

The Logic of
Nature Versus
the Logic of
Industrial
Humans

Marty Walter

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CONNEC-
TIONS

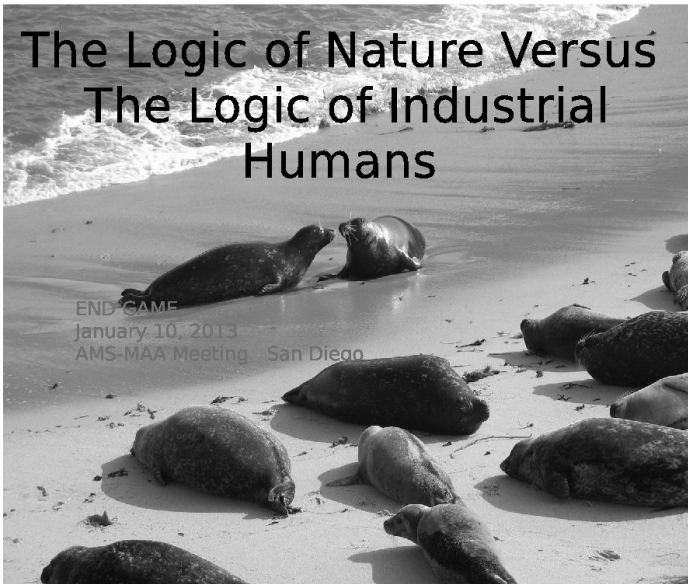
COUNTING
AND CON-
NECTING
EXERCISE

LOGICQUAKES

Humility is in
Order

The Logic of Nature Versus The Logic of Industrial Humans

END GAME
January 10, 2013
AMS-MAA Meeting San Diego



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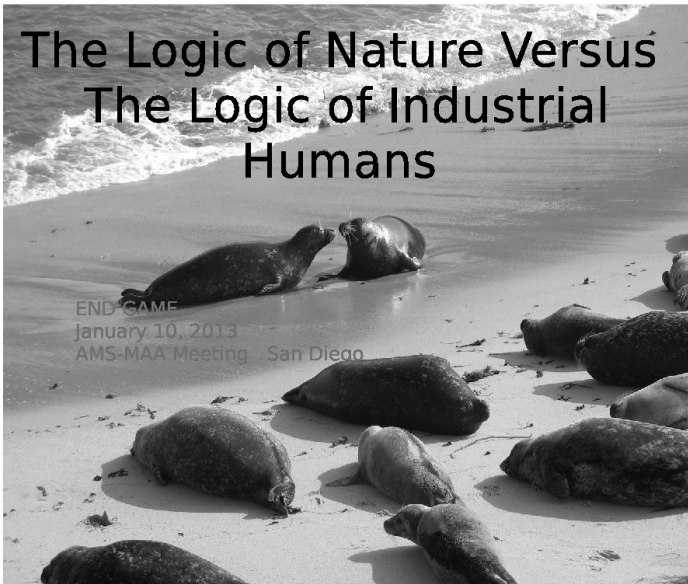
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Martin.Walter@Colorado.Edu

American Mathematical Society, San Diego Meeting,
January 10, 2013

We Math Teachers Have Important Work to Do!

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The Book/Class: 19 Years in the Making

Teaching Math as if Our Survival Matters

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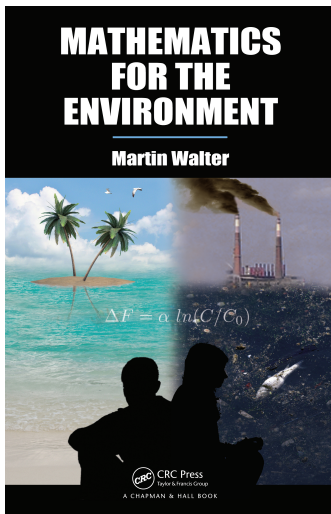
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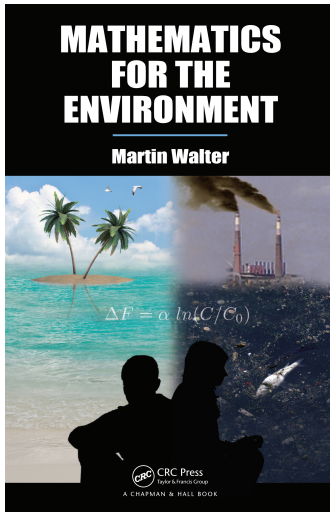
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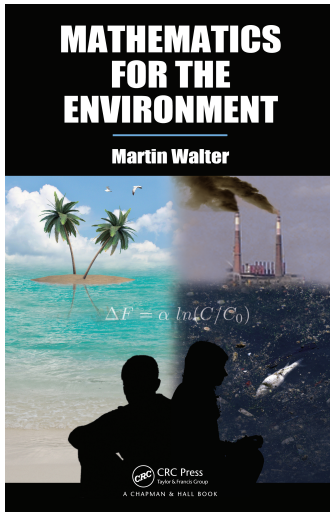
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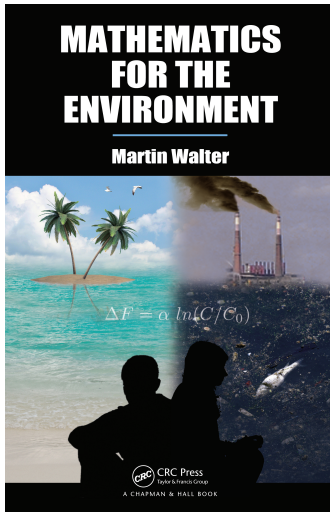
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- An EQUATION!

