - and his conclusions are based on a long-term study that he began twenty years ago. He picked two hundred and eighty-four people who made their living "commenting or offering advice on political and economic trends," and he started asking them to assess the probability that various things would or would not come to pass, both in the areas of the world in which they specialized and in areas about which they were not expert. Would there be a nonviolent end to apartheid in South Africa? Would Gorbachev be ousted in a coup? Would the United States go to war in the Persian Gulf? Would Canada disintegrate? (Many experts believed that it would, on the ground that Quebec would succeed in seceding.) And so on. By the end of the study, in 2003, the experts had made 82,361 forecasts. Tetlock also asked questions designed to determine how they reached their judgments, how they reacted when their predictions proved to be wrong, how they evaluated new information that did not support their views, and how they assessed the probability that rival theories and predictions were accurate.
>
> Tetlock got a statistical handle on his task by putting most of the forecasting questions into a "three possible futures" form. The respondents were asked to rate the probability of three alternative outcomes: the persistence of the status quo, more of something (political freedom, economic growth), or less of something (repression, recession). And he measured his experts on two dimensions: how good they were at guessing

probabilities (did all the things they said had an x per cent chance of happening happen x per cent of the time?), and how accurate they were at predicting specific outcomes. The results were unimpressive. On the first scale, the experts performed worse than they would have if they had simply assigned an equal probability to all three outcomes - if they had given each possible future a thirty-three-per-cent chance of occurring. Human beings who spend their lives studying the state of the world, in other words, are poorer forecasters than dart-throwing monkeys, who would have distributed their picks evenly over the three choices.

Tetlock also found that specialists are not significantly more reliable than non-specialists in guessing what is going to happen in the region they study. Knowing a little might make someone a more reliable forecaster, but Tetlock found that knowing a lot can actually make a person less reliable. "We reach the point of diminishing marginal predictive returns for knowledge disconcertingly quickly," he reports. "In this age of academic hyperspecialization, there is no reason for supposing that contributors to top journals - distinguished political scientists, area study specialists, economists, and so on - are any better than journalists or attentive readers of the New York Times in `reading' emerging situations". And the more famous the forecaster the more overblown the forecasts. "Experts in demand," Tetlock says, "were more overconfident than their colleagues who eked out existences far from the limelight."

People who are not experts in the psychology of expertise are likely (I predict) to find Tetlock's results a surprise and a matter for concern. For psychologists, though, nothing could be less surprising. "Expert Political Judgment" is just one of more than a hundred studies that have pitted experts against statistical or actuarial formulas, and in almost all of those studies the people either do no better than the formulas or do worse. In one study, college counsellors were given information about a group of high-school students and asked to predict their freshman grades in college. The counsellors had access to test scores, grades, the results of personality and vocational tests, and personal statements from the students, whom they were also permitted to interview. Predictions that were produced by a formula using just test scores and grades were more accurate. There are also many studies showing that expertise and experience do not make someone a better reader of the evidence. In one, data from a test used to diagnose brain damage were given to a group of clinical psychologists and their secretaries. The psychologists' diagnoses were no better than the secretaries.

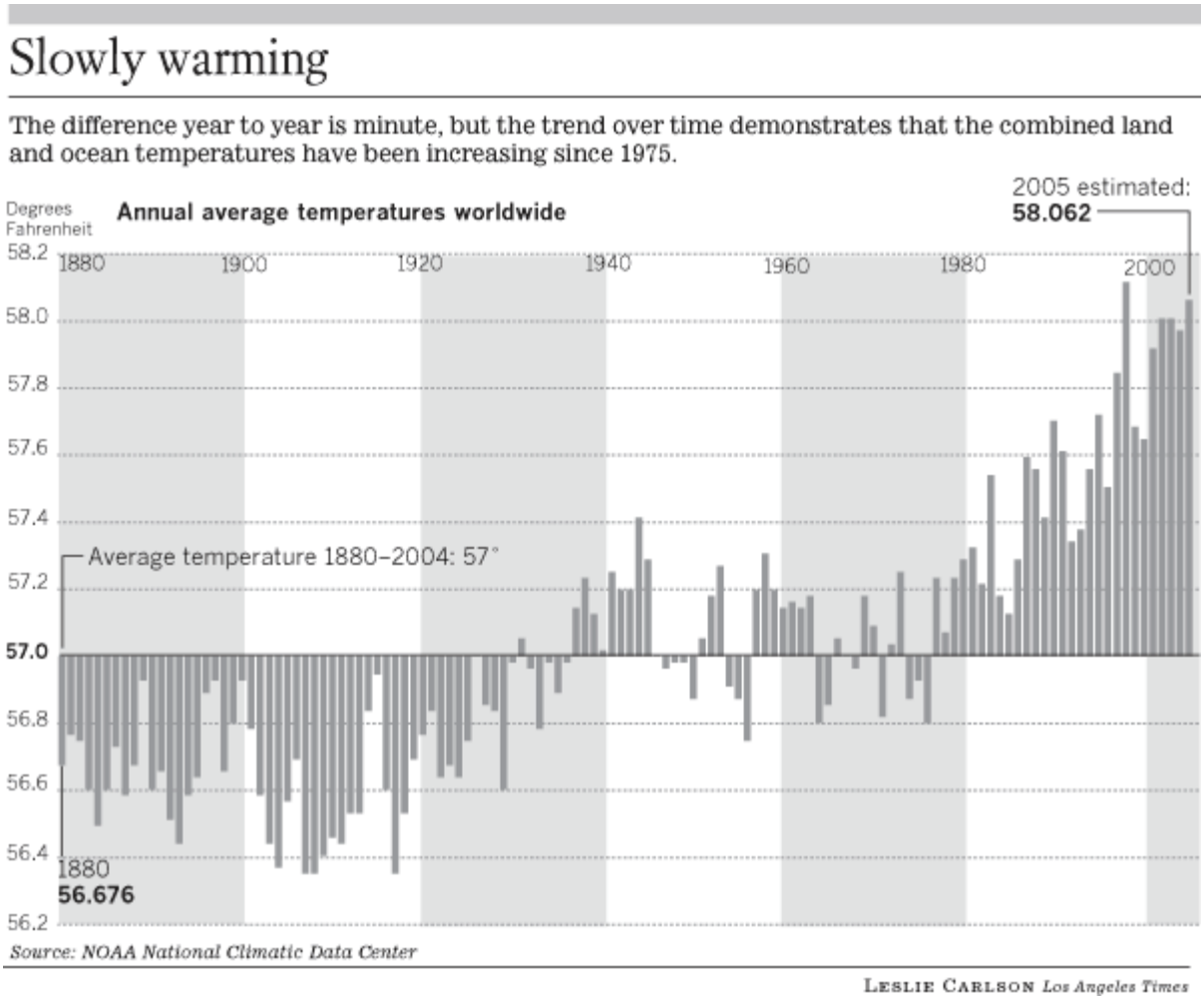
The experts trouble in Tetlock's study is exactly the trouble that all human beings have: we fall in love with our hunches, and we really, really hate to be wrong. Tetlock describes an experiment that he witnessed thirty years ago in a Yale classroom. A rat was put in a T-shaped maze. Food was placed in either the right or the left transept of the T in a random sequence such that, over the long run, the food was on the left sixty per cent of the time and on the right forty per cent. Neither the students nor (needless to say) the rat was told these frequencies. The students were asked to predict on which side of the T the food would appear each time. The rat eventually figured out that the food was on the left side more often than the right, and it therefore nearly always went to the left, scoring roughly sixty per cent, but a passing grade. The students looked for patterns of left-right placement, and ended up scoring only fifty-two per cent, an F. The rat, having no reputation to begin with, was not embarrassed about being wrong two out of every five tries. But Yale students, who do have reputations, searched for a hidden order in the sequence. They couldnt deal with forty-per-cent error, so they ended up with almost fifty-per-cent error.

