

An
Inconvenient
Truth,
in Very Few Words

By Timothy J. Truett

Death of denial,
in many minds, at same time,
a transformation.

A new, better world.
Have you tried? Maybe you can.
The birth of courage.

Longing to return,
to see, feel, and breathe real peace,
this is why I strive.





Bad things getting worse,
We see the changes coming.
Predictable woe.

Calls for big changes,
the moral imperative.

We cannot avoid.





To see more clearly,
go out far, and turn around.
Look homeward, and see.



Ground, then air, then space.

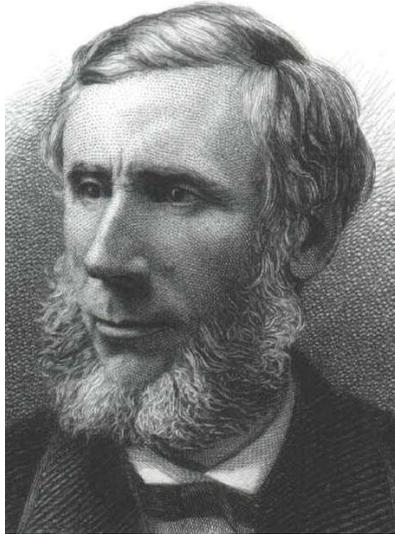
How thin is the atmosphere?

We can see through it.



Burning and burning,
CO₂ accumulates.
We know what that means.





John Tyndall - Discovered that CO₂ traps heat

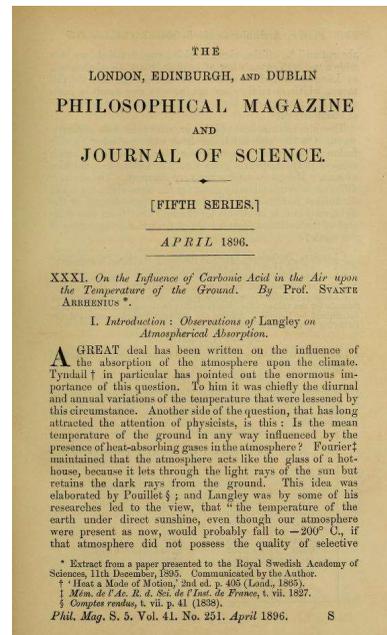


Ludwig Boltzmann - Explained thermodynamics

Increase CO₂,
thermodynamics happens.
Gets a lot hotter.



Svante Arrhenius - Developed a quantitative relation between atmospheric CO₂ and global average temperature (in 1896).





THE
LONDON, EDINBURGH, AND DUBLIN
PHILOSOPHICAL MAGAZINE
AND
JOURNAL OF SCIENCE.

[FIFTH SERIES.]

APRIL 1896.

XXXI. *On the Influence of Carbonic Acid in the Air upon the Temperature of the Ground.* By Prof. SVANTE ARRHENIUS*.

I. *Introduction: Observations of Langley on Atmospheric Absorption.*

A GREAT deal has been written on the influence of the absorption of the atmosphere upon the climate. Tyndall† in particular has pointed out the enormous importance of this question. To him it was chiefly the diurnal and annual variations of the temperature that were lessened by this circumstance. Another side of the question, that has long attracted the attention of physicists, is this: Is the mean temperature of the ground in any way influenced by the presence of heat-absorbing gases in the atmosphere? Fourier‡ maintained that the atmosphere acts like the glass of a hothouse, because it lets through the light rays of the sun but retains the dark rays from the ground. This idea was elaborated by Pouillet§; and Langley was by some of his researches led to the view, that “the temperature of the earth under direct sunshine, even though our atmosphere were present as now, would probably fall to -200° C., if that atmosphere did not possess the quality of selective

* Extract from a paper presented to the Royal Swedish Academy of Sciences, 11th December, 1895. Communicated by the Author.

† ‘Heat a Mode of Motion,’ 2nd ed. p. 405 (Lond., 1865).

‡ *Mém. de l’Ac. R. d. Sci. de l’Inst. de France*, t. vii. 1827.

§ *Comptes rendus*, t. vii. p. 41 (1838).

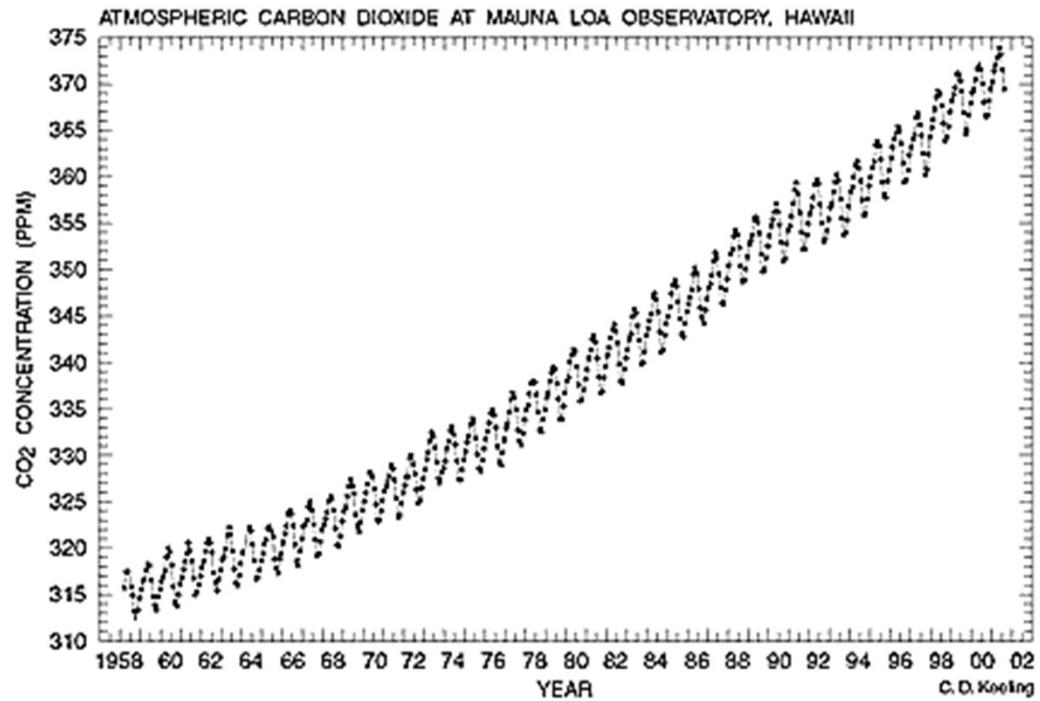


Roger Revelle



Charles Keeling

Revelle and Keeling precisely measured CO₂ at Mauna Loa beginning in 1957.



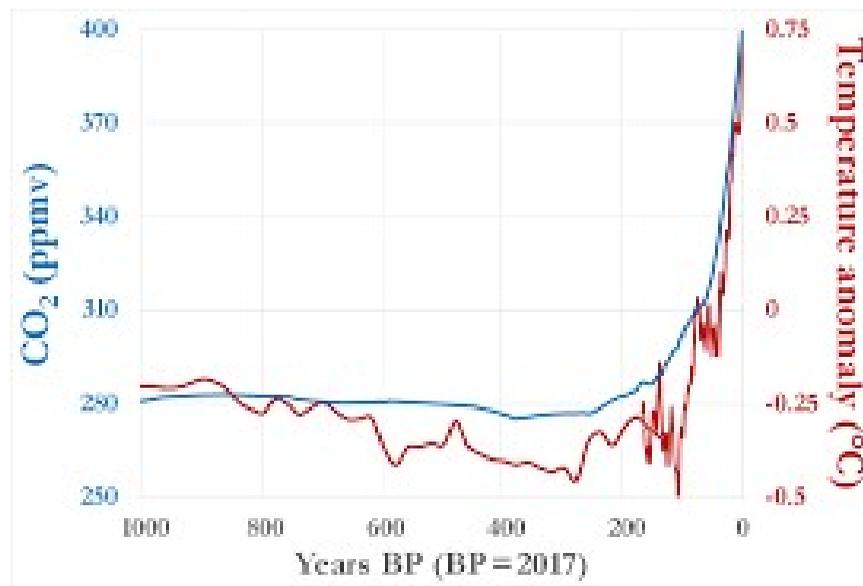
Measure CO₂.

Ask what happens over time.

The data tell us.

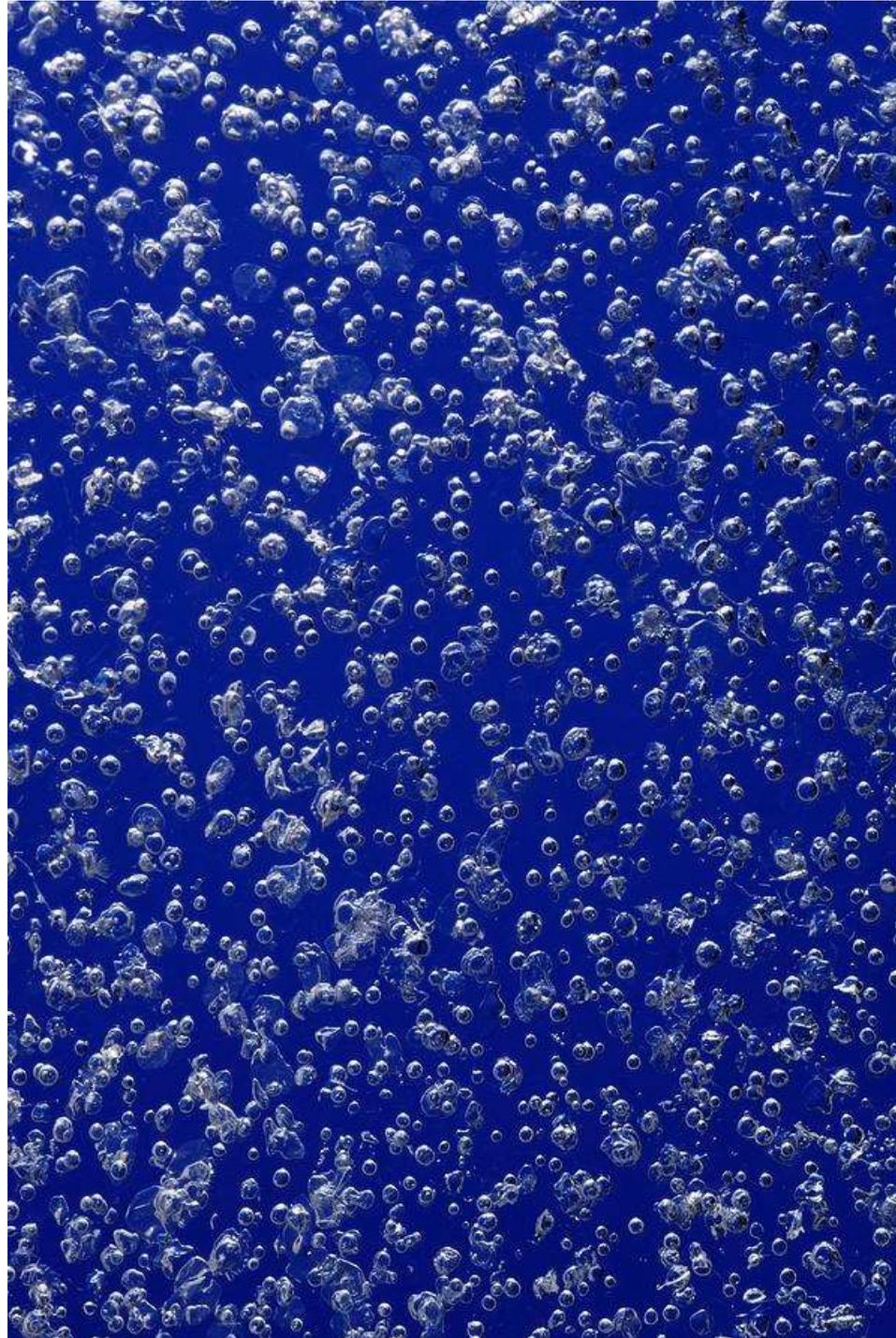


CO2 goes up,
year, after year, after year.
Hotter and hotter.