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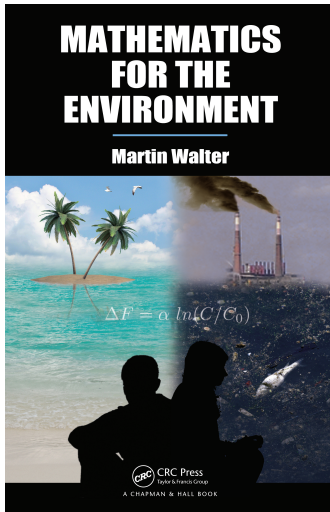
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- An EQUATION!
- $\Delta F = \alpha \ln(C/C_0)$

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The “Law of Gravity” for Climate Change

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First a little history: Two Scientists.

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First a little history: Two Scientists.



Joseph Fourier (1768-1830)
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Svante Arrhenius (1859-1927)
Discovered a Law of
Atmospheric Physics

The CO_2 Greenhouse Gas Law of Svante Arrhenius

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Question

What is this law?

The CO_2 Greenhouse Gas Law of Svante Arrhenius

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Question

What is this law?

Law

$$\Delta F = \alpha \ln(C/C_0)$$

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Question

What is this law?

Law

$$\Delta F = \alpha \ln(C/C_0)$$

$$C_0 = 275 \text{ ppm}$$

The CO_2 Greenhouse Gas Law of Svante Arrhenius

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Question

What is this law?

Law

$$\Delta F = \alpha \ln(C/C_0)$$

$$C_0 = 275 \text{ ppm}$$

$$C = 395 \text{ ppm}$$

The CO_2 Greenhouse Gas Law of Svante Arrhenius

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Question

What is this law?

Law

$$\Delta F = \alpha \ln(C/C_0)$$

$$C_0 = 275 \text{ ppm}$$

$$C = 395 \text{ ppm}$$

$$\alpha = \text{constant}$$

The CO_2 Greenhouse Gas Law of Svante Arrhenius

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Question

What is this law?

Law

$$\Delta F = \alpha \ln(C/C_0)$$

$$C_0 = 275 \text{ ppm}$$

$$C = 395 \text{ ppm}$$

$$\alpha = \text{constant}$$

$$\Delta F = \text{radiative forcing}$$

Increasing Carbon Emissions

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Increasing Carbon Emissions

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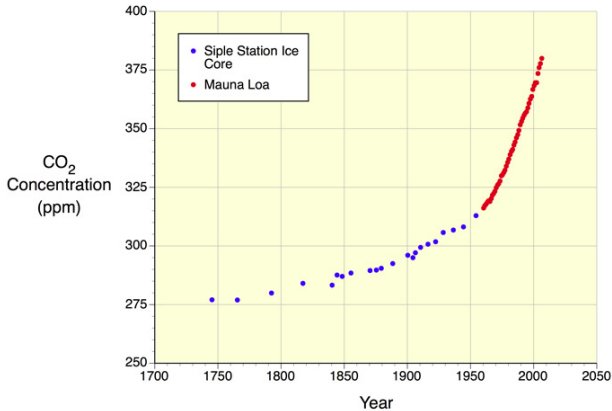
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Atmospheric Concentration of
Carbon Dioxide (1744-2005)



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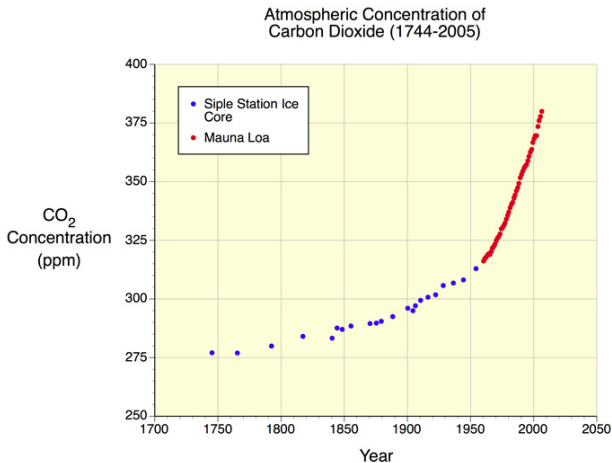
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This graph accounts for only about **HALF** of the calculated emissions. Where did the other half go?