This shows that the whole political/economic system, even in its most "rationalized" forms, is warped by its reliance on so-called "experts". It would be interesting to see if experts are any better at *deciding what to do* than at *predicting what will happen*. Presumably experts can avoid certain elementary mistakes that non-experts make. But, I suspect that they suffer from certain systematic flaws of judgement just as they do in prediction. Anyway, even if it's only *prediction* that experts are so bad at, it's a big problem.

Maybe someday we can figure out a way to address this - though there will be resistance from "experts" of every stripe. I wonder if Philip Tetlock has ideas? Maybe this is why he's involved in the Social Change Project.

December 16, 2005

Latest news on the global warming front! The National Climatic Data Center just came out with information on the world's temperature from 1880 to 2005:



As you can see, 2005 is the second hottest year on record, second only to 1998. In 1998 there was an El Niño to blame for the heat; this year there was not! The above chart comes from here:

- Usha Lee McFarling and Miguel Bustillo, 2005 Vying With '98 as Record Hot Year, *Los Angeles Times*, December 16, 2005, figure by Leslie Carlson.

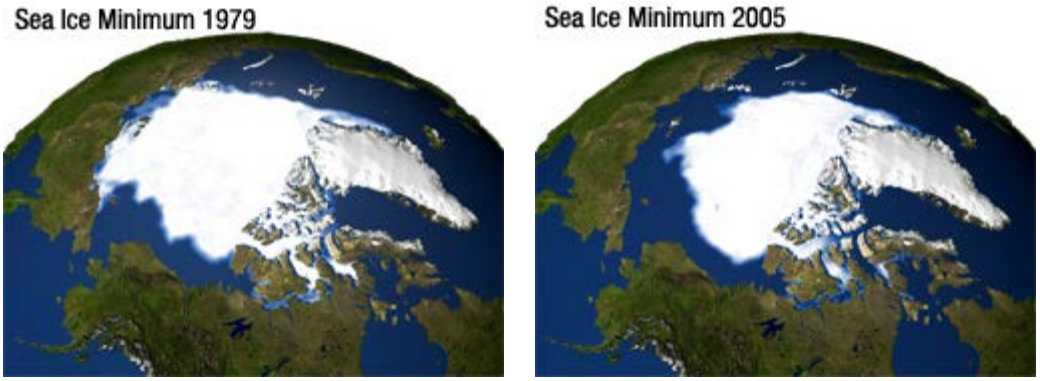
based on data from here:

- National Climatic Data Center, Climate of 2005 - in Historical Perspective, 2005.

What are the effects of this warming? For one thing, NASA has reported that since 1979, the Arctic ice cap has been melting at a rate of 8.5% per decade:

- NASA, Arctic sea ice continues to decline, arctic temperatures continue to rise in 2005.

You can watch a movie of the Arctic ice melting away!



In the summer we can now sail from Alaska all the way to Sweden. The Arctic ice cap may completely disappear sometime between 2050 and the end of the century:

- Linda Moulton Howe, 2005 Arctic summer ice melt - largest on record, interview with Mark Serreze.
- National Snow and Ice Data Center, Sea ice decline intensifies.
- Lindsay, R. W., and J. Zhang, The thinning of Arctic sea ice, 1988-2003: Have we passed a tipping point?, to appear in the *Journal of Climate*.

The last article studies the "ice-albedo feedback loop": less ice means the Arctic is less white, so it absorbs more sunlight, which warms the water and melts more ice. The authors write:

> The late 1980s and early 1990s could be considered a tipping point during which the ice-ocean system began to enter a new era of thinning ice and increasing summer open water because of positive feedbacks. It remains to see if this era will persist or if a sustained cooling period can reverse the process.

December 18, 2005

There's a fun, slightly fluffy article in *Wired* magazine about why high oil prices are good for us:

- Spencer Reiss, Why $5 gas is good for America, *Wired*, Issue 13.12, December 2005, pp. 238-247.

The basic idea is that having oil prices go up *sooner*, rather than *later*, gives us more time and more incentive to develop new energy technologies. He describes technologies that might become profitable as fuels for vehicles when the long-term price of oil reaches:

- $20-$30 / barrel - ultradeep offshore wells, gas to liquid, tar sands.
- $30-$70 / barrel - natural gas, coal to liquid, biodiesel.
- $70 / barrel and up - methane hydrates, hydrogen, electricity.

Of course hydrogen and electricity aren't sources of energy, just methods of delivering it. You'll notice that all the energy *sources* listed here contribute to global warming. In terms of the global reserves, the biggest ones on the list are tar sands (the equivalent of 4.3 trillion barrels of oil) and methane hydrates (the equivalent of 72 *quadrillion* barrels of oil). It would be interesting, and probably scary, to estimate the effects on the global climate of burning all this stuff!

If you've never heard of methane hydrates, read my August 29, 2004 entry on the Permian-Triassic extinction. Briefly, they're a methane-ice mixture that lines the sea floor in northern latitudes. There's *huge amounts of this stuff:* there's twice as much carbon in this form than in all other fossil fuels on Earth. Occasionally the gas gets released and rises to the atmosphere in a catastrophic "methane burp". Such an event may have caused a mass extinction 55 million years ago.

So, we have to be a wee bit careful when mining methane hydrates. But I'm a lot less worried about causing a methane burp by mining this stuff than the effect of burning it all and causing global warming that goes way beyond what we're seeing now. Such drastic warming could trigger a repeat of the Younger Dryas event, or even - yes - a methane burp!

Solar power, anyone? Nuclear energy? Energy conservation?

December 31, 2005

On Christmas day, Lisa and I went to Arizona with friends. We did a lot of hiking, and returned on New Year's Eve. We learned a lot about the Navajo and Hopi, and learned some lessons about the economic struggles of aboriginal peoples. I wrote a little photo essay about this trip.

On the Hopi tribe website, they write:

> The Hopi emerged from the Third World into this current Fourth World. This life is therefore referred to as the Fourth Way of Life for the Hopi. Hopi knew that life in this fourth world would be difficult and that we must learn a way of life from the corn plant.

It's a new year! So, I'll end this year's diary here, and continue in 2006.

For my 2006 diary, go here.

The destiny of our species is shaped by the imperatives of survival on six distinct time scales. To survive means to compete successfully on all six time scales. But the unit of survival is different at each of the six time scales. On a time scale of years, the unit is the individual. On a time scale of decades, the unit is the family. On a time scale of centuries, the unit is the tribe or nation. On a time scale of millennia, the unit is the culture. On a time scale of tens of millennia, the unit is the species. On the time scale of eons, the unit is the whole web of life on our planet. - Freeman Dyson

baez@math.removethis.ucr.andthis.edu

home

For my 2005 diary, go here.

Diary - 2006

John Baez

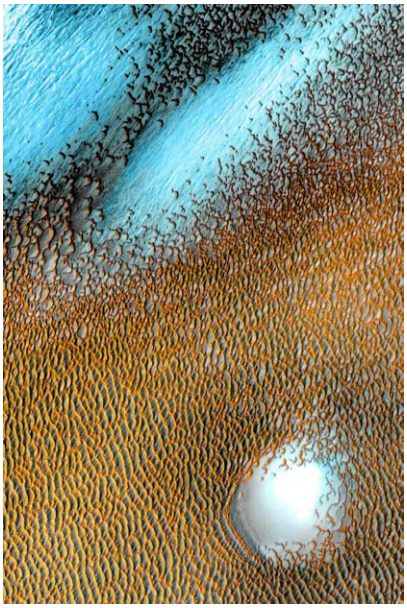
March 27, 2006

It's been a long time since I've written anything in my economics diary. Too busy, I guess. I've also been wanting to change the format of this diary a bit....