Antarctic ice core

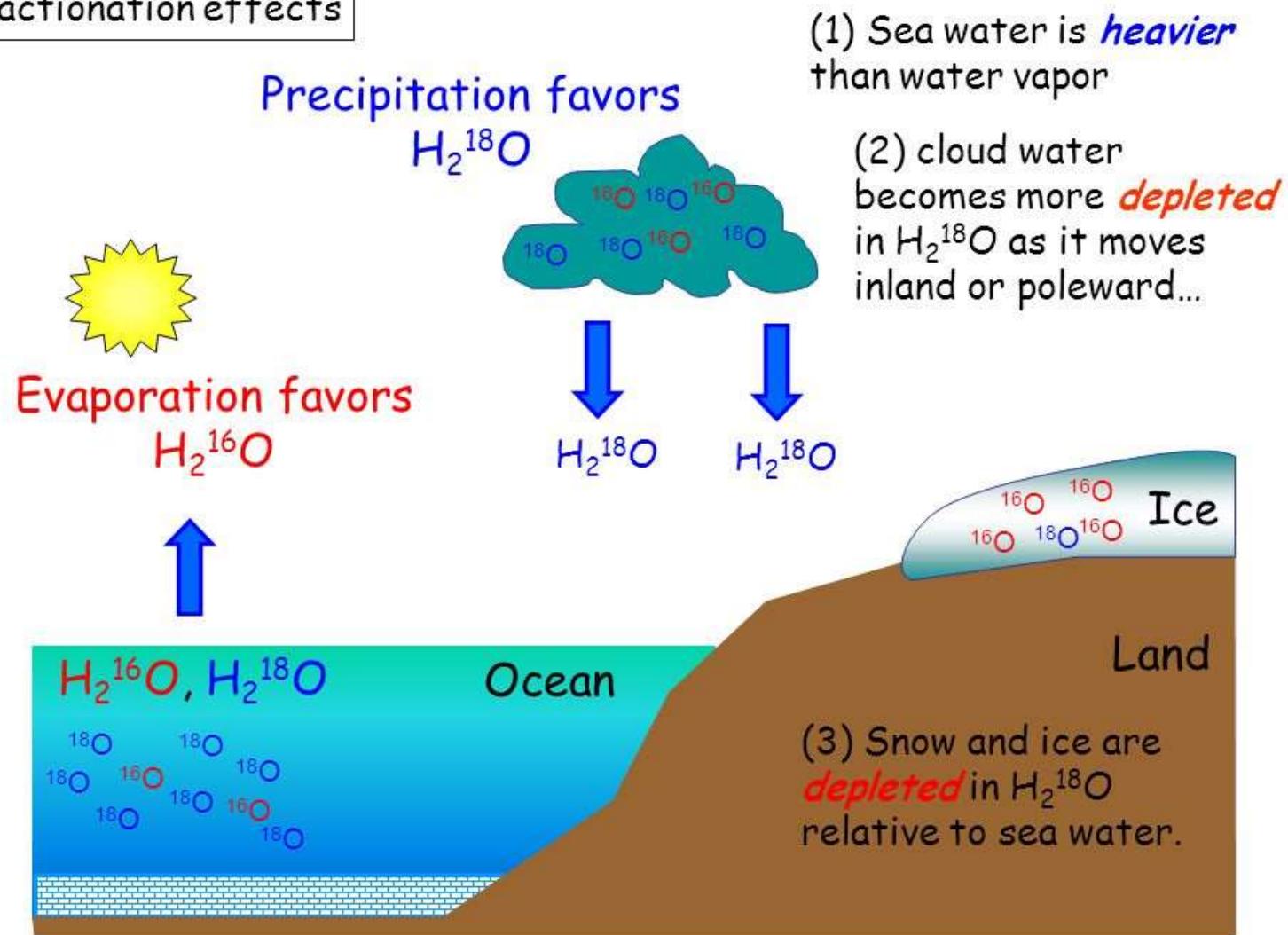


Bubbles trapped in snow.

The ice has stories to tell.

Hot, cold, history.

Fractionation effects

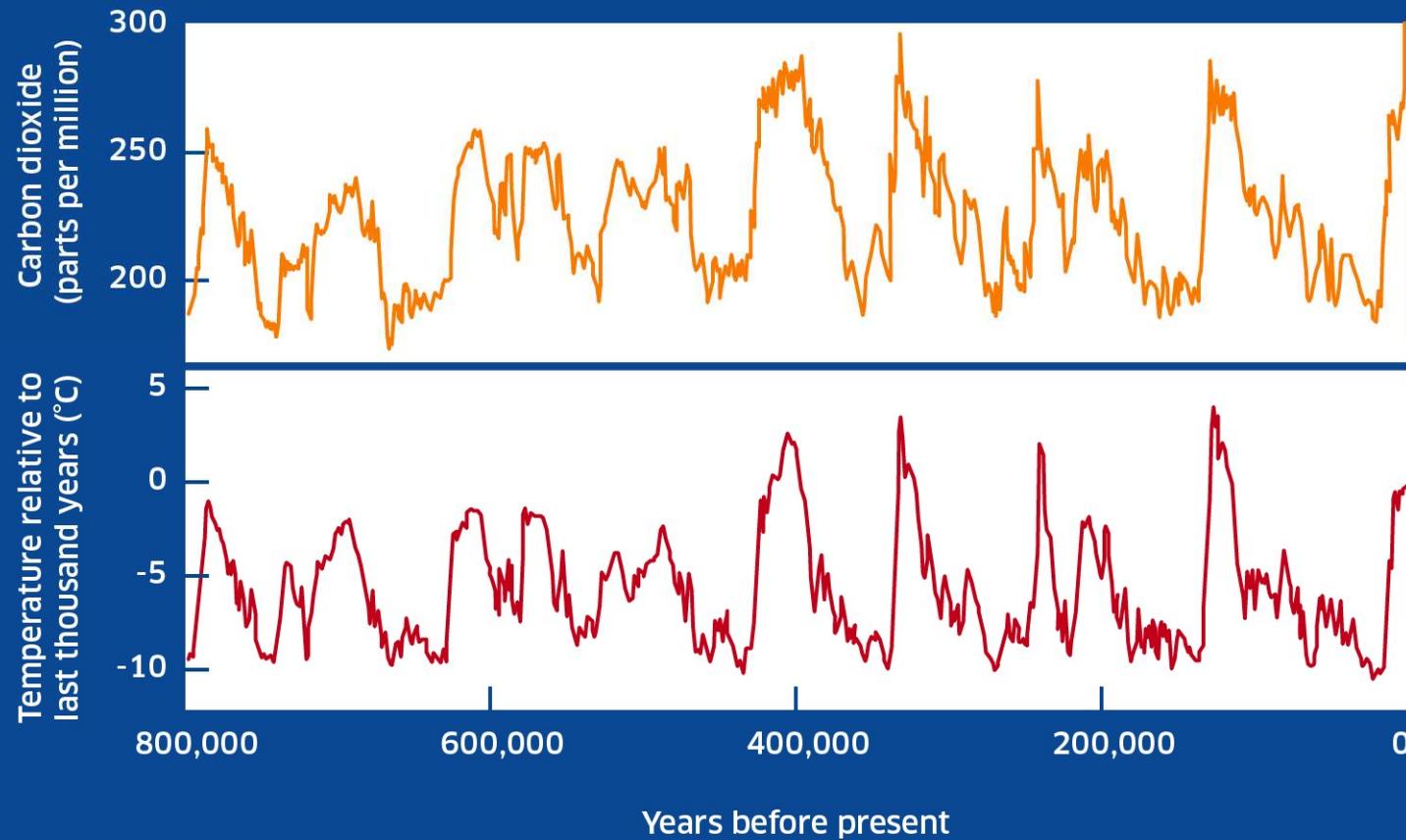


Oxygen-18,
Isotopic ratio.
Ice thermometer.

The Oxygen-18/Oxygen-16 ratio in Antarctic ice depends on the temperature of the water from which it evaporated.

