Effects of climate change

Environment

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"UNLESS we stop now, we will really doom the lives of our descendants. If we just go on for another 40 or 50 years faffing around, they'll have no chance at all, it'll be back to the Stone Age. There'll be people around still. But civilization will go." — James Lovelock, *The Independent*, May 24.

When James Lovelock calls for a massive expansion in nuclear power generation to ward off the worst effects of climate change, as he did in a front-page article in *The Independent* recently, you have to pay attention. The future may view him as the most important scientist of the 20th century, and he is revered by the Green movement, which hates nuclear energy. But now he writes: "Every year that we continue burning carbon makes it worse for our descendants and for civilization...I am a Green, and I entreat my friends in the movement to drop their wrongheaded objection to nuclear energy."

Lovelock is an independent scientist who grew wealthy by inventing equipment to measure the presence of CFCs, the chemicals used in spray cans and refrigerators that were destroying the ozone layer before they were banned. But his real claim to fame, on a par with Darwin's and Galileo's, was his insight that the Earth is a living system.

He often regrets having named that system "Gaia" (after the Greek goddess of the Earth), because the Green movement and various New Agers started using it as a beautiful metaphor, and delayed its acceptance as a valid scientific observation for several decades. But it is finally being accepted by the scientific community worldwide (with a name change to Earth System Science to placate the guardians of academic orthodoxy): last December the scientific journal *Nature* gave Lovelock two pages to summarize recent developments in the field.

Lovelock has always been worried about radical climate change, because the essence of the Gaia hypothesis is that the current composition of the Earth's air and seas — the global temperature regime, the salinity of the oceans, even the proportion of oxygen in the atmosphere — has been shaped over the eons by the activity of living things. Our planet would be radically different, he argues, if living things did

than centuries.

He doesn't believe that current efforts to reduce the output of carbon dioxide and other greenhouse gases through the Kyoto accord (which has still to be ratified, in any case) and the encouragement of power generation by wind, wave and solar power can possibly cut carbon emissions enough in time.

"I think we should think of ourselves as a bit like we were in 1938," he said. (He's 84, so he remembers.) "There was a war looming, and everybody knew it, but nobody really knew what the hell to do about it." The Kyoto protocol, he said, is "the perfect analogy for the Munich agreement," because it would solve nothing: the cuts it mandates in greenhouse gases are tiny, while it lets politicians look like they are doing something." And the Greens' attachment to renewable energy is "well-intentioned, but misguided, like the left's attachment to disarmament in 1938."

So the man who was among the first to warn of climate change says that there should be a massive expansion of nuclear power, which produces hardly any carbon, to deal with the inevitable growth of demand for power without toppling the world into climate change so abrupt and extreme that it would cause a massive human die-off. The problems of radioactive waste and the danger of nuclear accidents are

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eons by the activity of living things. Our planet would be radically different, he argues, if living things did not actively maintain the status quo that is so hospitable to life.

The concept of Gaia is no more mystical than the notion that triple-canopy tropical jungles create a local micro-climate under their leafy ceiling. The emerging "earth system science" just studies the hugely more complex system of biological interactions and feedbacks, involving millions of species, that has evolved over several billion years to optimize conditions on Earth for living things. But this system that can lurch into massive change if some major input (like the proportion of greenhouse gases in the atmosphere) is changed.

Recent evidence, including last summer's unprecedented heat wave in Europe and new data on the speed that the Greenland ice-cap is melting, has persuaded Lovelock that global warming is now moving far faster than most studies anticipated, and will have calamitous effects on key support systems of human civilization like food production in decades rather

minuscule by comparison, and there is no third alternative.

Only France and Japan among the developed countries get most of their electrical power from nuclear energy. No new nuclear power plants have been built in the United States or Britain for over 20 years: the "fear factor" linked to the accidents at Three Mile Island and Chernobyl killed the market dead. But those were local disasters that caused limited local damage, not massive and irreversible changes for the worse in the whole planetary environment, and with better design and more attention to safety they might have been avoided.

Would we be on the brink of massive climate change now if the nuclear power industry had continued to replace fossil-fuel-burning plants at the rate we expected in the late 1950s and early 1960s? Almost certainly not. We'd have a much smaller problem, and more time to deal with it. James Lovelock has done us all a favour: this debate is long overdue.