For some reason I don't completely understand, I've been thinking a lot about *ice*, from ice floes in the Arctic:

to the Ross ice shelf in Antarctica:

to the frosty dunes of Mars:



I made the more impressionistic pictures above by messing with some photos... a bit of art therapy to help delve into my obsession.

I'm not sure where this interest in ice came from - I don't get this way every winter! I guess I've been feeling cold, both literally and metaphorically, influenced by the chilly feel of some songs on Bowie's album *Heathen*, which I recently started listening to.

Like this, from the song *The Rays*:

> Steel on the skyline
> Sky made of glass
> Made for a real world
> All things must pass

written in New York *before* September 11th, 2001. Maybe I was also influenced by the recent news on global warming, which makes ice into yet another endangered species. I don't know! But the recent news at least gives me an excuse to talk about ice:

> **CLIMATE CHANGE:**
> **A Worrying Trend of Less Ice, Higher Seas**
>
> Richard A. Kerr
> *Science*, March 24, 2006
>
> Have an urge lately to run for higher ground? That would be understandable, given all the talk about the world's ice melting into the sea. Kilimanjaro's ice cloak is soon to disappear, the summertime Arctic Ocean could be ice-free by century's end, 11,000-year-old ice shelves around Antarctica are breaking up over the course of weeks, and glaciers there and in Greenland have begun galloping into the sea. All true. And the speeding glaciers, at least, are surely driving up sea level and pushing shorelines inland.
>
> Scientists may not be heading for the hills just yet, but they're increasingly worried. Not about their beach houses being inundated anytime soon; they're worried about what they've missed. Some of the glaciers draining the great ice sheets of Antarctica and Greenland have sped up dramatically, driving up sea level and catching scientists unawares. They don't fully understand what is happening. And if they don't understand what a little warming is doing to the ice sheets today, they reason, what can they say about ice's fate and rising seas in the greenhouse world of the next century or two?
>
> That uncertainty is unsettling. Climatologists know that, as the world warmed in the past, "by some process, ice sheets got smaller," says glaciologist Robert Bindschadler of NASA's Goddard Space Flight Center (GSFC) in Greenbelt, Maryland. But "we didn't know the process; I think we're seeing it now. And it's not gradual." Adds geoscientist Michael Oppenheimer of Princeton University, "The time scale for future loss of most of an ice sheet may not be millennia," as glacier models have suggested, "but centuries."
>
> The apparent sensitivity of ice sheets to a warmer world could prove disastrous. The greenhouse gases that people are spewing into the atmosphere this century might guarantee enough warming to destroy the West Antarctic and Greenland ice sheets, says Oppenheimer, possibly as quickly as within several centuries. That would drive up sea level 5 to 10 meters at rates not seen since the end of the last ice age. New Orleans would flood, for good, as would most of South Florida and much of the Netherlands. Rising seas would push half a billion people inland. "This is not an experiment you get to run twice," says Oppenheimer. "I

find this all very disturbing."

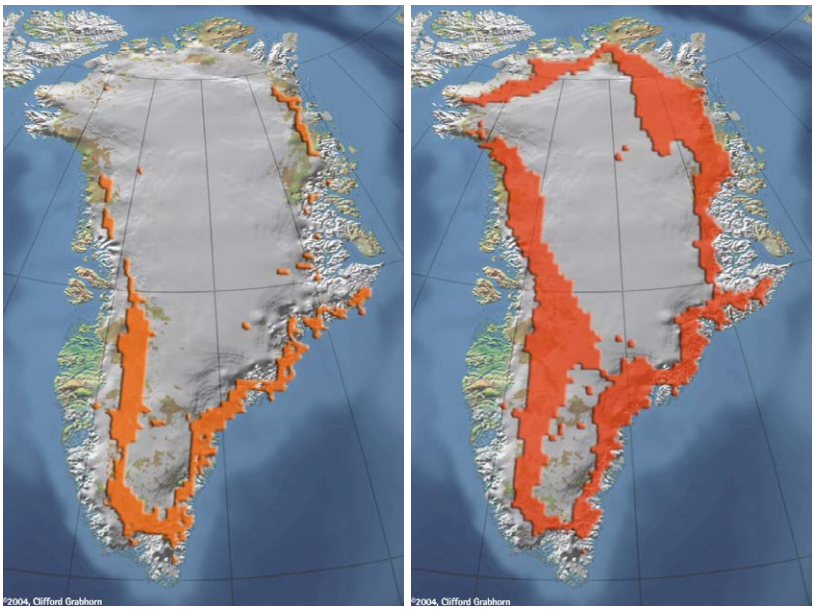
Much of the world's ice may be shrinking under the growing warmth of the past several decades, but some ice losses will have more dramatic effects on sea level than others. Glaciologists worried about rising sea level are keying on the glaciers draining the world's two dominant ice reservoirs, Greenland and Antarctica. Summertime Arctic Ocean ice may be on its way out, but its melting does nothing to increase the volume of ocean water; that ice is already floating in the ocean. The same goes for floating ice shelves around Antarctic. The meltwater from receding mountain glaciers and ice caps is certainly raising sea level, but not much.

The truly disturbing ice news of late is word that some of the ice oozing from the 3-kilometer-thick pile on Greenland has doubled its speed in just the past few years. In the 17 February issue of *Science*, for example, radar scientists Eric Rignot of the Jet Propulsion Laboratory in Pasadena, California, and Pannir Kanagaratnam of the University of Kansas, Lawrence, analyzed observations made between 1996 and 2005 by four satellite-borne radars. These synthetic aperture radars measure the distance to the surface during successive passes over a glacier. The changing distance can then be extracted by letting successive observations form interference patterns. The changing distance, in turn, translates to a velocity of the ice toward the sea.

In central east Greenland, Kangerdlugssuaq Glacier more than doubled its speed from 2000 to 2005, Rignot and Kanagaratnam found, from 6 kilometers per year to 13 kilometers per year. That made it the fastest in Greenland. To the south, Helheim Glacier accelerated 60%. And on the west of Greenland, Jakobshavn Isbrae almost doubled its speed between 1996 and 2005. The accelerations are "actually quite surprising," says glaciologist Julian Dowdeswell of the University of Cambridge in the United Kingdom. Even at its slower speed, Jakobshavn had ranked as one of the fastest-flowing glaciers in the world, perhaps the fastest; now it's just one of the pack.

As glaciers draining the Greenland Ice Sheet are picking up speed, researchers are realizing that nothing has made up for the increased loss of ice. Greenland's pile of ice is getting smaller. How much smaller is still being debated, if only because of the vast scope of an ice sheet. What goes out through glaciers is just one part of the equation: Ice sheets also lose mass by melting and gain it from snowfall. To gauge those gains and losses, Rignot and Kanagaratnam used previously published estimates of how the warming climate over Greenland has increased meltwater losses and slightly increased snowfall, making for a growing net loss in addition to the glacier flow. All told, the scientists find that the loss of mass from Greenland doubled from 1996 to 2005, reaching 224 ± 41 cubic kilometers per year. Los Angeles uses 1 cubic kilometer of water per year.