Carbon dioxide levels and Antarctic temperature

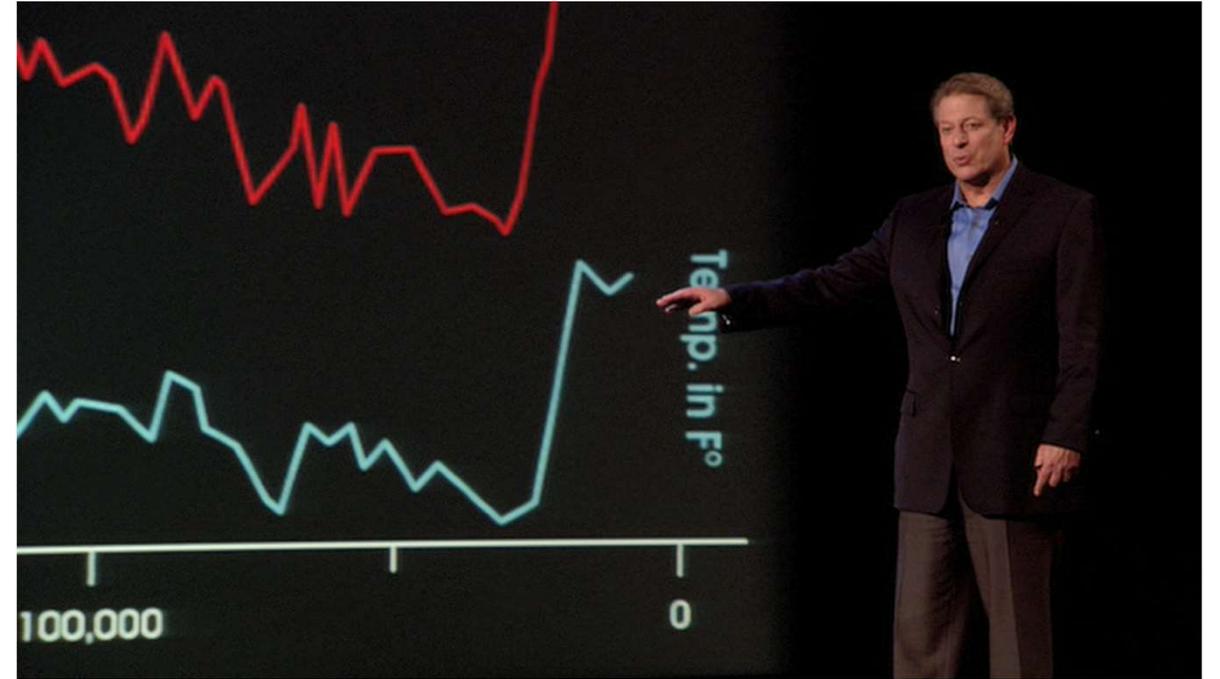
(data from EPICA ice core in east Antarctica)



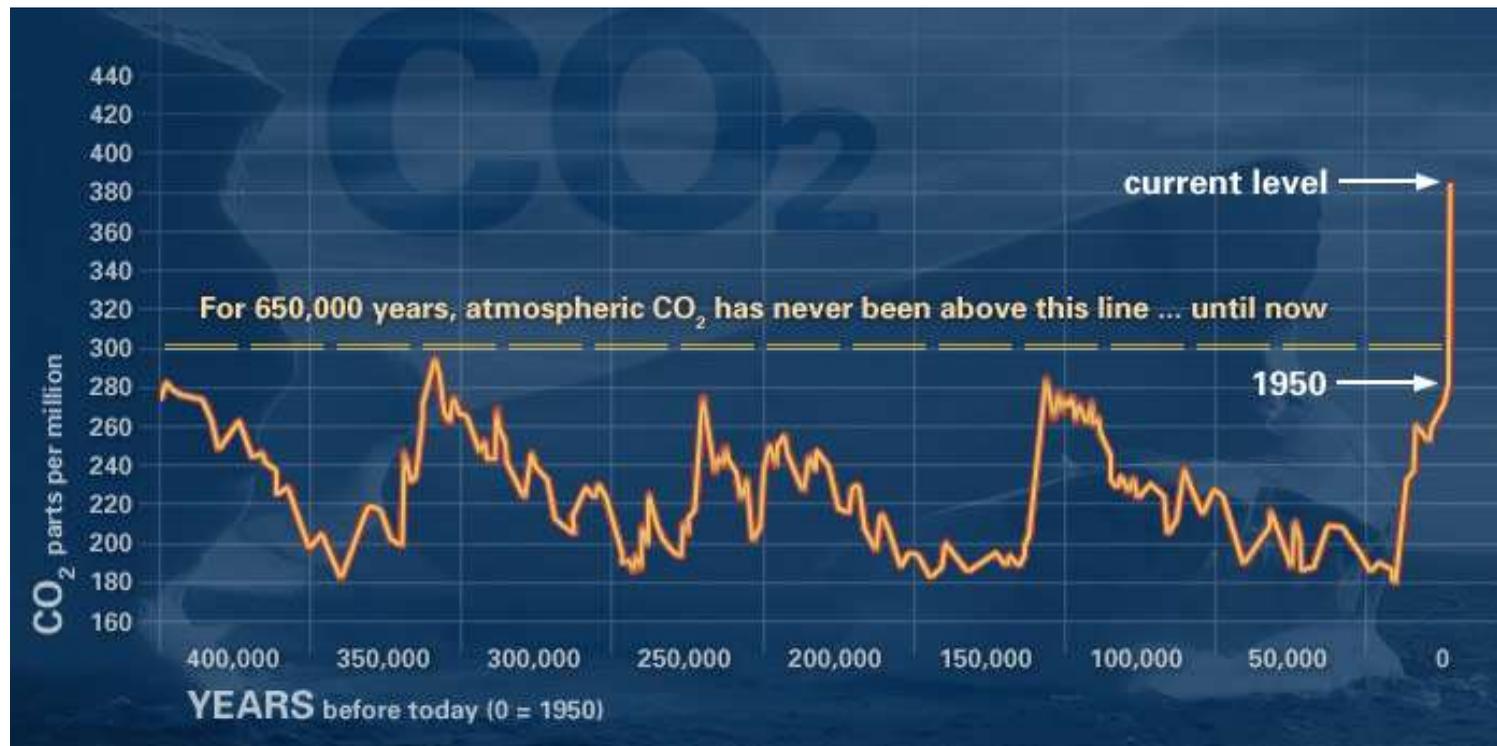
This variation
is mile of ice, or nice day.
That is all it takes.



Mile of ice

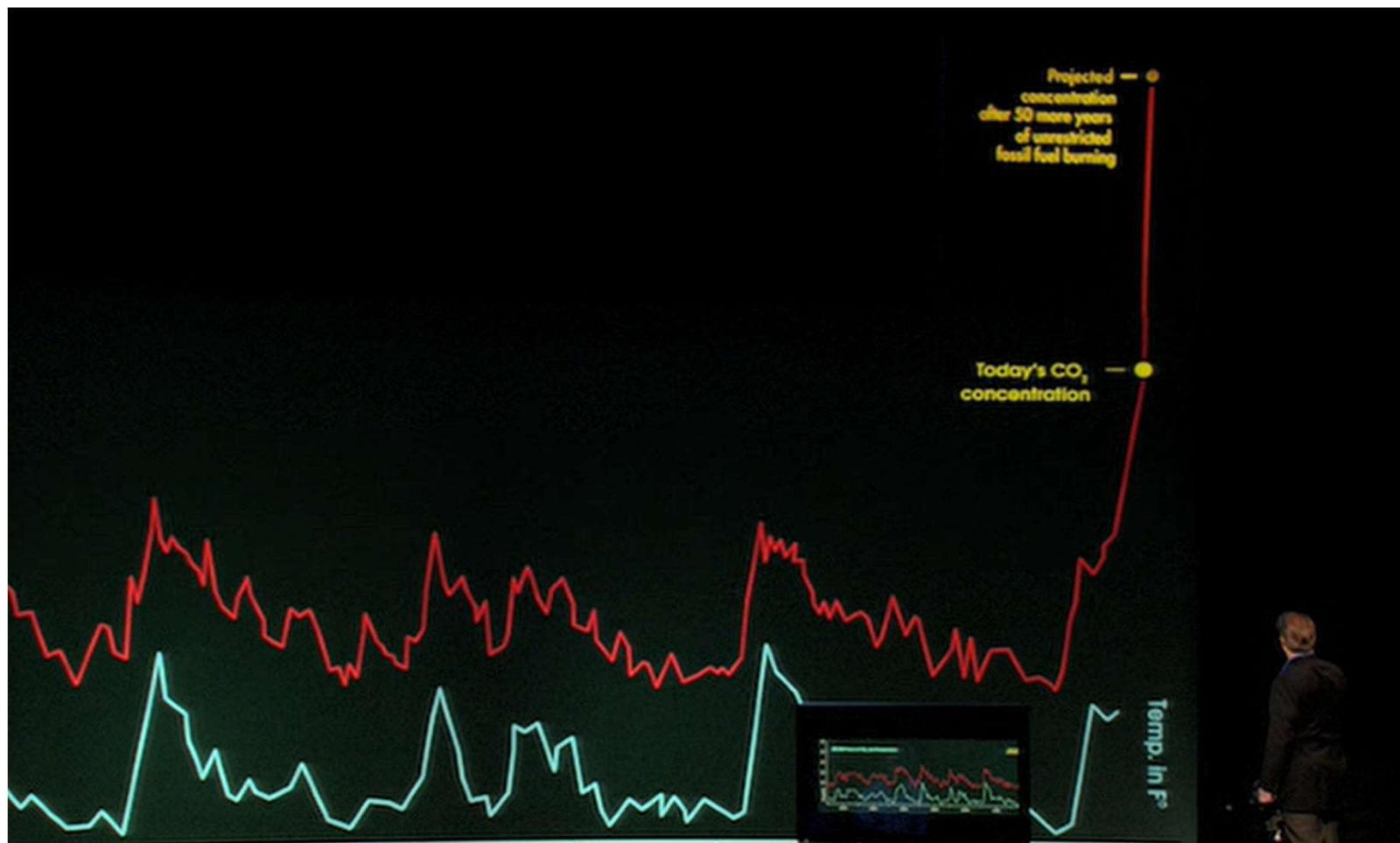


Nice day



CO₂ level ca. 2005. The 2020 level was 410 ppm.

Hotter and hotter.
A new kind of world awaits.
What does it look like?



Projected CO₂ concentration after 50 more years of unrestricted fossil fuel burning

Climatologists,
see danger, coming up soon.
Not a world for us.

What is the problem?

What kind of problem is this?

A moral problem.

We know how to act.