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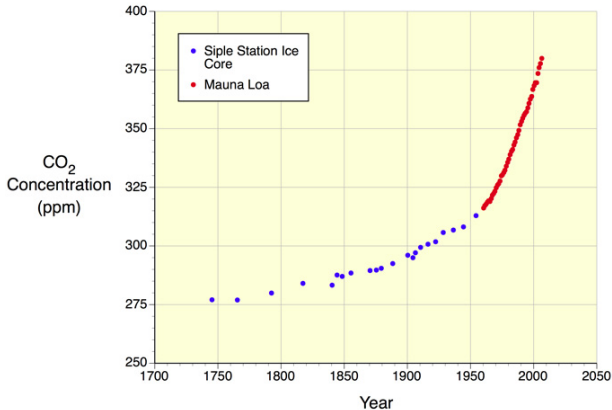
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Atmospheric Concentration of
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This graph accounts for only about **HALF** of the calculated emissions. Where did the other half go?

● **OCEAN ACIDIFICATION !**

Increasing Carbon Emissions Does it Matter?

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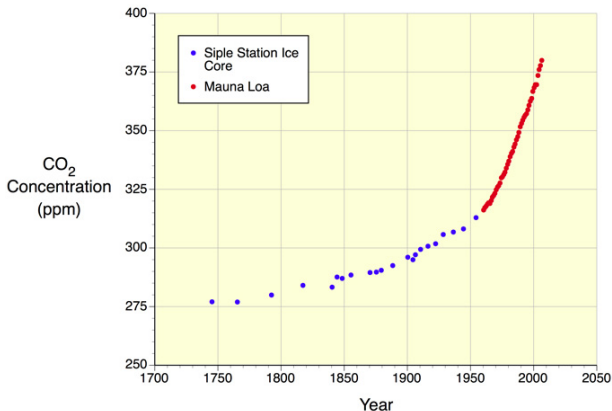
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Atmospheric Concentration of
Carbon Dioxide (1744-2005)



This graph accounts for only about **HALF** of the calculated emissions. Where did the other half go?

● **OCEAN ACIDIFICATION !**

Yes it Matters for Several Reasons

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Acid Ocean Damage Sooner Than Expected

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Extensive dissolution of live pteropods in the Southern Ocean

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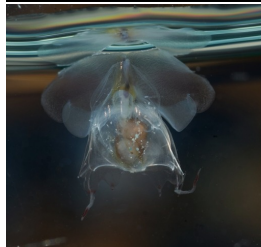
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Extensive dissolution of live pteropods in the Southern Ocean

N. Bednarek, G. A. Tarling
D. C. E. Bakker, S. Fielding
E. M. Jones, H. J. Venables
P. Ward, A. Kuzirian
B. Lz, R. A. Feely, E. J. Murphy
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Earthquakes and Weatherquakes: Mathematics and Climate Change

Martin E. Walter

In memory of Roger Gallet

In 1824 the French mathematician Jean Baptiste Joseph Fourier (1768-1830) in order to describe certain observations, created the term "greenhouse effect", [7, 8]. In modern language this effect occurs when visible spectrum sunlight passes through an enclosure-creating barrier, such as glass or an atmosphere, and the enclosure heats up because the barrier absorbs/emits infrared spectrum radiation or otherwise traps heat. This paper is one (small) mathematical step on the journey that Fourier began. Our main goal is to describe a plausible model wherein the proportion of extreme weather events, such as tornados, among all weather events, can be expected to increase as the concentrations of greenhouse gases, such as carbon dioxide, increase in the atmosphere.

In 1896 Swedish scientist Svante August Arrhenius (1859-1927), 1903 Nobel Prize winner in chemistry, was aware that atmospheric concentrations of CO₂ (and other gases) had an effect on ground level temperatures; and he formulated a "greenhouse law for CO₂", [1]. Were Arrhenius alive, the motivations for his study and the precise values of physical constants used in his models might change, but his greenhouse law remains intact today. From a reference published about 102 years after [1], namely, page 2718 of [14], we see Arrhenius's greenhouse law for CO₂ stated as:

(Greenhouse Law for CO₂) $\Delta F \sim \alpha \ln(C/C_0)$,

where C is CO₂ concentration measured in parts per million by volume (ppmv); C_0 denotes a baseline or unperturbed concentration of CO₂, and ΔF is the radiative forcing, measured in Watts per square meter, $\frac{W}{m^2}$. The Intergovernmental Panel on Climate Change (IPCC) assigns to the constant α the value 6.3; [14] assigns the value 5.35. Radiative forcing is directly related to a corresponding (global average) temperature, by definition radiative forcing is the change in the balance between radiation coming into the atmosphere and radiation going out. A positive radiative forcing tends on average to warm the surface of the Earth, and negative forcing tends on average to cool the surface. (We will not go into the details of the quantitative relationship between radiative forcing and global average temperature.)