You can see Greenland melting here, from 1992 to 2002:



These charts are taken from:

- Arctic Council, *Impacts of a Warming Climate: Arctic Climate Impact Assessment*, Cambridge U. Press, Cambridge, 2004.

So, ironically, it could be the melting ice that makes me feel cold. Somehow this has made me want to change the title of this diary from "Economics" to simply "Diary". The focus on economics has already been a bit of a straitjacket for some time now: I keep spilling over into ecology, biotech, and so on... and I want the freedom to do that without reaching for some relevance to economics.

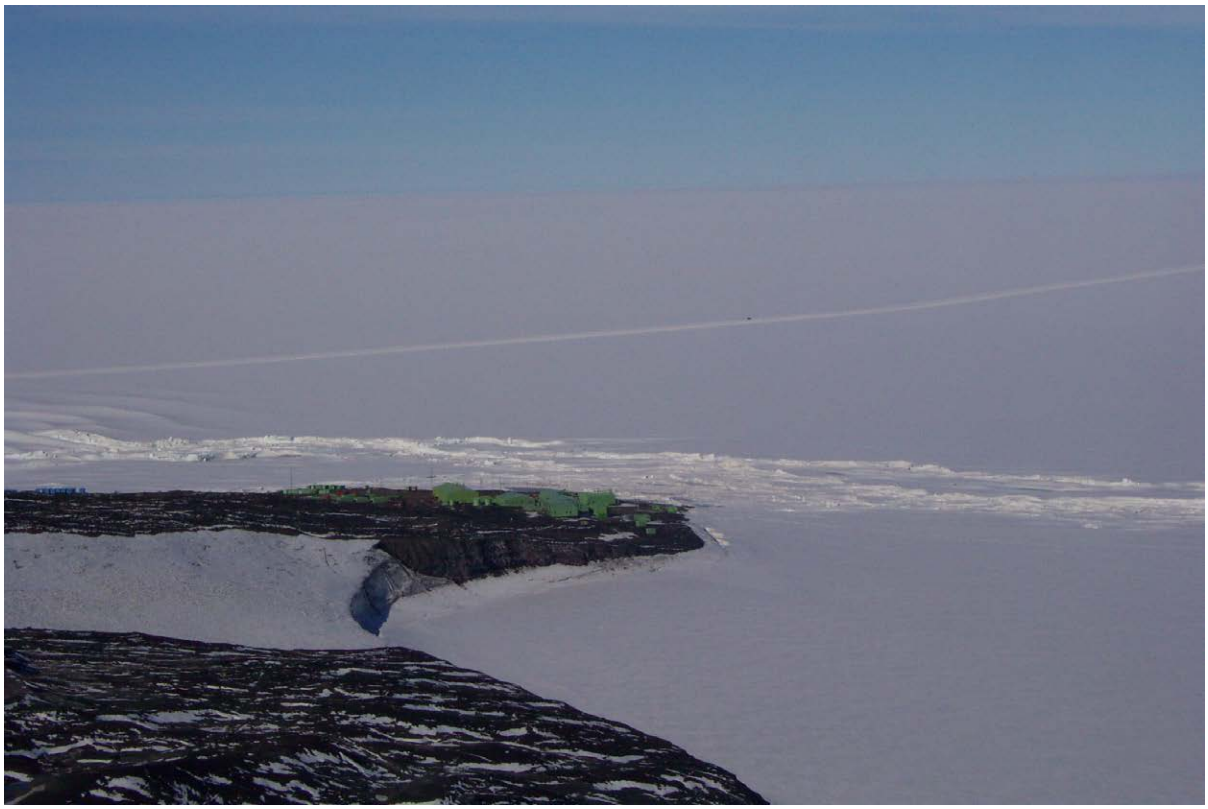
So, now it's just a diary. We'll see where it goes.

April 4, 2006

I'm at the University of Chicago now, visiting the math department until May 15th. There are lots of people working on n-categories here, mostly associated with Peter May. I'm giving some lectures here next weekend, as part of a conference in memorial of Saunders Mac Lane, one of the founders of category theory and a Chicago man through and through.

I got an email from Adrian Burd, who wasn't completely enthralled by my abstract expressionist massaging of that photo of the Ross Ice Shelf. He gave me the nice photo below:

> As an ex-cosmologist turned oceanographer I've followed your "This Weeks Finds" pages for many years. I recently came across your diary outlining your recent obsession with ice on which there's a fuzzy photo of the Ross Ice Shelf. Having just returned from there, I thought you might be interested in this one that I took in January.



It's from the top of Observation Hill looking down on the New Zealand base (Scott Base) and up the ice shelf. You can see the nice pressure ridges near Scott Base. The long straight line is a "road" heading out to Pegasus airstrip.

Please feel free to use the photo if you so wish.

All the best,
Adrian

This started an interesting email exchange where Adrian Burd answered some questions I had. Here's a slightly edited version of his next email:

Dear John,

```
> Cool!  What sort of oceanography were you doing down there in Antarctica?
```

I was part of an NSF run field course. The group of people who work in the poles in oceanography (and in other sciences) tend to form a tight knit group and it's hard to inject new blood. So the course introduces about 20 grad students, postdocs and junior faculty to working in the Antarctic and gives them practical experience there - dealing with issues such as what is and us not feasible, the mountains of paperwork involved, the scheduling of helicopter time and the procedure for writing grants for Polar Programs which differs somewhat from a regular NSF proposal. It's a unique environment and the problems of doing science there make it a challenge. We also did a lot of fun science. We had the first automated DNA sequencer on the continent, so the gene jocks were sequencing everything that moved (or not, as the case may be). We were able to collect some unique data sets from the microbial communities on Bratina Island. So all in all, a crazy, exhausting but incredibly fun enterprise.

Curiously, on the C-17 flight out I sat next to a guy from CalTech who was heading to the South Pole to work on the new telescope there. So we were able to have a good long chat (more a shout to get above the noise of the C-17 that is) about the state of cosmology today. Although I dip into the journals and keep up through reading sites like yours, there's a great deal I've been missing. There were also folks passing

through to work on the Ice Cube, so I was able to catch up on that aspect of things as well.

```
>> I recently came across your diary outlining your
>> recent obsession with ice on which there's a fuzzy photo
>> of the Ross Ice Shelf.

> It took me a long time to process the photo so it became that
> fuzzy - I was aiming for something between impressionism and
> abstract expressionism.
```

Ah, I see, I misunderstood. Standing on Ross Island and looking up the Ross Ice Shelf is quite an amazing experience; particularly when you have an inkling for the scale of the place.

All the best,
Adrian

And the next:

Hi John,

```
> Pretty weird, going to Antarctica to sequence genes!
```

We only sequenced microbial genes, looking into the microbial diversity in different environments. With modern day equipment, one can sequence genes just about anywhere. The course itself was written up for the Antarctic Sun (the local paper at McMurdo) under the headline " The Mother of All Field Trips".

There are some interesting mathematical problems associated with gene reconstruction from the experimentally derived PCR sequences. Sadly, I don't think too many practicing geneticists are aware of them, or the issues they raise. I see too many phylogenetic trees in talks without any hint given as to the uncertainty in the tree.