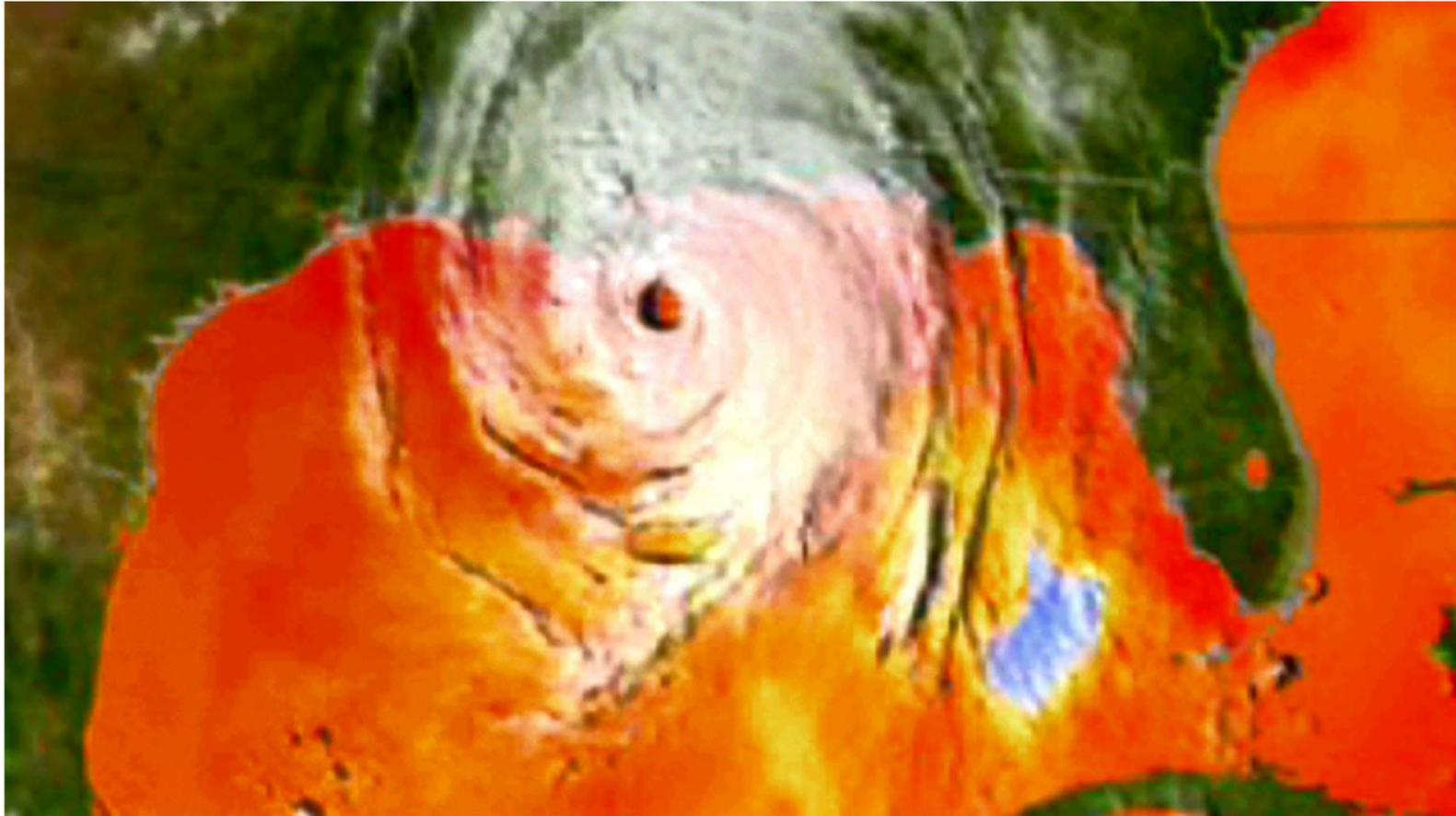
Everyone knows the right way.

Let's do the right thing.



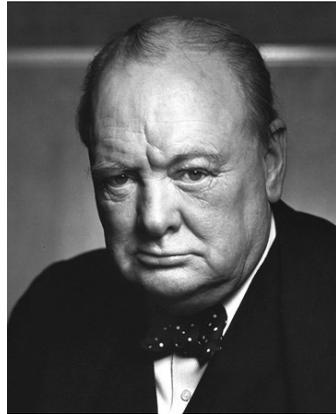


Congress did not act.
“So what, if we do nothing?”
We can lose it all.



Temperatures up.
Hurricanes are heat engines.
Guess what happens next.

“The era of procrastination, of half-measures, of soothing and baffling expedients, of delays is coming to its close. In its place we are entering a period of consequences.”



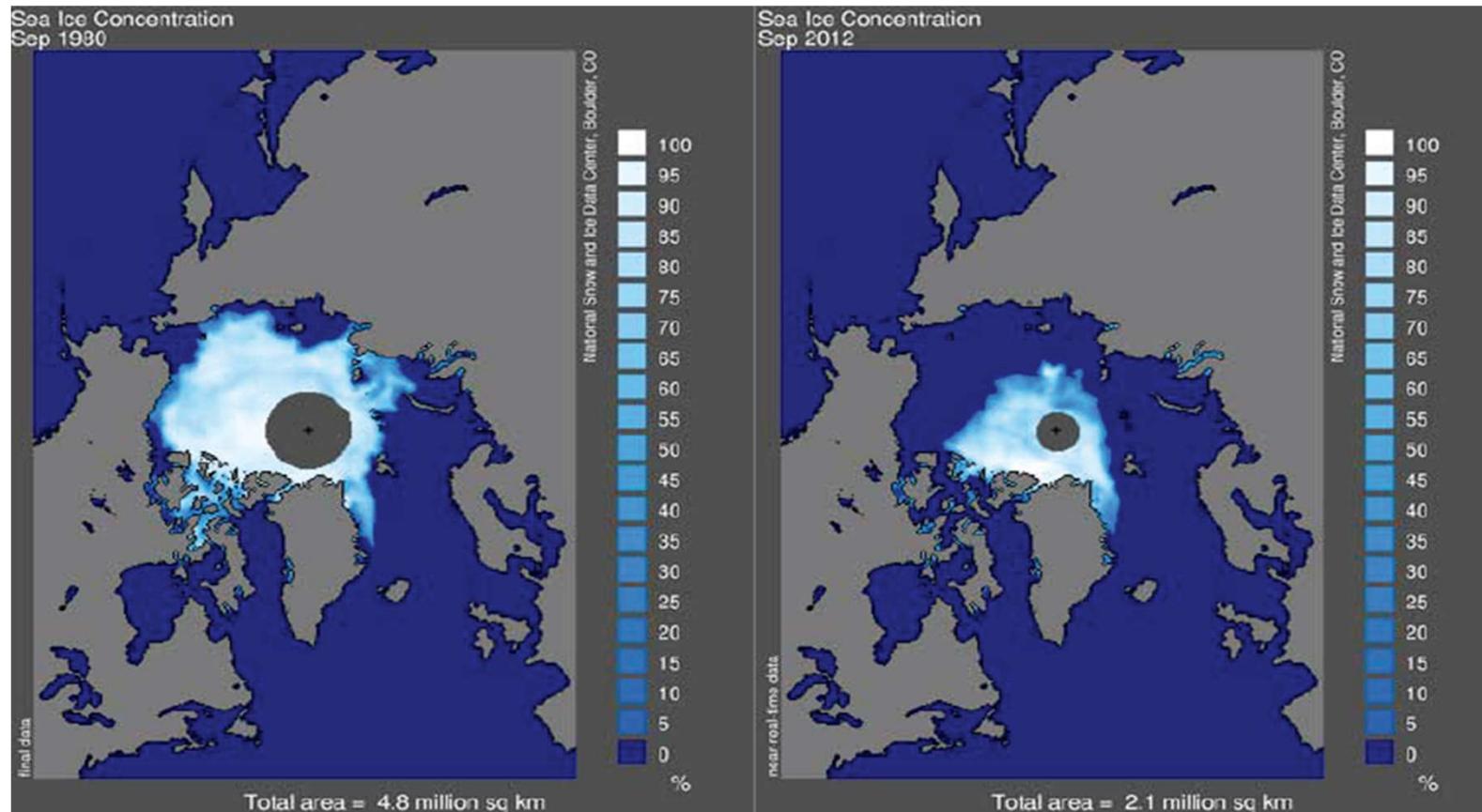
Winston Churchill



Dithering no more,
now time of consequences.
What we do matters.



In year 2000
Al Gore almost president.
Future different.



Arctic, Antarctic.

Canaries in the coal mine.

What will happen now?

How do we react
when again we hear warnings?

We need to decide.



James Hansen



Al Gore

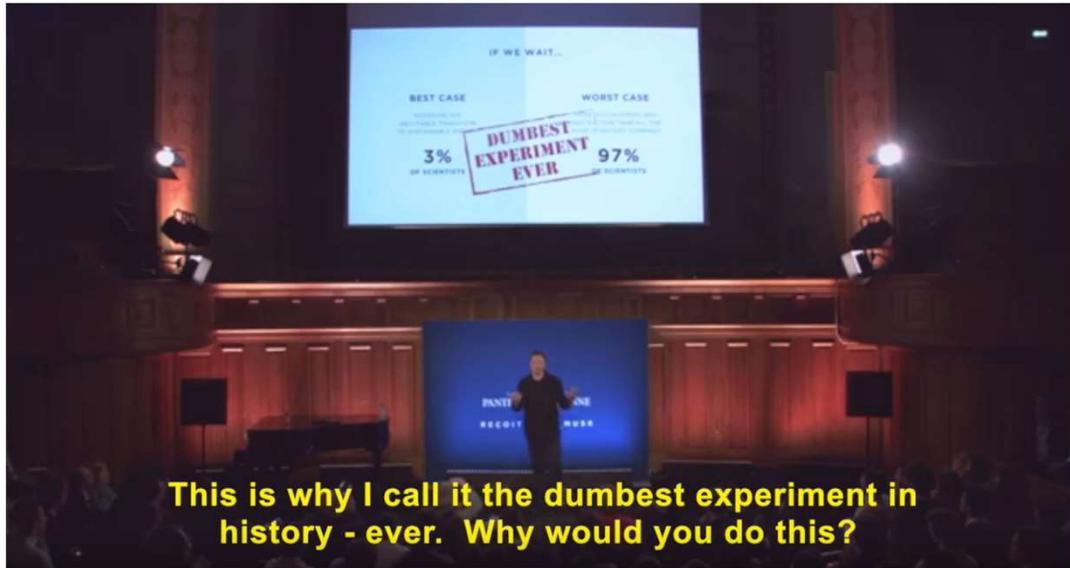


Bill McKibben



Bill Nye

What do we do now?
Make sure everybody knows.
Speak the truth again.



This is why I call it the dumbest experiment in history - ever. Why would you do this?

