

Faith, Hope and Lovelock

**How Should We Respond
to the prospect of
Climate Change?**

Noel Cheer 2008

Agenda

- **Is this “religion” or “practical”?**
- **What do those concerned about climate change claim as to its nature and cause?**
- **Some background physics and maths**
- **Lovelock’s “Gaia hypothesis” and predictions**
- **How can we respond: individually and corporately?**
- **How should we react?**

Introduction

We like to be 'scared to death'

**The Russians/Chinese/Japanese/
Muslims/Americans**

Atom bomb/Nuclear War

AIDS/Y2K/Bird Flu

Worldwide economic meltdown

Hadron Accelerator

Introduction

Climate Change scares us

Should it?

**What is the contribution of
media/politicians/religionists?**

Introduction

**Today we
will search
for a
sane and informed
approach**



**Is this a “Religious” or
a “Practical” matter?**

**We need to decide
because our
prescription will
depend on
our starting point**

Option 1

Faith (= passive acceptance)

**“it will all come right,
God will look after us”**

**“The earth is merely
a temporary way-station.”**

Option 2:

Hope (= realistic expectations)

we can deal with it

**We can cope with it more-or-less
adequately**

Option 3:

**Subscribe to James Lovelock's
"Gaia Hypothesis"**

**There is an inescapable
bad time ahead
for planetary life**



Discussion:

What option, and why?

What Is Claimed?

Climate Change is real

Climate Change is inevitable, given human industrial and agricultural activity since the 18thC.

Climate Change may be unstoppable

Climate Change is dangerous

This may be “the last human century”

What is the Cause?

Humanly-induced interference with the escape of radiant energy from the surface of the earth.

- **Carbon dioxide (CO₂) from planes, trucks, cars and from homes**
- **Methane: from farmed animals**
- **Refrigerants and propellants: fridges and aerosol cans**

Discussion: 5

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The Physics: 1

Earth temperature previously in balance

- Incoming solar energy balanced by reflected solar energy and infrared energy radiated from the earth.

Natural Global Warming caused by:

- Variation in solar output (none recently detected).
- Variation in atmospheric reflectivity (clouds, ash)
- Variation in atmospheric infra-red blocking (**natural greenhouse effect**)
- Incoming = short wavelength, unhindered by atmospheric blanket
- Outgoing = long wavelength and is trapped by atmospheric gases: water vapour, carbon dioxide, methane etc

The Physics: 2

*Think
of a
feather
duvet
on
your
bed*

- **“Greenhouse effect”**
 - The process by which an atmosphere warms a planet
 - Other planets too:
Venus (but too hot)
Mars (but too cold)
Earth (like Goldilocks) = “just right” at about 20°C
 - With no greenhouse Earth would be at minus 18°C
 - Both natural and anthropogenic (human-made) components

The Physics: 3

Problem amplified by **positive feedback** viz the output is 'fed back' to the input, but in step.

Dying vegetable matter adds methane and CO₂ to the atmosphere.

Warmed tropical waters add water vapour to the atmosphere.

Ice-free arctic waters are darker than ice and absorb sunlight

Other as yet unidentified feedback

Predicted Effects

Sea levels rise (2m-6m by 2100) by ice melt and thermal expansion.

Plant (and therefore animal) life retreats from the equator.

Hamilton and Palmerston North become significant

The Maths

- Developed world get 80% of its energy from fossil (viz CO₂ producing) fuels
 - Driving a car 50km uses 40 kWh: same as a 2 bar heater on all day.
 - Atmospheric CO₂ stable at 280ppm from 1000AD-1800AD.
 - Today it is at about 350ppm.
 - Photovoltaic cells are 7% to 17% efficient
 - Excellent analysis by David J.C. MacKay of Cambridge University
- www.withouthotair.com

Circumstantial Evidence

- **CO₂ levels are rising**
- **Temperatures are rising**
- **CO₂ is a known greenhouse gas**
- **Humanly released greenhouse gases have increased significantly in the last 200 years.**
- **Therefore there is something that we ought to do.**

LoveLock's 'Gaia' Hypothesis

Earth's temperature level has remained constant at **20°C ± 5°C**

Ensured by the interaction of living and physical processes.

Arbitrarily named the 'Gaia hypothesis'

Not mystical or even intelligent: it is the emergent property of two systems that evolved together.

‘Daisyworld’ Thought Experiment

Metaphor for biological processes interacting with physical processes.

Black daisies: prefer cooler climate but better absorb sunlight for photosynthesis and warm the environment. They could cook themselves.

White daisies: prefer warmer climate but better reflect sunlight and cool the environment. They could freeze themselves.

Environment finds an equilibrium point which is maintained by the daisies.

• Gaia' Under Stress

“Daisyworld” is **negative feedback** viz the output is ‘fed back’ to the input, but out of step.

Global warming is caused by radiated heat trapped under the ‘duvet’ of greenhouse gases.

Daisyworld **cannot compensate** for greenhouse warming

Lovelock's Predictions

Too late to reverse, certain tipping points have been reached.

2020: extreme weather, starvation, riots

2040: mainland Europe a desert, massive population migrations, consequent political instability

2100: 80% of humans wiped out

Individual Responses

Source: www.stopglobalwarming.org

- Landscaping for Energy Efficiency
- Buy a Hybrid Car
- Buy a Fuel Efficient Car
- Carpool When You Can
- Inflate Your Tyres
- Change Your Air Filter
- Reduce Garbage,
- Decline Supermarket Bags
- Use Recycled Paper
- Buy Minimally Packaged Goods
- Unplug Un-used Electronics
- Plant a Tree

*Save the
World?*

Or merely

Salve our

Conscience?

Who are we kidding?

Societal Responses

1: Repairing

Massive tree planting

Reflectors in space

Induce high level cloud/ash to shade sun

Societal Responses

2: Delaying

Paint house roofs white – like daisies

Reflector panels in space

Nuclear energy: fusion power speculative, worth pursuing.

**Solar panel 'farms' in equatorial deserts with long cables.
(14W/m² v. wind at 3W/m²)**

Sequester CO₂ at source

Improve diets of cud animals to emit less methane and nitrous oxide.

Move from a meat-intensive human diet

Cap-and-trade use of fossil fuels

Societal Responses

3: Coping

Retreat into garrisoned cities supported by hi-tech devices.

Gunboats to sink incoming refugees

Systematic population reduction (volunteers?)

Move to another planet?

Any Upside?

NZ tropical climate

Farm the Russian steppes?

Opportunity and incentive for international cooperation (but don't hold your breath)

Irrational Optimism

Technologies not yet discovered?

Remember the revolutionary effect of transistor?

Information technology (email, teleconferencing) might reduce travel.

Natural physical systems not yet in operation therefore not yet known.

What Is Our Reaction?

Faith? It will all come right, perhaps with God's intervention.

Hope? We will cope and perhaps turn the process around.

Lovelock? Buckle down for an ugly future after 80% wipeout?

Gaia?

The green movement may speak the language of science, but what really moves it is an ethical imperative.

It is an attempt to create a society in which some choices are recognised as better than others, in which nature is seen to put constraints upon the free play of desire.

In short, it is a religion -- a religion without God.