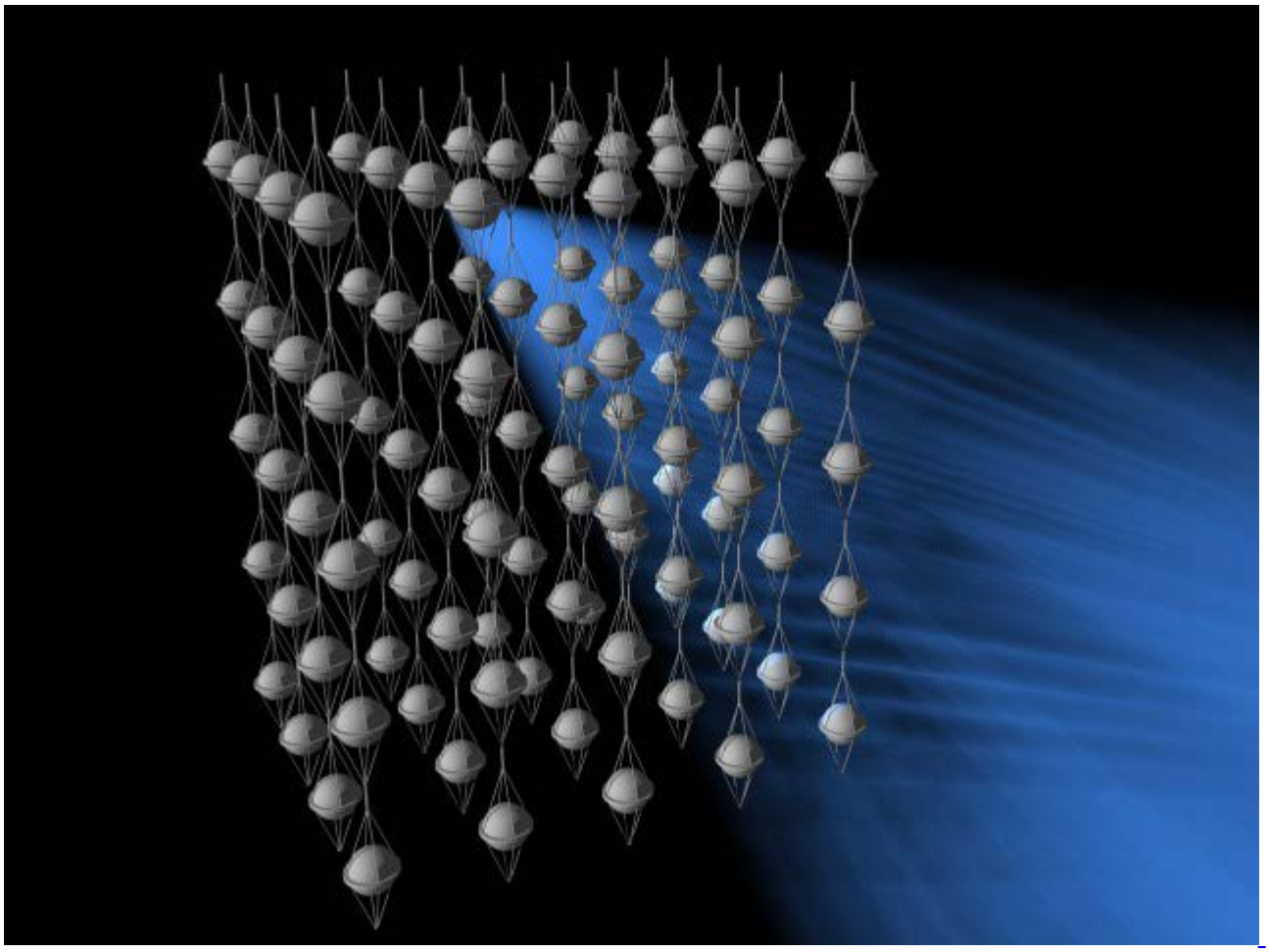
```
>> There were also folks passing through to work on the Ice Cube,
>> so I was able to catch up on that aspect of things as well.

> Hmm, I forget what that detector is supposed to do, and where it is.
```

It's located at the South Pole station and will detect high energy neutrinos. It will take a while before coming on-line since it will take a while to drill the large number of cores required for a 1 cubic km detector! A nice write up on progress as of the end of the season can be found in the Antarctic Sun.

The Antarctic Sun is a neat newspaper since it keeps everyone in touch with what is going on. That way, support staff like helo-techs can learn what the folks they are helping out are actually doing, as well as keeping other scientists informed.

All the best,
Adrian

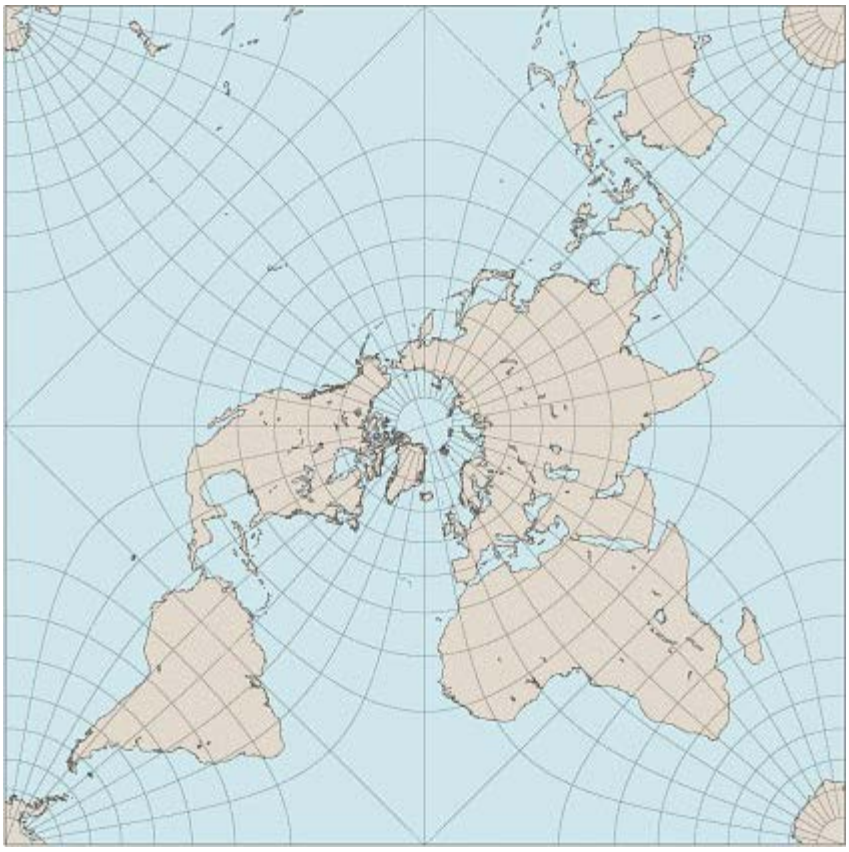
Here's what the IceCube will look like... if you could see it:



Cerenkov light passing through the IceCube neutrino detector
Steve Yunck/NSF

April 15, 2006

My math lectures are over - whew! An intense and exhausting conference. I recovered by writing up some stuff about math in week229, all related to the amazing properties of this map of the world invented by the philosopher C. S. Peirce, the founder of "pragmatism":



I often wish I could spend all my spare time (when I'm not teaching) writing This Week's Finds - it's one of the truly unalloyed pleasures of life for me. But, if I did it all the time, it would somehow become a "job" and be less fun. The tricks of the mind.

I'm all jazzed up today, because yesterday Stewart Brand invited me to give a talk in San Francisco on October 13th as part of his Seminars About Long-Term Thinking. This is a series of talks sponsored by the Long Now Foundation, which seeks to extend our horizons from the next quarterly report to the next 10,000 years, to foster a more sane approach to life.