Elon Musk – “The Basics of Climate Change in 12 Minutes”



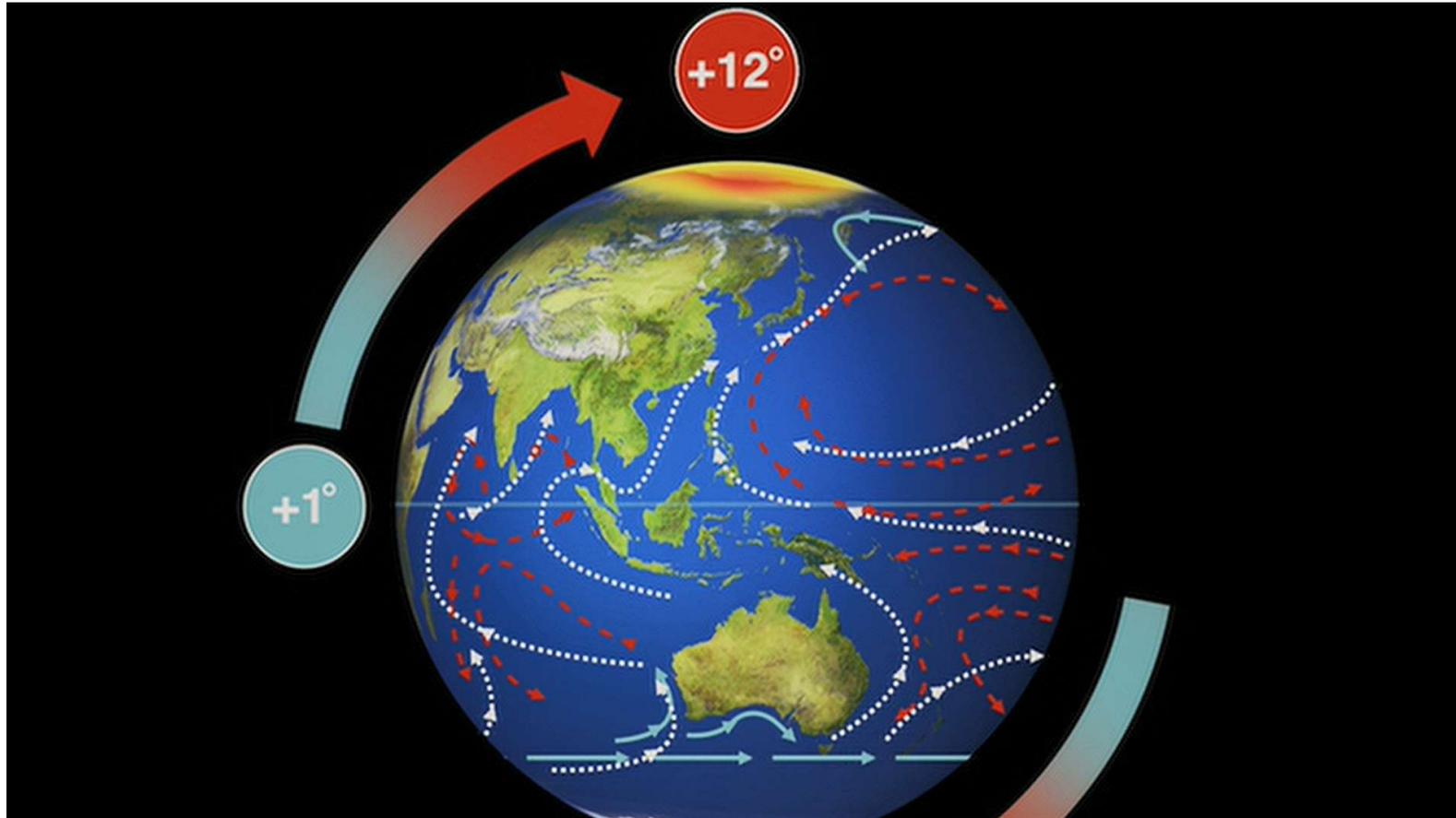
Arnold Schwarzenegger



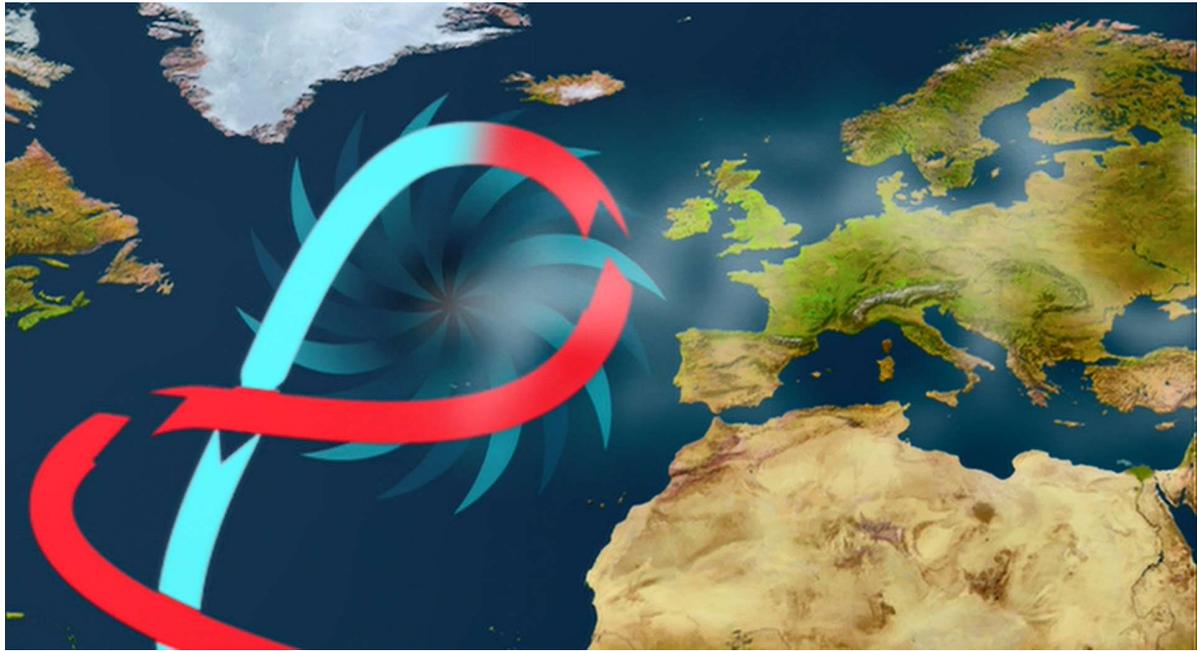
Greta Thunberg



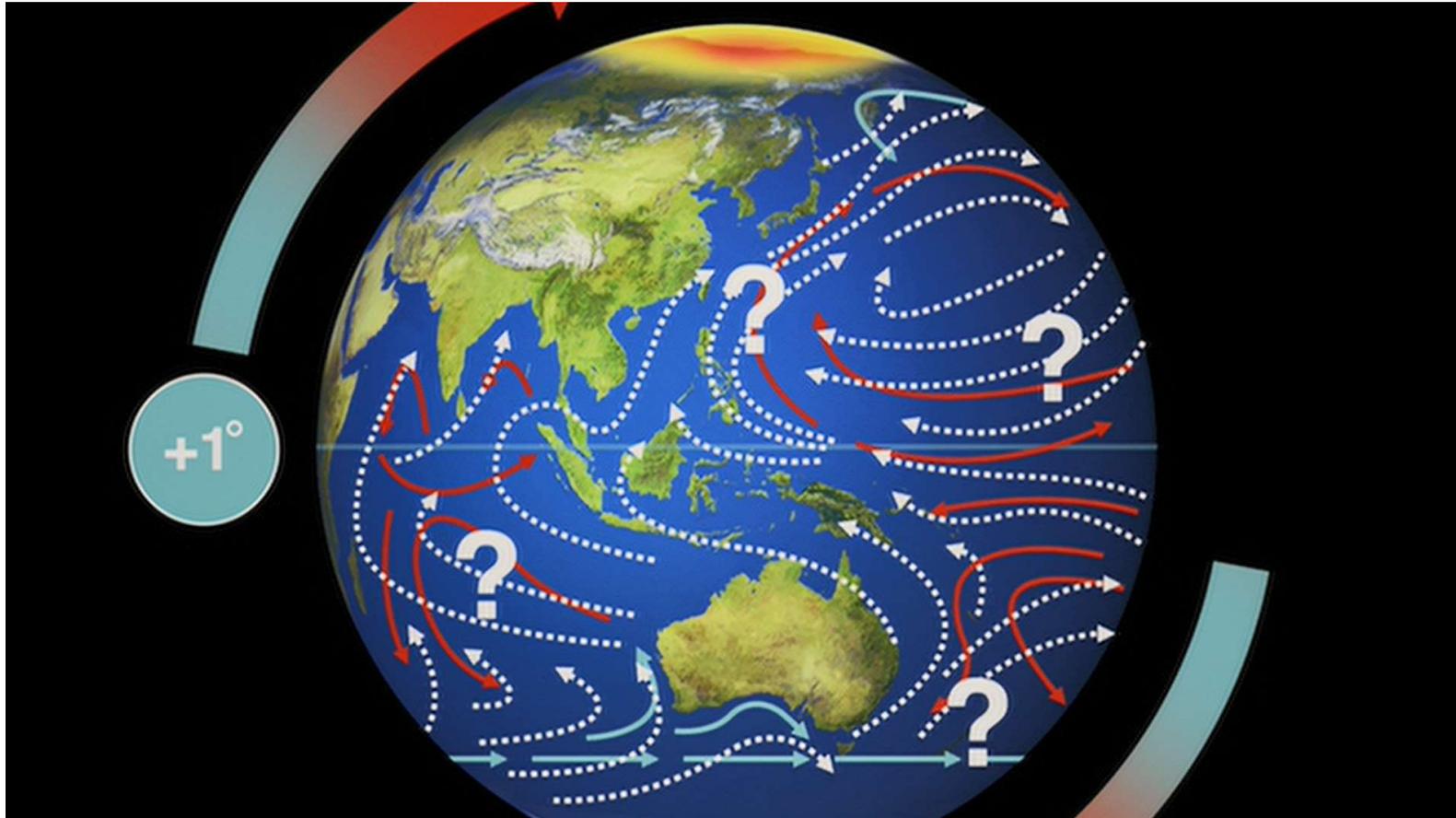
Nicholas Stern - economist



Fastest heat buildup
is in the Arctic Ocean.
That means something bad.



The Greenland ice melts.
Haline circulation stops.
Then all hell breaks loose.



Sun heats the Earth.
Ocean currents move the heat.
We depend on it.

Mess with the currents
and the whole climate changes.
Oops, bad idea.

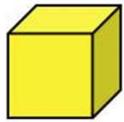


Earth, air, water, sun,
a climate system it is.
System laws apply.

Our planet's climate,
a nonlinear system.
Has big sudden jumps.

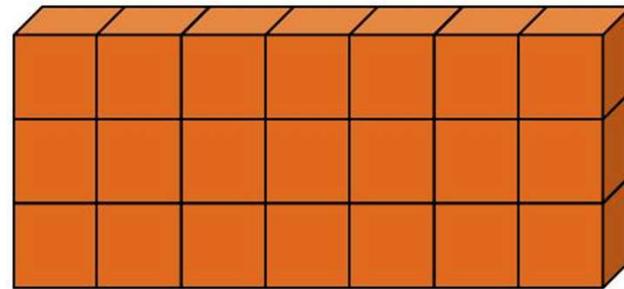
What does all this mean?
Big changes can happen fast.
Bad news for farming.

