Geoengineering and our Collective Future: New challenges for ethics

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On June 15, 1991 (three days after this photo), Mt. Pinatubo injected 10 million tons of sulfur into the stratosphere.

The Earth’s average surface temperature was 0.5°C cooler six months later, then rebounded.
What if the current technocratic response is not sufficient?

Two possible reasons:

1. The world cannot implement the necessary changes.
   
   A. Inertia and habit
   
   B. Shortcomings of the available “solutions”

2. The world *does* implement the necessary changes, but low-probability nasty outcomes arrive anyway.
Monsters behind the door

Steve Pacala calls the worst credible climate outcomes “monsters behind the door.” The monsters include:

- a five-meter rise in sea level by the end of this century
- major alterations of the global hydrological cycle
- major changes in forest cover
- major emissions of greenhouse gases from the tundra.

The monsters open their door in a world of very strong positive feedbacks, a world that spirals out of control.

Today’s science cannot predict how much atmospheric change would let these monsters in, nor how quickly they could enter.
Response to an emergency

We may someday need “fast geoengineering,” matched to the sudden onset of a crisis. S injection acts quickly.

The analogy here is to the use of epinephrine to treat an acute allergic reaction. It is considered irresponsible for a doctor not to have epinephrine in his or her medicine cabinet.

But geoengineering today is “comparable with 19th century medicine.” (James Lovelock).
Today’s scrimmage line: Research

Research:

Slippery slope or moral imperative?

Scale: Is there a scale large enough so that research can tell us what we need to know but small enough not to trigger the hazards we must avoid. (Drug testing confronts this question too.)

Proposals for governance: Ban large-scale research, enable small-scale research. Circumscribe the self-governance of the scientists.
Moral hazard

Geoengineering and traditional mitigation compete, if costs of geoengineering are low enough.

Is geoengineering qualitatively different? (Scale?? Reversibility?? Something else??) If so, geoengineering needs special attention.

If not, and given that all responses to climate change are fraught, shouldn’t geoengineering be welcomed as allowing reduced effort on other alternatives?
Conservatives like Geoengineering

Watermelon greens [green on the outside, “red” on the inside] reject geoengineering because it does not result in reduction of human appetites for natural resources.

On what grounds will geoengineering be resisted?

Rejection will be energized by:

belief in Murphy’s Law

unwillingness to cede authority to experts

religious outrage at the prospect of unconstrained human self-determination.

But will rejection dominate?
The Sword of Damocles: Rapid disengagement

Rapid disengagement from S-injection might be

a. deliberate: An adverse side-effect is discovered.

b. unintentional: Loss of capability, political will.

In one model run, following an interruption of injection, “within a few decades, winter warming in the polar regions exceeds 10°C and summer warming in the northern temperate latitudes will be about 6°C.”

“Coming generations will have to live with the danger of this ‘Sword of Damocles’ scenario, the abruptness of which has no precedent in the geologic history of climate.”
Global thermostat – set where?

The deployment of geoengineering will present choices among end-points.

There will be some bias toward retrieving the pre-industrial world (the *status quo ante*). We planted crops where the rain fell and built our cities near rivers and coasts. Sea-level rise means moving inland. Sea-level fall means cities without access to the sea.

Nonetheless, neither the pre-industrial world nor any other world will be universally desired.

Can the world conceivably negotiate its temperatures and sea level?
Earth enhancement

If we succeed in developing geoengineering for insurance, it will allow us to enhance the planet.

The analogy is genetic engineering, valuable for the treatment of many diseases, and also providing a capability to enhance the human species.
What will Earth-enhancement look like?

Genetic engineering now allows enhancement of the human species (prettier, taller, smarter,…)

Geoengineering will allow enhancement of the planet – notably, the moderation of extreme events:

- warmer winters where people want them
- cooler summers where people want them
- less severe storms and droughts

Every valley shall be exalted and every mountain and hill made low, the crooked straight and the rough places plain.

As for the well-being of non-human species?
Enhancement is problematic

Michael Sandel sets up a dichotomy to explore modern medicine:

*Cure or restore vs. enhance or perfect.*
- Fertility and sex selection
- Eugenics
- Steroids and sports
- Cosmetic surgery
- Hyper-parenting

He argues that enhancement can be pursued to excess. He sees a loss of the ability to savor the life we have been “gifted.” He sees value in randomness, the “unbidden.”

“When science moves faster than moral understanding, as it does today, men and women struggle to articulate their unease.”
Patient Earth

“I will apply, for the benefit of the sick, all measures that are required, avoiding those twin traps of over-treatment and therapeutic nihilism.”

Hippocrates