Qualitatively his CO₂ thesis, which Arrhenius was the first to articulate, says: *increasing emissions of CO₂ leads to global warming*. Arrhenius predicted that doubling CO₂ concentrations would result in a global average temperature rise of 5 to 6 deg C. In 2007 the IPCC calculated a 2 to 4.5 deg C rise. This is fairly good agreement given that more than a century of technology separates the two sets of numbers.

For the record, cf. [2], preindustrial concentrations of CO₂ are estimated to have been about 280 ppmv. From [2], page 43, we see a table of global, average annual CO₂ concentrations from 1960 when it was 316.91 ppmv to 2006 when it was approximately 381.84 ppmv. In this table the function of CO₂ concentration versus time is essentially an increasing function from 1960 to the present (neglecting the annual fluctuation). We

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THEOREM: A *modest* increase in global temperatures likely leads to

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For the record, cf. [2], preindustrial concentrations of CO_2 are estimated to have been about 280 ppmv. From [2], page 43, we see a table of global, average annual CO_2 concentrations from 1960 when it was 316.91 ppmv to 2006 when it was approximately 381.84 ppmv. In this table the function of CO_2 concentration versus time is essentially an increasing function from 1960 to the present (neglecting the annual fluctuation). We

THEOREM: A *modest* increase in global temperatures likely leads to an *immodest* increase in EXTREME weather events.

Yes It's a Matter of Life and Death

The Logic of
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Earthquakes and Weatherquakes: Mathematics and Climate Change

Martin E. Walter

In memory of Roger Gallat

In 1824 the French mathematician Jean Baptiste Joseph Fourier (1768-1830) in order to describe certain observations, created the term "greenhouse effect", [7, 8]. In modern language this effect occurs when visible spectrum sunlight passes through an enclosure-creating barrier, such as glass or an atmosphere, and the enclosure heats up because the barrier absorbs/emits infrared spectrum radiation or otherwise traps heat. This paper is one (small) mathematical step on the journey that Fourier began. Our main goal is to describe a plausible model wherein the proportion of extreme weather events, such as tornados, among all weather events, can be expected to increase as the concentrations of greenhouse gases, such as carbon dioxide, increase in the atmosphere.

In 1896 Swedish scientist Svante August Arrhenius (1859-1927), 1903 Nobel Prize winner in chemistry, was aware that atmospheric concentrations of CO_2 (and other gases) had an effect on ground level temperatures; and he formulated a "greenhouse law for CO_2 ", [1]. Were Arrhenius alive, the motivations for his study and the precise values of physical constants used in his models might change, but his greenhouse law remains intact today. From a reference published about 102 years after [1], namely, page 2718 of [14], we see Arrhenius's greenhouse law for CO_2 stated as:

(Greenhouse Law for CO_2) $\Delta F \sim \alpha \ln(C/C_0)$,

Martin E. Walter is professor of mathematics at the University of Colorado. His email address is walter@uic11d.colorado.edu.

where C is CO_2 concentration measured in parts per million by volume (ppmv); C_0 denotes a baseline or unperturbed concentration of CO_2 , and ΔF is the radiative forcing, measured in Watts per square meter, $\frac{\text{W}}{\text{m}^2}$. The Intergovernmental Panel on Climate Change (IPCC) assigns to the constant α the value 6.3; [14] assigns the value 5.35. Radiative forcing is directly related to a corresponding (global average) temperature, by definition radiative forcing is the change in the balance between radiation coming into the atmosphere and radiation going out. A positive radiative forcing tends on average to warm the surface of the Earth, and negative forcing tends on average to cool the surface. (We will not go into the details of the quantitative relationship between radiative forcing and global average temperature.)

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CO_2 is giving a one-percent boost to solar heating.

Another Technical Detail

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Athabasca Tar Sands

BEFORE



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3 Million Barrels of Water per Day

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One Million Barrels of Bitumen per Day

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This is XTREME 2

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THE NEW YORK TIMES NATIONAL SATURDAY, NOVEMBER 24, 2012

A13

Pipeline Protest Draws Pepper Spray From Deputies

By SAUL ELBEIN

WELLS, Tex. — The first construction workers to arrive at TransCanada's Keystone XL construction site on Monday morning found climbing ropes tied to their equipment. Three protesters had hung platforms from pine trees, hoisted them 50 feet into the air and secured them to TransCanada construction equipment. Then they had shimmed up. The equipment could not be moved without pulling the protesters out of the trees.

At another site down the road, workers found four protesters kneeling on the pipeline easement, their arms locked through the trunks of two bulldozers.