As Brand puts it:

> Civilization is revving itself into a pathologically short attention span. The trend might be coming from the acceleration of technology, the short-horizon perspective of market-driven economics, the next-election perspective of democracies, or the distractions of personal multi-tasking. All are on the increase. Some sort of balancing corrective to the short-sightedness is needed-some mechanism or myth which encourages the long view and the taking of long-term responsibility, where 'long-term' is measured at least in centuries. Long Now proposes both a mechanism and a myth. It began with an observation and idea by computer scientist Daniel Hillis:
>
> > "When I was a child, people used to talk about what would happen by the year 2000. For the next thirty years they kept talking about what would happen by the year 2000, and now no one mentions a future date at all. The future has been shrinking by one year per year for my entire life. I think it is time for us to start a long-term project that gets people thinking past the mental barrier of an ever-shortening future. I would like to propose a large (think Stonehenge) mechanical clock, powered by seasonal temperature changes. It ticks once a year, bongs once a century, and the cuckoo comes out every millennium."
>
> Such a clock, if sufficiently impressive and well engineered, would embody deep time for people. It should be charismatic to visit, interesting to think about, and famous enough to become iconic in the public discourse. Ideally, it would do for thinking about time what the photographs of Earth from space have done

> for thinking about the environment. Such icons reframe the way people think.
>
> Hillis, who developed the 'massive parallel' architecture of the current generation of supercomputers, dev ised the mechanical design of the Clock and is now building the second prototype (the first prototype is on display in London at the Science Museum). The Clock's works consist of a binary digital-mechanical system which is so accurate and revolutionary that we have patented several of its elements. (With 32 bits of accuracy it has precision equal to one day in 20,000 years, and it self-corrects by 'phase-locking' to the noon Sun.) For the way the eventual Clock is experienced (its size, structure, etc.), we expect to keep proliferating design ideas for a while. In 01999 Long Now purchased part of a mountain in eastern Nevada whose high white limestone cliffs may make an ideal site for the ultimate 10,000-year Clock. In the meantime Danny Hillis and Alexander Rose continue to experiment with ever-larger prototype Clocks.
>
> Long Now added a "Library" dimension with the realization of the need for content to go along with the long-term context provided by the Clock - a library of the deep future, for the deep future. In a sense every library is part of the 10,000-year Library, so Long Now is developing tools (such as the Rosetta Disk, the Long Viewer and the Long Server) that may provide inspiration and utility to the whole community of librarians and archivists. The Long Bets project - whose purpose is improving the quality of long-term thinking by making predictions accountable - is also Library-related.
>
> The point is to explore whatever may be helpful for thinking, understanding, and acting responsibly over long periods of time.
>
> -Stewart Brand

I'll give a talk called *Zooming Out In Time*, based on my studies of climate change, mass extinctions and the long term history and future of the universe. Brand says he wants cool graphics and a mind-blowing talk. So, I have to start thinking about it. It should be fun! But I have to figure out the overarching message - a talk should always be about one thing - while packing the talk with fun stuff.

April 16, 2006

The title of my talk *Zooming Out In Time* is a double entendre. On the one hand, I want to show how science is letting see the history of the universe ever more clearly, so we can now *zoom out in time* and understand processes on scales of 10 years, 100 years, 1000 years, 10000 years, 100000 years and so on, like that wonderful movie *Powers of Ten*. On the other hand, I want to explain how we're broadening our perspective just barely *in time* to ameliorate certain crises like climate change and mass extinction.

I want to illustrate these ideas with four examples:

- Cultural memory loss - the burning of the library of Alexandria, the forgotten revolution in Greek science, the translation of Greek texts to various languages before they reached the Arabs and then medieval Western Europe, and the recent recovery of lost treasures at Oxyrhyncus and Herculaneum, and the discovery of the Archimedes Palimpsest.
- Climate change, past and present, including the Younger Dryas event, the danger of abrupt changes in the thermohaline circulation, maybe even stuff about Heinrich events.
- Mass extinctions, past and present.
- The posthuman future of the universe.

These examples will cover increasingly large time scales.

Ironically, I won't have time for all this... the talk should only last 45 minutes.

April 17, 2006

I'm staying on 61st St., near the University of Chicago but just south of the "Midway" - a strip of land and roads separating the "okay" part of Hyde Park from the "bad" part - the part where everyone tells you not to walk in at night. So, I'm in the "bad" part, but right on the edge - so every night I try to make it all the way back home before someone mugs me. It is deserted and somewhat spooky - so deserted that I hope no mugger is sufficiently patient to wait there for someone to mug.

When I walk to the University in the morning everything looks more benign... especially because it's *spring!* When I first arrived, on April Fool's Day, it was quite cold. Since then it's warmed up. At first the forsythia bushes looked like dead sticks. But soon they had leaves and yellow blossoms, and now, each day as I walk to school, their leaves and blossoms grow visibly bigger! Nature is full of life, irrepressible.

Alas, I heard today on the morning radio news that sea bird populations have crashed in the Pacific Northwest:

- Deirdre Kennedy, Disappearing birds may point to bigger problems, *Morning Edition*, National Public Radio, April 17, 2006.
- The Sea Duck Joint Venture.
- Lynn La, Bird populations declining in Puget Sounds, *The California Aggie*, March 1, 2006.

It may be related to global warming: the upwelling of cold water in the Pacific didn't happen in the usual way last year, so there wasn't as much plankton as usual, and everything that feeds on them suffered. For example, there was a 20-30% drop in the population of salmon, and 5 to 10 times as many dead birds washed up on beaches from central California to British Columbia:

- Glen Martin, Sea life in peril - plankton vanishing: usual seasonal influx of cold water isn't happening, *San Francisco Chronicle*, July 12, 2005.
- Carina Stanton, Warmer oceans may be killing West Coast marine life, *Seattle Times*, July 13, 2005.

But, apparently this doesn't explain a longer-term population decline among sea ducks. Over the last decade, for example, the number of grebes has dropped by a factor of 10!

I wish I could find more detailed in information on how ocean currents are changing, and how this is affecting ocean life. Here's a related item I mentioned on November 4, 2004:

- Angus Atkinson, Volker Siegel, Evgeny Pakhmonov and Peter Rothery, Long-term decline in krill stock and increase in salps within the Southern Ocean, *Nature* **432** (November 4, 2004), 100-103.

In the southwest Atlantic there's been an 80% drop in krill population since 1979, apparently because there are 30 fewer days of sea ice near the Antarctic Peninsula, on average, and it only gets cold enough for them to breed every three years or so these days. Krill are near the bottom of the food chain there, so this is a big deal even if you don't love teeny crustaceans: no krill, no whales - and a lot fewer penguins, too. The krill population outweighs the world's human population!

But I digress. I wonder how the Antarctic ocean upwellings are changing, and how this is affecting things. It's all part of the "Great Ocean Conveyor Belt".