1 pound of CH₄



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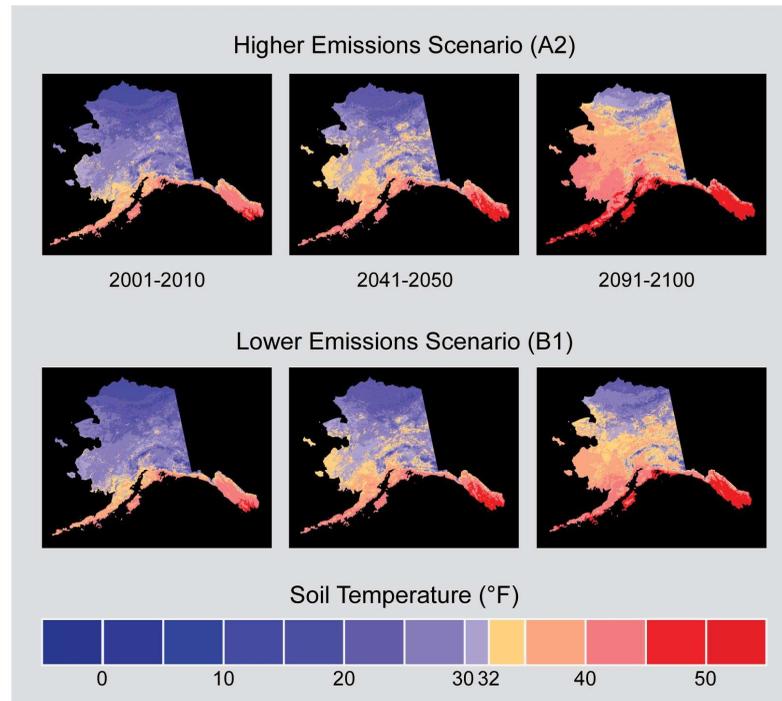
21 pounds of CO₂



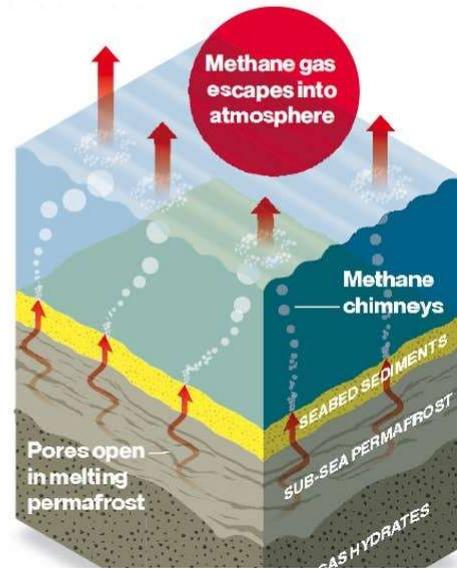
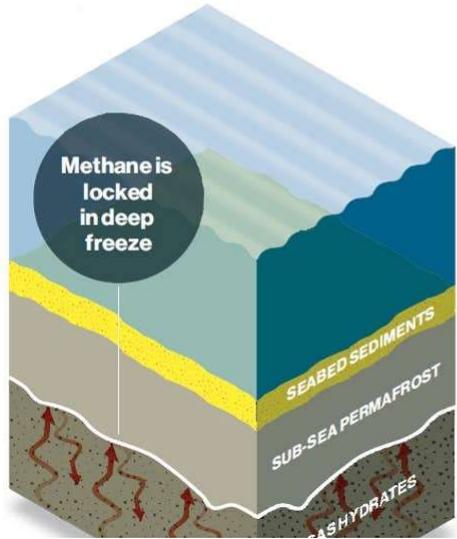
Carbon dioxide,
Most well-known heat-trapping gas.
Methane, much stronger.



Thawing Permafrost in Alaska



Melting permafrost
releases lots of methane.
Methane heats Earth more.



Permafrost melts;
Methane is released

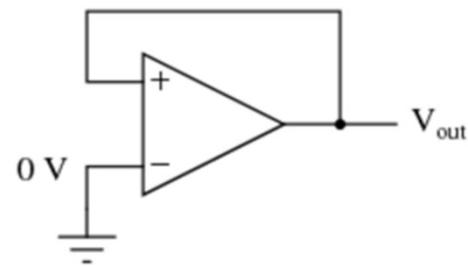


Methane raises
temperature;
Permafrost melts

Sea ice melts;
darker ocean
exposed to the
sun.



Darker ocean
absorbs more heat;
Sea ice melts.



Amplifier with feedback

The effect is a cause.

More heat leads to yet more heat.

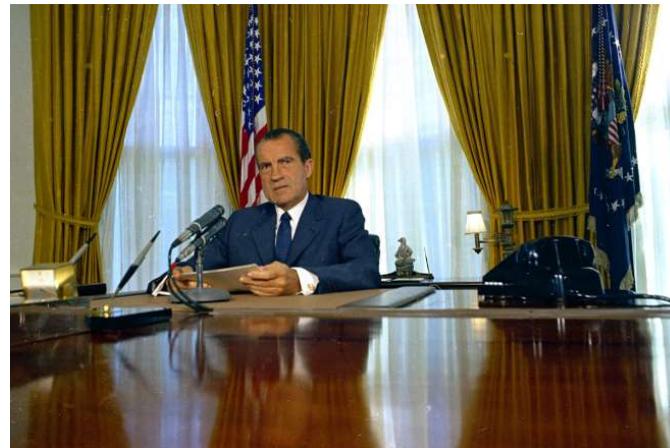
Climate feedback loop.

Feedback loops like this,

Unstable the system makes.

Runaway greenhouse.

There is also water vapor feedback, and cloud feedback. See <https://e360.yale.edu/features/why-clouds-are-the-key-to-new-troubling-projections-on-warming>



Constituencies -
needed for any problem.
Make them do what's right.



Pine borer beetle,
used to be killed by winter.
Not now. Dead pine trees.

Expanded their range.
Nonlinear change in range.
Over the Rockies.



Coral reefs dying.

Hot air means hot water too.

Water is too hot.

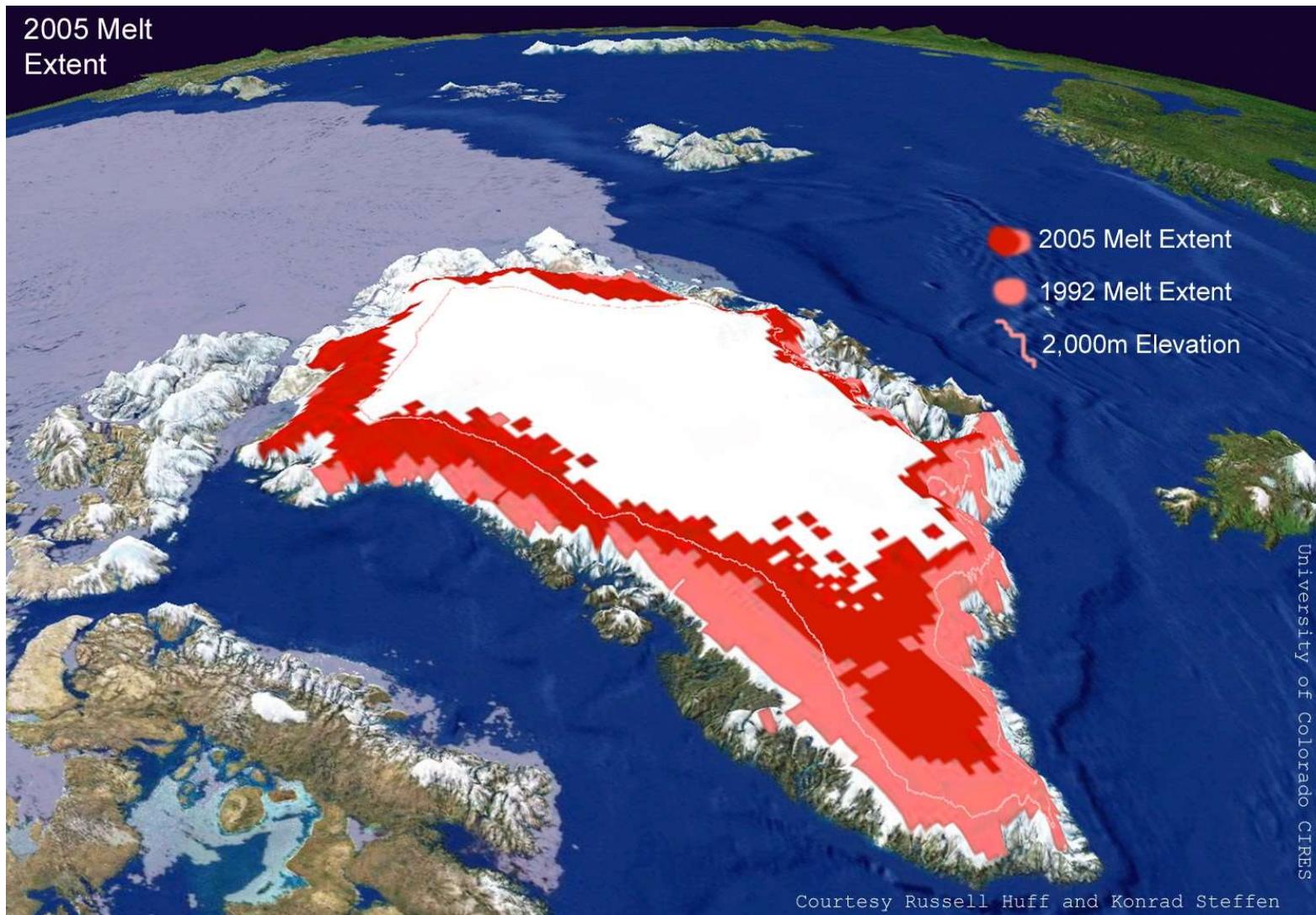
Higher CO₂

makes water more acidic.

Bad for things with shells.



Vectors for disease,
have expanded their range too.
Oh, hello Zika.



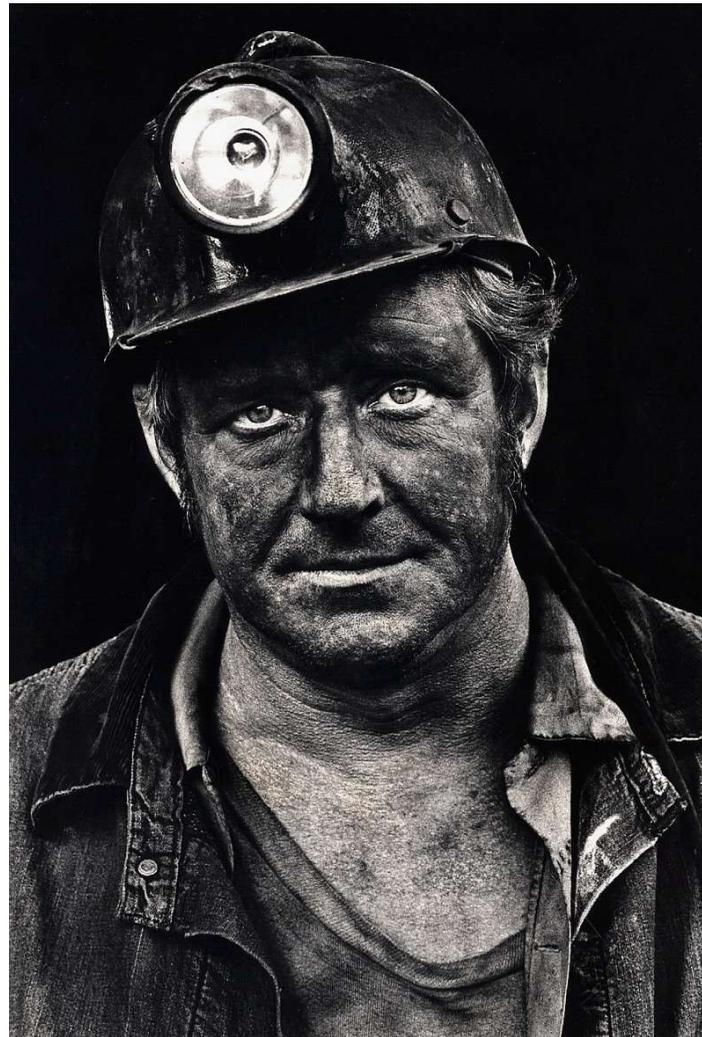
If Greenland ice melts,
sea level up 20 feet.
Big ice, big water.