By 10 o'clock, a group of about 40 protesters had gathered along the shoulder of the highway. They chanted "Go back to Canada" and waved signs with messages like "TransCanada: No eminent domain for private gain" and "Don't mix Canadian tar with Texas water."

It is a scene that has become common in East Texas in the last two months. Since September, when construction began on the Keystone, the Tar Sands Blockade, a grass roots coalition of East Texas landowners and environmental advocates from across the country, has been waging a nonviolent guerrilla campaign against the pipeline. About every week since construction began, blockade volunteers have locked themselves to construction equipment in protest. So far, 43 have been arrested. But on Monday, protesters who were not locked to equipment were pepper-sprayed as well, the first such incident, according to Ron Seifert, a spokesman for the Tar Sands Blockade.

The protesters have come from across the country. Some are young activists from the coasts, veterans of the Occupy movement and other environmental campaigns who believe that devastating the Alberta tar sands will seriously aggravate climate change. Many are locals angered by what they see as TransCanada's high-handed treatment of landowners.

"I don't like how they've treated people," said 75-year-old Jeanette Singleton of nearby Nacogdoches, who was worried about the Keystone's effect on the Angoulin River. "If you don't want to



NEW YORK TIMES PHOTOGRAPHERS

A protester occupied a tree along the route of the Keystone XL TransCanada Pipeline during an October demonstration by the Tar Sands Blockade. Below, sections of pipe in Sumner, Tex.



AP/WIDEWORLD

sign, they just take your land from you. It doesn't seem right." TransCanada has attracted particular ire for its use of eminent domain to take easements from landowners who did not want to sign. Many landowners who eventually did sign say they did so out of fear of having their land seized otherwise.

This widespread landowner resentment has created a fertile ground for the blockade's resist-

ance to the pipeline. The protests on Monday took place with the support of the landowners whose property the easement crossed.

TransCanada has fought back against the protests by hiring off-duty police officers to patrol its pipeline easements, arresting any trespassers. (That has included, in one case, the owner of the land the easement went through.) The company has also filed civil suits against protesters

It's law enforcement's call, a company spokesman says.

and the landowners who have supported them.

When TransCanada's construction workers found the protesters on Monday, they called the police. Deputies from the Cherokee County Sheriff's Department arrived at the site where the four protesters were locked to tractors and asked them to unlock themselves. When the protesters refused, the deputies administered pepper spray.

After the deputies cut the first pair free, they moved them over to a backhoe, where they left them for more than an hour while they tried to free the second pair. Unable to do so, they pepper-sprayed the second pair until they unlocked themselves.

Around noon, on the advice of a lawyer, the landowners hosting the sit-in revoked the protesters' permission to be there. Sheriff's deputies came with a cherry picker on a flatbed trailer to remove the protesters from the trees. When other protesters blocked the truck, deputies warned them to get out of the road and then began firing pepper spray into the crowd. Ms. Singleton was unable to get out of the road in time and was hit in the face with the spray.

One by one, the tree sitters were arrested.

After the police had left, protesters sat her in a wheelchair on the shoulder of the highway and doused her eyes with milk of magnesia to alleviate the burning.

"I don't believe it," Ms. Singleton kept saying. "I just don't believe it."

A TransCanada spokesman said the company had nothing to do with the police response.

"TransCanada doesn't determine who to arrest or how to handle a situation," said the spokesman, David DePom. "When there's contact with protesters, we contact law enforcement, and law enforcement takes appropriate action."

Remember the Noedisti

Fracking for Gas 1

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Fracking for Gas 2

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Fact

*The fossil fuel industry has in its reserves **5 times*** the carbon needed to raise global temperatures 2 degrees C.*

Nature to Humans: *WAKE UP !!*

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*The fossil fuel industry has in its reserves **5 times*** the carbon needed to raise global temperatures 2 degrees C.*

Fact

If we continue with business and politics as usual, “the market” will burn enough carbon to completely collapse complex civilization.

Nature to Humans: *WAKE UP !!*

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Fact

If we continue with business and politics as usual, “the market” will burn enough carbon to completely collapse complex civilization.

Fact

Humans are putting CARBON into the atmosphere 1,000,000 times faster than Nature sequestered it into the Earth. This is Bad for Biodiversity.

* www.carbontracker.org

We Can Avoid This!

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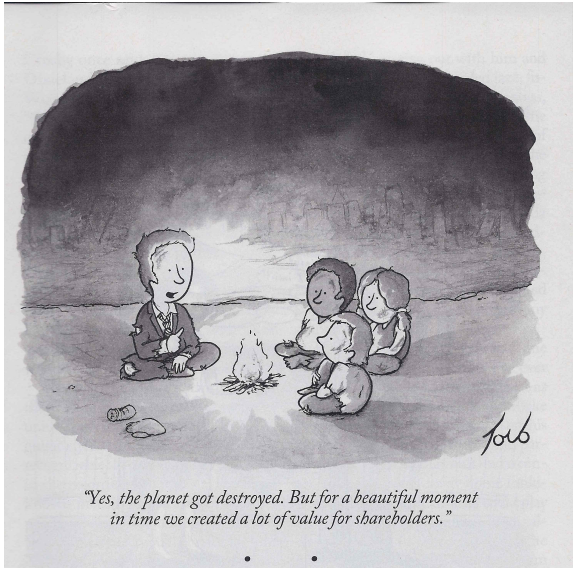
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For Example: 100 % Electric Cars are Back!

