

Global Warning

- The snows of Kilimanjaro are history.
- Polar bears are swimming in open wastes of ocean, looking for an ice floe; the sea ice that enabled them to hunt for seals is vanishing; polar bears face extinction.
- Coral reefs are bleaching, killed by, among other things, warming ocean temperatures.
- All the world's deserts are growing; all the world's jungles are shrinking. Yes, there is still burning of jungle for agriculture, but climate change now does its part, climate change much aggravated by that very burning of jungles.
- Coastal communities in Alaska are desperately considering moving inland as the shore erodes with alarming speed: ice sheets that used to hold the waves at a distance have vanished, storms are increasing in fury and the permafrost is melting. Not only are buildings collapsing into the mud all over the far north, but in these coastal areas, river banks that recently were frozen solid are melting and eroding under the ocean's assault.*
- We see images of glaciers calving faster and faster, the Antarctic ice sheet diminishing by the day. The Greenland ice sheet is bleeding water into the North Atlantic. This will lead, if it continues, to a slowed or stopped Gulf Stream and to astonishing rises in ocean levels that will inundate all the world's coastal areas. Added to the more-frequent, more-ferocious hurricanes, there are forecasts of devastation on our coasts that already have persuaded many people around here to invest in government flood insurance. However, if the warming continues and, as Al Gore's *An Inconvenient Truth* predicts, accelerates vastly, this inexorable sea-level rise of 25 or more feet could cover all of Long Island, leaving nothing to insure.



Are you worried yet? All these events are products of the "greenhouse effect." We all know the term, but just what is it?

In any greenhouse, the sun's light passes in through the glass and is converted to heat inside, which, being at a longer wavelength, is unable to escape by the way it came in and so warms the air in the greenhouse. Playing the role of the glass on earth are the "greenhouse gases" – predominantly carbon dioxide but including many others, such as methane, which is principally produced by natural sources like volcanoes, the digestive systems of cattle, and termites. Within reason, this process keeps the earth warm enough to sustain life or prevent us from slipping into an ice age. Out of control, it could have serious consequences. As ice cores taken up in Antarctica tell us, the earth in its history has been through repeated cycles of heat and cold whose causes are not well understood. The warming periods are always associated with increased carbon dioxide levels. However, our CO₂ has now risen to a higher concentration than at any time in the last 650,000 years or longer, and there is strong evidence that human actions are the reason.

A recent realization in the study of global warming has been the effects of positive feedback, or "feedback loops." This refers to the principle that having more of something often produces *much* more of it. The sea ice melts around the North Pole and the dark ocean (now clearly visible in satellite photos) absorbs solar radiation much more efficiently than the ice did, causing warming that causes melting of more sea ice, and so on. The melting of permafrost throughout the northern parts of the northern hemisphere is itself releasing CO₂ and methane, which enhance the warming, which melts more permafrost. In meadows that have warmed, flowers are replaced by sagebrush, which is slower at photosynthesis, using and trapping less CO₂ and, being darker, absorbing more heat. More CO₂ encourages faster-growing trees in forests, which lock up less carbon.** Feedback goes far to explain that astounding *acceleration* of the whole process that has only recently been detected.



Beside the effects of global warming, which are bad enough, there are some more direct effects of Earth's rising carbon dioxide levels that are equally disturbing. I used to feel relieved to hear that air pollution in places like the eastern end of Long Island was considerably alleviated by being absorbed into the surface of the ocean. At that time, the ocean was seen as having a near-unlimited capacity to do this absorbing, and nobody hinted that this patient huge body of water

might have its limits or be suffering irremediable harm. Now we learn*** that about half of the CO₂ produced on earth since 1900 has already found its way there, and maybe 90% of all that will be produced in the future will be so absorbed. The ocean has not been undamaged by this but has always before recovered in the next cycle. With carbon dioxide being added on an unprecedented scale, there may be unprecedented effects as the ocean's chemistry undergoes radical changes. It is called "ocean acidification," and it plays hob with all ocean dwellers that make shells or skeletons, almost everything except jellyfish. Coral reefs are feeling the stress worldwide, and episodes of bleaching, which can lead to death, are more common than ever. Thousands, even millions of species' extinctions may be on the way; ocean life as we know it may be doomed. The connections between all life forms in the ocean, like those on land, are as strong as those between bricks in a building; you can't just pull out a few.

So what do we do about it? What we do *not* do about it is insist global warming is a hoax, an error or greatly exaggerated. *Every* reputable scientist confirms its existence; they vary only in predicting how bad it will be, how soon, or whether it can be reversed. Lately, all one hears is that previous predictions have underestimated the threat. Yet, in 2005, polls showed that 65% of Americans did not perceive any real risk to themselves.

We are the heirs of a great mistake that began with the industrial revolution. For two centuries, nobody had any idea where the smoke from factories could lead or cared where it went, and every new energy-using invention – steam engines! automobiles! aviation! – was greeted with celebration. The haves of the world delighted in their rate of consumption, the have-nots aspired to match it. In the present day, Americans have arrived at an orgy of resource-destruction, a juggernaut whose sheer momentum seems to carry it onward despite the fact a growing minority is ready to put on the brakes.

How to do this? The advocates of reducing energy consumption by making it more expensive with price rises or universal taxes on energy, have a compassion problem. They forget how badly the market manages desirable societal aims: expensive fuel impacts the bottom rungs of the economic ladder disproportionately. The rich can go on wasting freely because they can afford it; the poor can't afford to drive to the job.

Probably, the only thing that can work with problems this size is massive governmental intervention. The U.S. should ratify the Kyoto treaty but go much farther, even to phasing out coal-fired power plants. Regulation of polluting industries has to have a big comeback, and why not tax *them* on CO₂ production? I recall the noise we heard in the 70's about federal laws requiring higher fuel efficiency in cars, and there has been some recent motion in that direction. Not enough. By now, we can see that we have to be more ambitious to make any difference: 60 miles per gallon is where we should *begin*. In the future we may breed microscopic organisms that produce hydrogen, so we don't increase the carbon score to make it. We need to invent batteries that work better and can do bigger jobs. Wind and solar energy should already have received the sort of governmental support once mistakenly handed to the nuclear industry; still, better late than never.



Meanwhile, right now, never underestimate the power of ordinary people to change their habits *provided* they see the need. Millions of Americans gave up tobacco addiction when they recognized it as death-dealing. They can give up their energy addiction too, for the same reason. Even the simple choice of energy efficient lightbulbs, if we all choose them, can make a significant improvement. We can drive less, drive slower, heat and cool our houses less or by renewable methods, insulate houses and bodies better, even use wind and solar devices privately, if we have the wherewithal. But to do this we have to see the whole picture and recognize that the hour is late. If we all resist necessary energy-saving changes, it will get us exactly nowhere.

– Cile Downs, 2007

*BBC Daily Email, Jan. 4, '07

**Peter Alsop, on climate scientist John Harte's work, in Sept./Oct. '06 *California Magazine*

***Elizabeth Kolbert, *The Darkening Sea*, in Nov. 20, '06 *The New Yorker*