How many people?
People fleeing sea level?
One hundred million.

That many people,
maybe we should be concerned.
Where will they all go?



Familiar pattern,
electricity from coal.
A harmful pattern.



Mountain-top removal coal mining



Acid runoff from a coal mine



Smokestacks



Warnings must be heard.
Speak so our leaders listen,
respond to warnings.



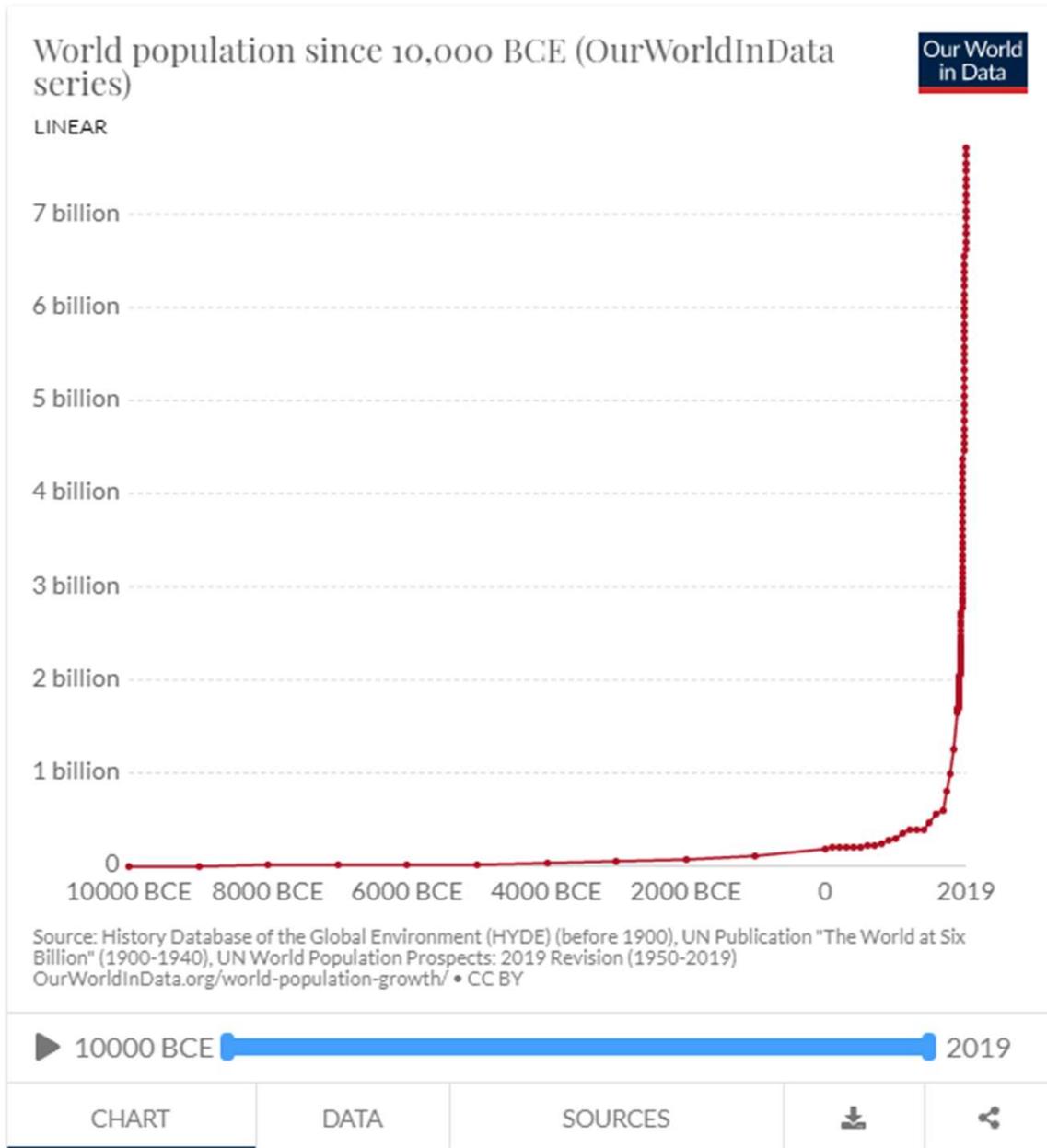
Say it like it is.
A climate emergency.
Action needed now.

It's clear what to do.
We only need to do it.
Break out of pattern.

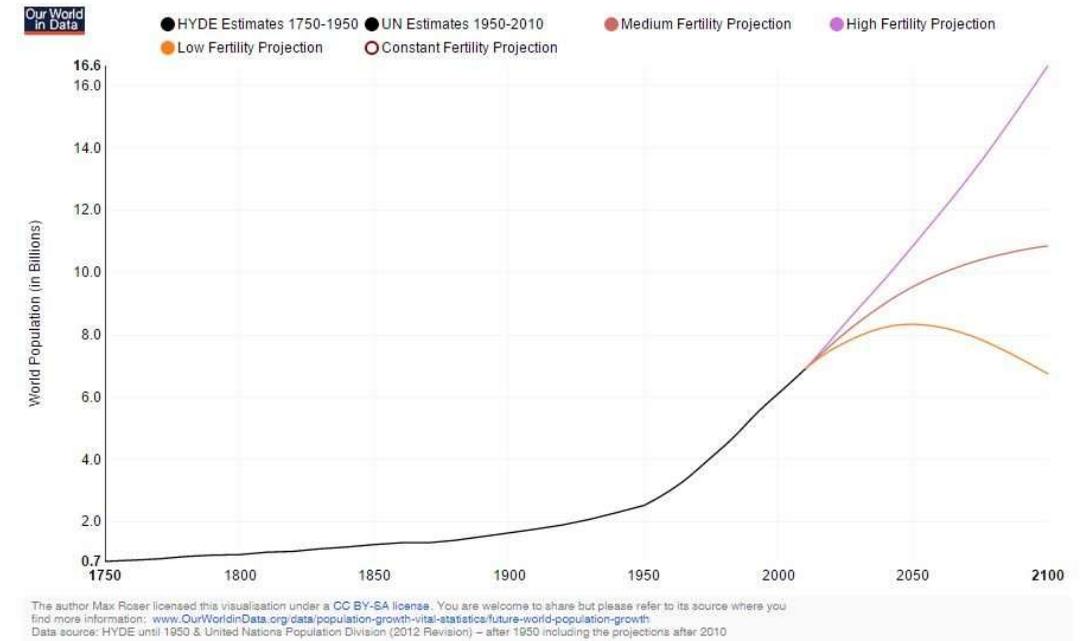


Something different,
putting pressure on the Earth,
more and more people.





Population in 1800 was 989 million



Population in 2020 was 7.8 billion



Burning the forest,
like we always used to do.

Can't burn anymore.

Fires in the Amazon over the past 48 hours

• Fires detected by satellite in the 48 hours leading up to 23 August, 2019, 11:30 a.m. GMT



CNN Sources: MODIS; NASA Earthdata/FIRMS, maps4news@here
Graphic: Henrik Pettersson, CNN



Emperor of Austria, till 1916 (Franz Joseph)



Emperor of Russia, till 1917 (Nicholas II)



Empress of China, till 1908 (Dowager Cixi)



Emperor of Japan, till 1926 (Taisho)

Patterns of the past,
we can't simply continue.
Nothing stays the same.



Cannot continue
making mistakes with Nature.
Nature remembers.

Time to be honest.
We are a force of Nature.
What kind will we be?



Shovel circa 1910



Shovel circa 2010

Big technologies,
our responsibility.
Moral choices needed.



Oil tanker



Gold mining



Oil tanker



Gold mining

Our way of thinking
builds the path to the future.
We make the future.

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Nine hundred papers.

All say humans are the cause.

A firm conclusion.

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From The STERN REVIEW: The Economics of Climate Change

Edward L.
Bernays
PUBLIC
RELATIONS

PR firm suggests:

"Reposition as theory."

This is how they work.

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Edward Bernays

With an Introduction by Mark Crispin Miller

P ropaganda

only through the active energy of the intelligent few can the public at large become aware of and act upon new ideas.

propaganda bears the same relation to education as to business or politics. It may be abused. It may be used to over-advertise an institution and to create in the public mind artificial values. There can be no absolute guarantee against its misuse.

a presidential candidate may be "drafted" in response to "overwhelming popular demand," but it is well known that his name may be decided upon by half a dozen men sitting around a table in a hotel room.

governments, whether they are monarchical, constitutional, democratic or communist, depend upon acquiescent public opinion for the success of their efforts and, in fact, government is government only by virtue of public acquiescence.



as civilization has become more complex, and as the need for invisible government has been increasingly demonstrated, the technical means have been invented and developed by which opinion may be regimented.

nowadays the successors of the rulers, those whose position or ability gives them power, can no longer do what they want without the approval of the masses, they find in propaganda a tool which is increasingly powerful in gaining that approval.

democracy is administered by the intelligent minority who know how to regiment and guide the masses.

an entire party, a platform, an international policy is sold to the public, or is not sold, on the basis of the intangible element of personality.

"Bernays's honest and practical manual provides much insight into some of the most powerful and influential institutions of contemporary industrial-state capitalist democracies."

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—Noam Chomsky



According to repeated nationwide surveys,

More Doctors Smoke **CAMELS** than any other cigarette!

Doctors in every branch of medicine were asked, "What cigarette do you smoke?" The brand named most was Camel!