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The Electric Car was killed in 1900 and 2000 — But it is Back.



Just Plug It In To

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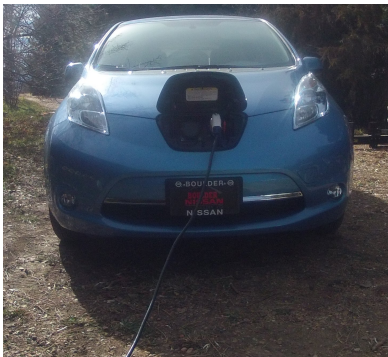
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TO SOLAR OR WIND ENERGY

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We Can Run the World Economy on Renewable Energy

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There is enough renewable energy for all of us.

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For a proof see my book!

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- Put Solar Collectors on Urbanized Space—roofs etc.

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- Put Solar Collectors on Urbanized Space—roofs etc.
- Collect Wind Energy Without Killing Birds

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- Put Solar Collectors on Urbanized Space—roofs etc.
- Collect Wind Energy Without Killing Birds
- Algae Biodiesel Exists

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- Electrolysis Alcohol Exists

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- Electrolysis Alcohol Exists
- Storage Exists

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For a proof see my book!

- Put Solar Collectors on Urbanized Space—roofs etc.
- Collect Wind Energy Without Killing Birds
- Algae Biodiesel Exists
- Electrolysis Alcohol Exists
- Storage Exists
- Imagination and Creativity Still Exist!

Let's Do an Exercise

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Let's use WATER to Connect a few Numbers and Concepts.

Dust Bowl: Farmers Focus on Wheat!

We ALL Facilitated it (WWII) → Ogalla Aquifer

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Drought Map 2012

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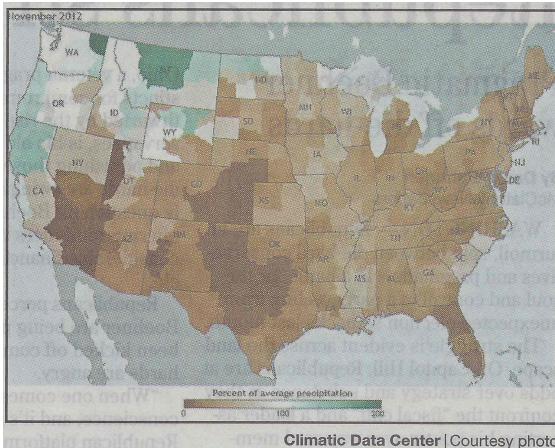
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Don't Forget Fire

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Fire is Often Up-Close and Personal

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POPULATION BOMB EXPLODES

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Water in the SouthWest?

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Water in the SouthWest? In Las Vegas?

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Water in the SouthWest? In Las Vegas?

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newscasts, giving talks to cli-

James Balog
Chasing Ice
Montana
Alaska
Greenland
Iceland

Much Faster Than Predicted

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f t p

Daily Camera

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Bohn rules out Mangino, Petrino, Sports 1C

Friday, November 30, 2012 • 75¢ • www.dailycamera.com

Scientists highlight record melting

Greenland, polar sea ice top concerns

by Charlie Brennan
Camera Staff Writer

The polar ice sheets of Antarctica and Greenland are now melting three times faster than in the 1990s, according to a study released Thursday and co-authored by a Boulder scientist.

To date, it is believed that ice-sheet melt has only added about half an inch to rising sea levels. But the

quicker pace of melting, particularly in Greenland, now has ice scientists worried.

New research published in the journal *Science* concludes that Antarctica is melting, but points to the smaller ice sheet in Greenland, which covers most of the island, as the more critical issue. Its melt rate has grown from about 55 billion tons a year in the 1990s to almost 290 billion tons a year recently, according to the study.

"Greenland is really taking off," said the study's co-author Ted Scambos, lead scientist at Boulder's National Snow and Ice Data Center, which is part of the University of Colorado.

"In Greenland, the melt was so severe that it took away the very instruments we used to measure the ice sheet," Scambos added. "Many in-

SEELT, 8A

This July 4 image shows surface melt water rushing along the surface of the Greenland Ice Sheet through a supra-glacial stream channel southwest of Ilulissat, Greenland.

Associated Press

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Estimates Can Be Too Conservative!