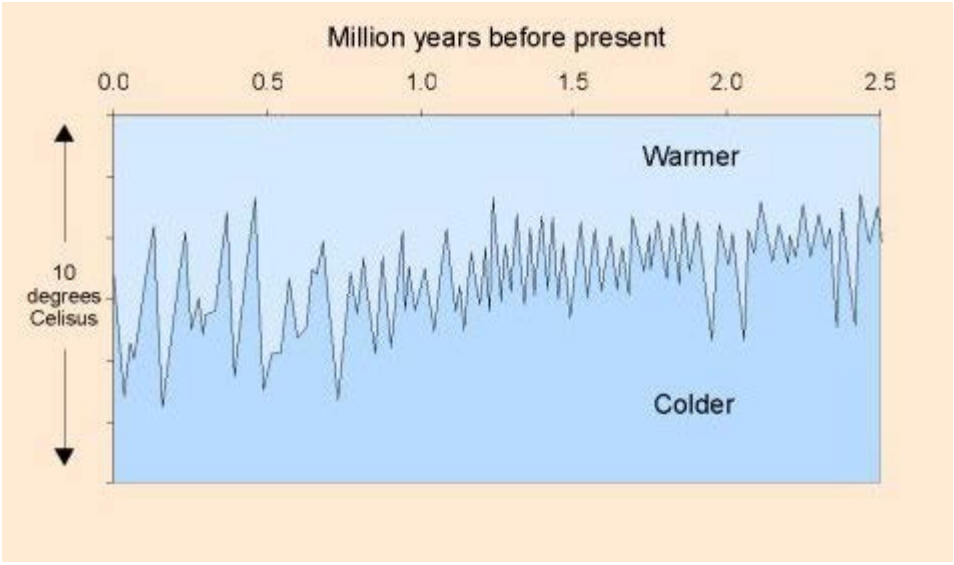
In a secretly related story, the radio played an interesting interview with Kevin Phillips about how America's dependence on oil is affecting foreign policy:

- Kevin Phillips and Steve Inskeep, America under the influence of oil, *Morning Edition*, National Public Radio, April 17, 2006.

April 18, 2006

I've been reading a bit about "Snowball Earth" - an attempt to explain what may be *really serious* ice ages in the Cryogenian Period of the Neoproterozoic Era, between 800 and 550 million years ago. It seems that least twice, glaciers extended almost to the equator and most of the Earth's oceans were covered with ice! How could this happen, what was its effect on life, and how did we ever get out of it?

- How could this happen? There could have been a runaway "ice albedo effect". This is the feedback loop where the colder it gets, the more ice there is, so the more sun gets reflected back out of the atmosphere, so... the colder it gets! The reverse feedback loop is happening now as glaciers melt and the Earth heats up. It's a basic instability in the climate system. It may be exacerbating the erratic climate changes the Earth has experienced in the last 1.8 million years ago - the "glacials" that normal folks call "ice ages":



  The real puzzle is what *stabilizes* the climate system! Some drastic effect may have occured to heat up the Earth after each brutal ice age in the Proterozoic - more on that later.

- What was its effect on life? In the 1960s, Martin Rudwick and Brian Harland theorized that it triggered the rise of multicellular animal life! The body plans of nearly all living animals appeared between 600 and 525 million years ago, perhaps near the end of Earth's days as a big fat snowball. According to Hoffman and Schrag,

A series of global "freeze-fry" events would cause population "bottlenecks and flushes", observed to accelerate evolutionary rates in some species. The crash in population size accompanying a global glaciation would be followed by millions of years of comparative genetic isolation in high-stress environments. This is a favorable scenario for genomic reorganization and the evolution of new body plans. Finally, repopulations following each glaciation would occur in transient selective environments quite different from those preceding the glaciation, favoring the emergence of new life forms.

- How did we ever escape from Snowball Earth? The ice-albedo feedback loop may only have been broken when the lack of running water diminished weathering of rock - a process that uses up carbon dioxide - to the point where enough CO_2 built up to cause a serious greenhouse effect. Unusual carbonate rock formations support this theory. The change from cold to hot could have been quite drastic. Hoffman and Schrag write "Calculations by Raymond Pierrehumbert at the University of Chicago suggest that tropical sea-surface temperatures would reach almost 50 degrees Celsius in the aftermath of a "snowball" Earth, driving an intense hydrologic cycle. Sea ice hundreds of meters thick globally would disappear within a few 100s of years.". Hence the "freeze-fry" scenario mentioned above.

Of course all this is a bit speculative, since fossil and other records of the Proterozoic aren't so great - it was a long time ago! But, the "Snowball Earth" theory does seem to explain lots of anomalies. For more, try these:

- Paul F. Hoffman and Daniel P. Schrag, The Snowball Earth.
- Wikipedia, Snowball Earth.
- David Archer, Who threw that snowball?, *Science* **302** (October 2003), 791-792.

Since you can only access the last one if you have a subscription, I'll quote a bit:

> The overall stability of Earth's climate is generally attributed to a balance between degassing of CO_2 from deep within Earth, and consumption of CO_2 by weathering reactions at Earth's surface. Urey wrote the reaction as:
>
> $$CaSiO_3 + CO_2 \underset{\text{weathering}}{\overset{\text{metamorphosis}}{\rightleftharpoons}} CaCO_3 + SiO_2$$
>
> where the left-hand side is favored at the high temperatures of Earth's interior and the right-hand side is favored in the cool, wet conditions at Earth's surface. Walker *et al* proposed that the rate of weathering should depend on temperature and the intensity of the hydrological cycle, which in turn depend on the partial pressure of CO_2 in the atmosphere, pCO_2.The latter adjusts such that the CO_2 sources and sinks balance. If the Sun warms up, weathering accelerates, consuming more CO_2 until Earth's surface cools back down. The time scale of Walker *et al*.'s thermostat is ~500,000 years.
>
> This thermostat appears to have broken down during Snowball Earth. The Snowball Earth hypothesis is based on geological evidence of multiple glaciations at sea level in low latitudes. The glaciation deposits are accompanied by "banded iron formations," which appear to mark the oxidation of an iron-rich anoxic ocean. They are overlain by caps of mineralogically peculiar $CaCO_3$ deposits that resemble abiotic precipitates from a highly supersaturated ocean.
>
> The leading explanation for the Snowball is a runaway ice-albedo feedback. When ice sheets reach some critical latitude, they reflect so much solar energy back into space that the entire planet freezes over. In the frozen world, weathering stops. Hydrothermal iron becomes more abundant than weathering sulfur in the anoxic ocean, generating the first banded iron formations on Earth in 1000 million years. Ultimately,

Walker *et al.*'s thermostat overcomes the ice albedo, because CO_2 degassing from Earth's interior drives atmospheric pCO_2 upward. The ice melts abruptly, transforming Earth into a hothouse, which the thermostat eventually ameliorates. In the process, weathering consumes large amounts of CO_2, generating the cap carbonates.

There were two to four snowball glaciations during the Neoproterozoic. Why did the thermostat break repeatedly during this interval, but not at any other time? Ridgwell *et al.* have identified a mechanism that may help to answer this question. To understand their idea, we need to consider a second feedback mechanism in the carbon cycle: $CaCO_3$ compensation.

The balance this time is between weathering of $CaCO_3$ and its burial in the ocean. The homeostat switch is the pH of the ocean. $CaCO_3$ is a base and dissolves in acid. If the rate of weathering exceeds that of burial, the ocean becomes more basic, enhancing burial until the two fluxes balance. $CaCO_3$ compensation operates more quickly than Walker *et al.*'s thermostat; under today's conditions the time scale is about 10,000 years. Ridgwell *et al.* have identified a mechanism by which $CaCO_3$ compensation might have gone awry, drawing down enough CO_2 to explain the descent into the Snowball state.

April 19, 2006

You may think my diary is depressing: global warming, dead ducks, Snowball Earth... but in fact, I'm getting pretty optimistic. History seems to show that life is wonderfully resilient. After each mass extinction or disaster, it springs back better than ever! For example:

- When cyanobacteria first invented photosynthesis about 3.5 billion years ago, oxygen was a poisonous gas: life was unable to handle it! Life had to adapt or die... and it adapted. Now we breathe oxygen.
- Life almost froze during Snowball Earth, but the selection pressure may have triggered the rise of multicellular animals!
- Each of the five classic mass extinctions led to the rise of new life forms... most famously, the demise of the dinosaurs seems to have let mammals rise to their current prominence.

So, the mass extinction we *humans* are causing may also lead to good results we can't imagine now.