You'll enjoy Camels for the same reasons so many doctors enjoy them. Camels have cool, cool *mildness*, pack after pack, and a *flavor* unmatched by any other cigarette. Make this sensible test: Smoke only Camels for 30 days and see how well Camels please your taste, how well they suit *your* throat as your steady smoke. You'll see how enjoyable a cigarette can be!

THE DOCTORS' CHOICE IS AMERICA'S CHOICE!



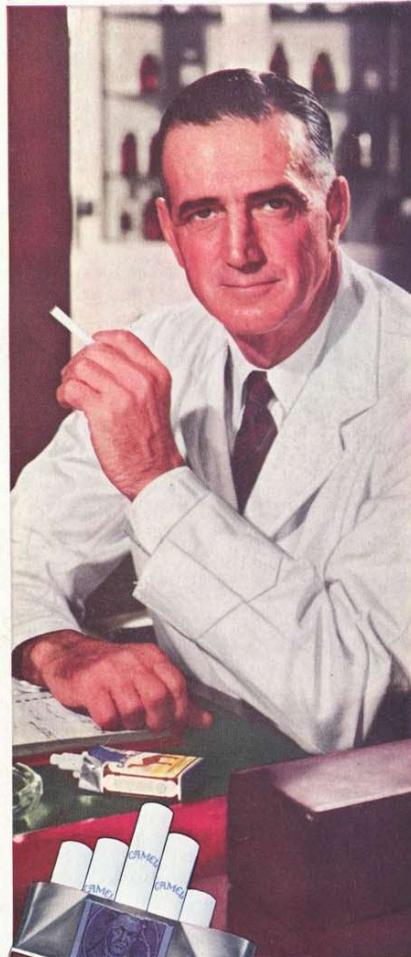
MAUREEN O'HARA says: "I pick Camels. They agree with my throat and taste wonderful!"



DICK HAYMES states: "I get more pleasure from Camels than from any other brand!"



RALPH BELLAMY reports: "Camels suit my taste and throat. I've smoked 'em for years!"

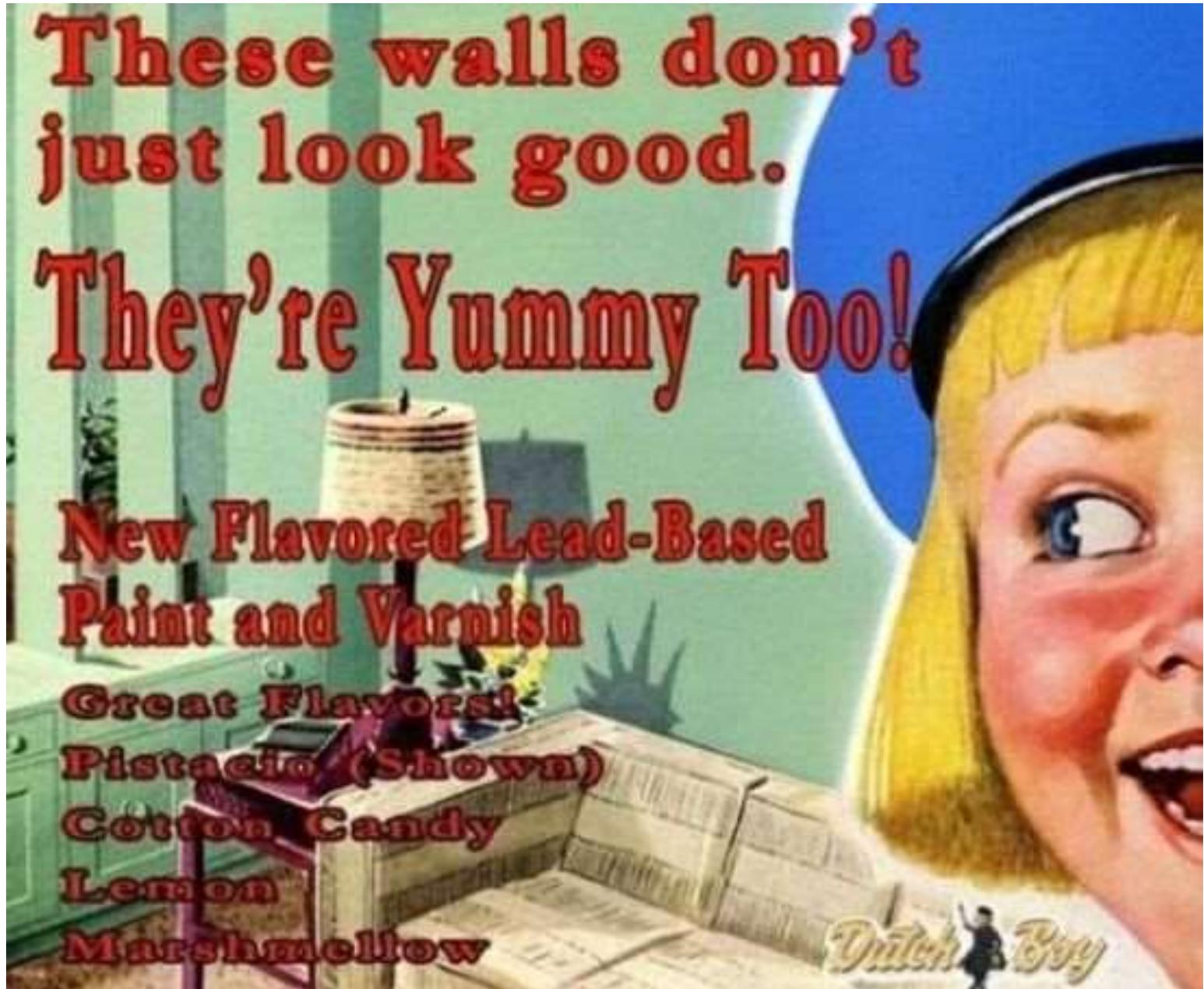


R. J. Reynolds Tobacco Co. Winston-Salem, N. C.



For 30 days, test Camels in your "T-Zone" (T for Throat, T for Taste).

We've seen this before.
Like, "More doctors smoke Camels."
Disinformation.



Information war.
The enemy is out there –
Vested interests.

“It is difficult to get a man to understand something when his salary depends upon his not understanding it.”

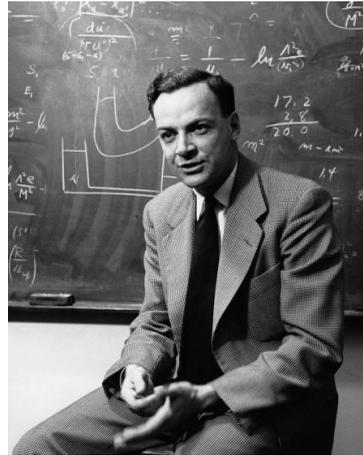
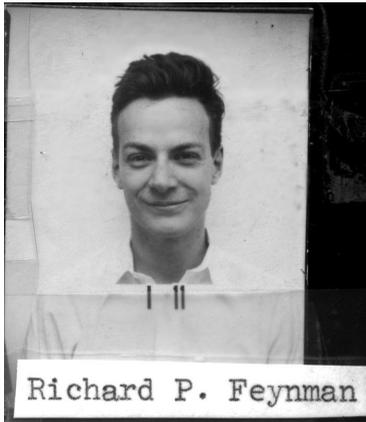
Upton Sinclair





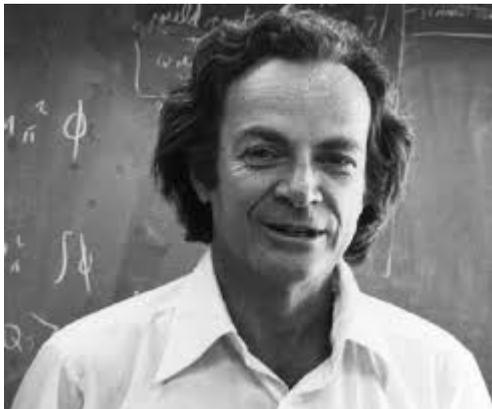
Al Gore Sr. raised tobacco. His daughter died of lung cancer.

Can be hard to see
all we have a need to see.
Connect all the dots.



“If it disagrees with experiment, it’s wrong. In that simple statement is the key to science. It doesn’t make any difference how beautiful your guess is, it doesn’t matter how smart you are who made the guess, or what his name is ... If it disagrees with experiment, it’s wrong. That’s all there is to it.”

Richard Feynman



Evil men spread lies,
but reality exists.
Scientists know it.



So, what can I do?

Vote! That's what is needed most.

Need group solutions.

"STRATEGIC PLAN FOR THE U.S. CLIMATE CHANGE SCIENCE PROGRAM," DRAFT TEXT, OCT. 2002

k 14 wetlands will expand in areas where meltwater resulting from deeper and longer thaw
15 periods does not have a natural drainage path to the ocean.
16 ~~Warming will also cause reductions in mountain glaciers and advance the timing of the melt~~
17 ~~of mountain snow packs in polar regions. In turn, runoff rates will change and flood~~
18 ~~potential will be altered in ways that are currently not well understood. There will be~~
19 ~~significant shifts in the seasonality of runoff that will have serious impacts on native~~
20 ~~populations that rely on fishing and hunting for their livelihood. These changes will be~~
21 ~~further complicated by shifts in precipitation regimes and a possible intensification and~~
22 ~~increased frequency of extreme hydrologic events. Reducing the uncertainties in current~~
23 ~~understanding of the relationships between climate change and Arctic hydrology is critical~~
24

*straying from
research
strategy into
speculative
findings
here.*

Changes to the work of scientists by Philip Cooney, Bush administration political appointee (not a scientist) and subsequently American Petroleum Institute lobbyist

Oil and gas lobby.
Scientists persecuted.
Inconvenient truth.

Forces of darkness
Influencing decisions.
Earth is in the balance.

Doing the right thing,
It's the most important thing,
For climate, for life.



Have hope, take action.

Protect the environment.

Communicate this.

Person by person,
connect, listen, and explain.

Enough minds will change.

Not one thing alone,
we've got to do many things.

We can, together.

We already know.

We know what to do, and how.

Have hope, take action.



We know what to do.
But how? Determination.
Then it can happen.

People make choices.
People caused climate crisis.
People can fix it.



Are we capable
of doing difficult things?
Ancestors say: Yes.





“[The Ozone Treaty is] the first truly global treaty that offers protection to every single human being.”

~ Mostofa K. Tolba,
Director of the UN Environment Programme

Political will.

No more ozone hole crisis.

That's how to do it.

To solve the problem,

use our political will.

Yes, we can do that.



Germany during WWII



Institutions created in a period of bold thinking after WWII to prevent the horrors of war

Civilization,
our ability to live,
that's what is at stake.

What kind of future?
This is a moral question.
Have hope, take action



A window's open.
The future is visible.
Is it what we want?



Our children will ask,
What were you thinking?
Hear that question now.