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8A | FRIDAY, NOVEMBER 30, 2012

DAILY CAMERA

Melt 'proceeded to a level we have never seen before'

Continued from 1A

struments were melted out and toppled over because melt proceeded to a level we have never seen before."

The work of the NSIDC also made waves Thursday on the other side of the world. It was reported at the U.N. climate talks in the Qatari capital of Doha that, based on data supplied by Boulder researchers, an area of Arctic sea ice larger than the United States melted this year.

The dramatic record-low reading of Arctic sea ice documented in the U.N. report prompted the World Meteorological Organization to declare climate change is happening "before our eyes."

Arctic ice melt was one of numerous record-breaking weather events to hit the planet in 2012, but the ice melt dominated the yearly climate report, with the U.N. concluding ice cover had reached "a new record low" in the area around the North Pole.

The loss of ice measured during the warming months of March to September was a staggering 4.57 million square miles — an area bigger than the U.S.

WMO Secretary-General Michel Jarraud said, "The alarming rate of its melt this year highlighted the far-reaching changes taking place on

"The decline of sea ice seems to have accelerated over the past. It has just gotten faster. The year of 2007, we were all astounded; there was all kinds of talk about what was happening. But in 2012, we didn't just beat — we blew out the old record."

Mark Serreze
director of CU's National Snow and Ice Data Center

the concentrations of greenhouse gases in the atmosphere, which ... again reached new records."

According to Mark Serreze, director of CU's NSIDC, "The decline of sea ice seems to have accelerated over the past. It has just gotten faster. The year of 2007, we were all astounded; there was all kinds of talk about what was happening. But in 2012, we didn't just beat — we blew out the old record."

"From where we're looking now, we don't see any evidence that this trend is going to stop," Serreze added. "My view is we could be looking at an Arctic Ocean with no sea ice in summer by 2030, or 20 or 30 years from now."

Representing Boulder's NSIDC in Doha is scientist Ken Schneider, whose area of specialty is permafrost carbon cycle feedback.

As Serreze explained, there

become active in the atmosphere.

"Respiration ensues, and they breathe out carbon — mostly as carbon dioxide, but also as methane," Serreze said.

"Then, that adds to the atmosphere's existing load of greenhouse gases, makes it even warmer and drives even more of the permafrost, and gives an even bigger carbon release. There is a concern out there that this could become a significant player" in climate change. "Once the genie is out of the bottle, you can't put it back in."

As for the sea ice, because of the size of the world's oceans, it takes a lot of ice melting — about 10 trillion tons — to raise sea levels by 1 inch. Since 1992, ice sheets at the poles have lost nearly 5 trillion tons of ice, according to researchers, raising sea levels by about a half inch.

ist Erik Ivins, another co-author of the study concerning the Antarctic and Greenland ice sheets.

"The more energy there is in a wave, the further the water can get inland," Ivins said.

Scientists blame man-made global warming for the melting. Burning fossil fuels, such as coal and oil, emits carbon dioxide and other greenhouse gases that trap heat, warming the atmosphere and oceans. Gradually, that erodes the ice sheets from above and below. Snowfall replenishes the ice sheets but hasn't kept pace with the melting.

Just how much ice is vanishing at the two poles has been difficult for scientists to answer. In 2007, the Intergovernmental Panel on Climate Change did not include ice sheet melt in its calculations of future sea level rise because numbers were so uncertain.

Scambos said the study he co-authored involved more than 50 scientists working to reconcile three different methods of measuring ice sheet loss. Their work leaves him optimistic that ice-sheet melt's contribution to rising sea levels can soon be quantified with greater confidence — most likely in a 2014 report by the IPCC.

The Associated Press

Obesity: As We All Grow Fatter

The Logic of
Nature Versus
the Logic of
Industrial
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Marty Walter

WELCOME

CLIMATE
CHANGE –
CONNECTIONS

COUNTING
AND CONNECTION
EXERCISE

LOGICQUAKES

Humility is in
Order

16A | SUNDAY, NOVEMBER 25, 2012

DAILY CA

World briefs

Cairo | Hamas No. 2 rejects Gaza arms halt

Gaza's ruling Hamas will not stop arming itself because only a strong arsenal, not negotiations, can extract concessions from Israel, the No. 2 in the Islamic militant group told The Associated Press in an interview Saturday.

The comments by Moussa Abu Marzouk, just three days after the worst bout of Israel-Hamas fighting in four years, signaled trouble ahead for Egyptian-brokered talks between the hostile neighbors on a new border deal.

Hamas demands that Israel and Egypt lift all restrictions on the movement of goods and people in and out of the Palestinian territory, which has been buckling under a border blockade since the Islamists seized the territory in 2007. The restrictions have been eased somewhat in recent years, but not enough to allow Gaza's battered economy to develop.

Israeli officials were not immediately available for comment Saturday, the Jewish Sabbath. However, an Israeli security official said this week that Israel would

likely link a significant easing of the blockade to Hamas' willingness to stop smuggling weapons into Gaza and producing them there.