The interesting question is whether we'll be around to see them.

I think the answer is: we're too destabilizing to last for long in our current form. We'll either die out, move out, or transform into something different.

(The last two could both happen, in principle.)

April 22, 2006

Oil gossip seen on Bruce Sterling's blog:

Oil: The Party Is Over

By Gwynne Dyer
GBN Global Perspectives

Welcome to the world of $70-per-barrel oil. That's if there is no crisis in the Gulf over Iran's nuclear ambitions. If there is, then get ready for $140 a barrel. Oil briefly breached the $70 barrier eight months

ago, but this time it is going up for good.

Exactly one year ago the investment bank Goldman Sachs put out a paper suggesting that the "new range" within which oil prices will fluctuate is $50-$105 per barrel. (The old range, still used by most of the oil industry when deciding if a given investment will be profitable, was $20-$30.) The price could surge well past the upper end of the Goldman Sachs range if the United States actually does launch military strikes against Iran, but it's going up permanently anyway.

Whatever his longer-term plans, President Bush is unlikely to attack Iran before the mid-term Congressional elections in November, for three of the last four global recessions were triggered by a sharp rise in the oil price. But even without a Gulf crisis, the oil price will only stabilise at a price a good deal higher than now, because the major players in the market understand the long-term trends.

Transient events like the Iran crisis and the political unrest in Nigeria (which has cut that country's exports by a quarter) drive the daily movements in the oil price, but the underlying supply situation is so tight that oil would stay high even if Nigeria turned into Switzerland and Iran opted for unilateral disarmament. "On production, there is nothing we can do. [OPEC, the Organisation of Petroleum Exporting Countries, is] already producing at maximum output," said Abdullah al-Attiyah, Qatar's Oil Minister.

This is not about "peak oil," the notion that we are already at or near the point where total global oil production reaches its maximum and begins a long decline. That may well be true, but the present price rise is just about rising demand for oil as the big developing countries, especially the Asian ones, lift large parts of their populations into the middle class.

Middle-class people buy cars. They also run their air conditioners all summer, and take holidays abroad, and do other things that have big implications for total energy consumption, but above all they buy cars. For the foreseeable future most of the cars they buy will run on some form of refined oil.

The rising demand that drives the oil price up does not just come from the middle-class Americans (and, increasingly, Europeans) who insist on driving enormous SUVs with macho names like 'Raider', 'Devastator', and 'Genocidal Exterminator'. It also comes from the new middle class of unassuming Chinese, Indian, Russian and Brazilian families who only want a modest family car for the school run and the weekend. ¨There are just so many of them. This is the first big price rise that has been caused by rising demand rather than some temporary interruption of supply.

Goldman Sachs also predicted last year that in twenty years' time there will be more cars in China than in the United States -- about 200 million of them. Ten years after that, India's car population will also overtake America's. Within twenty years Russia and Brazil will each have more cars than Japan. We are headed for a billion-car world (unless all the wheels fall off first), and that means permanently high oil prices.

Good. If the oil price rises gradually from $70 to $100 over the next five years, people and governments will start paying serious attention to energy conservation and alternate energy sources (including nuclear energy). ¨The sooner that happens, the less extreme the global warming that we will have to contend with as the century progresses. But if the oil price leaps to $100 or more in one swift jump we will have the mother of all recessions, and then there will be a desperate shortage of funding for developing alternative sources of energy.

[....]

April 23, 2006

I just spent a nice day on a tour of historic buildings of Chicago with Thomas Fiore and his wife. I guess Chicago was a boomtown in the late 1800's, so they started building the world's tallest buildings, some of them quite beautiful....

Did you know I'm going to run for President in 2024? I'm not! But, you can still buy a campaign T-shirt. And while you're at it, visit the myspace.com page that some joker set up in my name. I asked them to take it down, but they didn't... so, I might as well enjoy it. Some of my "friends" look pretty shady, but I won't let that stand in my way. After having been Geek of the Week, nothing short of the leading the world's only hyperpower will sate my ever-growing ambition.

Addendum as of December 26, 2006 - Yay! That myspace.com page is gone now!

April 28, 2006

Coyotes are settling into the suburbs of Washington DC:

- Mary Battiata, Among us, Washington Post, April 16, 2006.

Quoting a bit:

> There was a paradox in all this. Over the past 20 years, residents of suburban Washington had become accustomed to living amid ever-growing herds of azalea-stripping deer, flocks of lawn-fouling and territorial Canada geese, as well as raccoon and squirrel populations far more dense than they would be in rural areas. But coyotes were something different: medium-size predators, with a wolf-like appearance and a reputation for wiliness, who seemed to stir a primal fear of wolves that came to this continent with European settlement. [...]
>
> Washington is the last major metropolitan area in the country to be colonized by coyotes. They arrived in Maryland and Virginia about 20 years ago, after expanding their range into every part of the continental United States except the southernmost tip of Florida. (They showed up there about five years ago.) By 2004, when coyotes first were sighted in Rock Creek Park, large populations already were ensconced in suburban Westchester County, outside New York City, as well as Boston, Nashville, Phoenix, Houston and elsewhere. Last month, a coyote on the loose in Central Park, at the latitude of 66th Street, made headlines -- "Beep! Beep! Wily Coyote Captured." It was the second coyote to show up in Manhattan in recent years. In downtown Chicago, coyotes have been spotted trotting back and forth across Michigan Avenue. Outside Boston, the presence of coyotes has provoked a fierce debate in the state legislature about reintroducing leg-hold traps, currently banned as cruel and unnecessary. In California, coyotes have been a fact of urban life for decades. On the beaches of Santa Barbara, when bathers go into the water, coyotes come out of the brush to sniff beach towels.
>
> The coyote -- biological cousin of the wolf, fox and dog -- has roamed the Plains states for at least 15,000 years. The coyotes' outward migration began about a century ago. They moved east and west, filling the ecological vacuum left by human efforts to eradicate wolves from the lower 48 states. Coyotes expanded west first, toward California. Eastward expansion began a few decades later, along two routes, one due east and southeast, through the Gulf States, and the other northeast, into Canada, and eventually down into New England and along the East Coast. Wildlife biologists believe that the coyotes now showing up in the Washington area may be part of both eastward migrations: the smaller, Western coyotes -- 20 to 35 pounds -- of the due-east migration; and larger coyotes from the Canadian migration. Coyotes in this second group weigh 35 to 50 pounds, because of interbreeding with Canadian wolves.
>
> [...]
>
> Failing to show dominance toward a coyote is always a mistake, Boelens said. It undermines the coyotes' fear of humans and, with that, the urban coyote's best chance for peaceful coexistence with us. So now it was time for Boelens to go to work, to remind these coyotes that hanging around and staring at humans, even out of curiosity, was unacceptable behavior.
>
> He turned and looked directly at them. He raised his arms, widened his eyes. Then he ran toward them,

> arms over his head. Before he'd taken three steps, the coyotes hopped in place, and then took off, so silently and fluidly that they seemed to float over the open ground. Within seconds, they were gone.

I see coyotes sometimes when I walk back from work late at night. When I see more than one at a time, it's a bit scary. But the right thing to do is act big and tough and scare *them*... so they'll stay elusive and not get in trouble.

For my May 2006 diary, go here.

Sometimes it seems unlikely that a society as a whole can make wise choices. Yet there is no choice but to call for the "the recovery of the commons" - and this, in a modern world that doesn't quite realize what it has lost.... The commons is a curious and elegant social institution within which human beings once lived free political lives while weaving through natural systems. - Gary Snyder

baez@math.removethis.ucr.andthis.edu

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