Abu Marzouk said Saturday that the group would not disarm, arguing that recent Palestinian history has shown that negotiations with Israel lead nowhere unless backed by force.

Mexico City | Nation faces diabetes 'disaster' as obesity levels soar

With each bite into a greasy taco and slurp of a sugary drink, Mexico hurtles toward what health experts predict will be a public health crisis from diabetes-related disease.

A fifth of all Mexican women and more than a quarter of men are believed to be at risk for diabetes now. It's already the nation's No. 1 killer, taking some 70,000 lives a year, far more than gangster violence.

Public health experts blame changes in lifestyle that have made Mexicans more obese than anywhere else on Earth except the United States. They attribute changes to powerful snack

and soft drink industries, newly sedentary ways of living and a genetic heritage susceptible to diabetes, a chronic, life-threatening illness.

Palestine | Arafat's body to be exhumed

RAMALLAH — The body of late Palestinian leader Yasser Arafat is to be exhumed on Tuesday, in an official ceremony that will see the corpse returned to the grave on the same day once samples needed to determine the cause of his death are taken, a Palestinian official said Saturday.

Tawfik Tirawi, who heads the official Palestinian committee investigating Arafat's death, said Swiss, French and Russian forensic teams would be present at the site.

A Swiss lab carried out tests on Arafat's belongings in August and found traces of the poisonous radioactive material polonium. The finding prompted the Palestinian Authority and Arafat's widow to demand a further investigation of the causes and reasons for his death.

Camera wire services

Food Monopolies: SHUT UP and eat GMOs! (no labels in U.S.)

The Logic of
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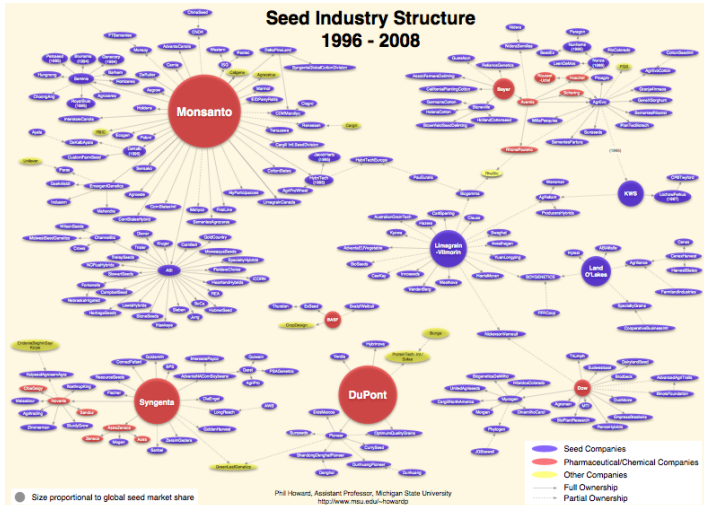
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Where to Buy Organic Seeds?

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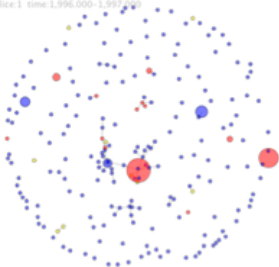
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slice:1 time:1,996,000-1,997,000



slice:13 time:2,008,000-2,009,000



The Logic of Industrial Agriculture is NOT Sustainable

The Logic of
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It takes 10 CAL of Fossil Fuel Energy
to put
1 CAL of Food on our plates.

Treadmill ONE of Industrial Agriculture

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Synthetic (Fossil Fuel) Pesticides



Treadmill TWO of Industrial Agriculture

Synthetic (Fossil Fuel) Fertilizer

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Precious Soil and Toxic Chemicals → Oceanic Dead Zones



Treadmill THREE of Industrial Agriculture

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THE FINANCIAL TREADMILL

INPUTS from Corporations (cost go up):

SEEDS: from Monsanto et al (used to grow our own)

CHEMICALS: Pesticides/Fertilizers

FARM OUTPUTS (to Corporations) Cargill, Conagra etc.

Price paid ??

Water Bottled in Plastic from Athabasca?

The Logic of
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Colorado Oil and Gas Association:

“Only” $6.5 * 10^{12}$ gallons/year of water
is used to frac 43,000 oil/gas wells in Colorado.

Water Bottled in Plastic from Athabasca?

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In U.S. we consume about $9 * 10^9$ gallons of bottled water/year.

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The ratio is ONE THOUSAND!

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Where does the plastic end up?

Great Garbage Patch

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Death in the Garbage Patch

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Bird Death in the Garbage Patch

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Mammal Death in the Garbage Patch

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Garbage Death: Hawaii

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Turtle Death in the Garbage Patch

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More Turtle Death in the Garbage Patch

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The Oceans are a DUMPING GROUND

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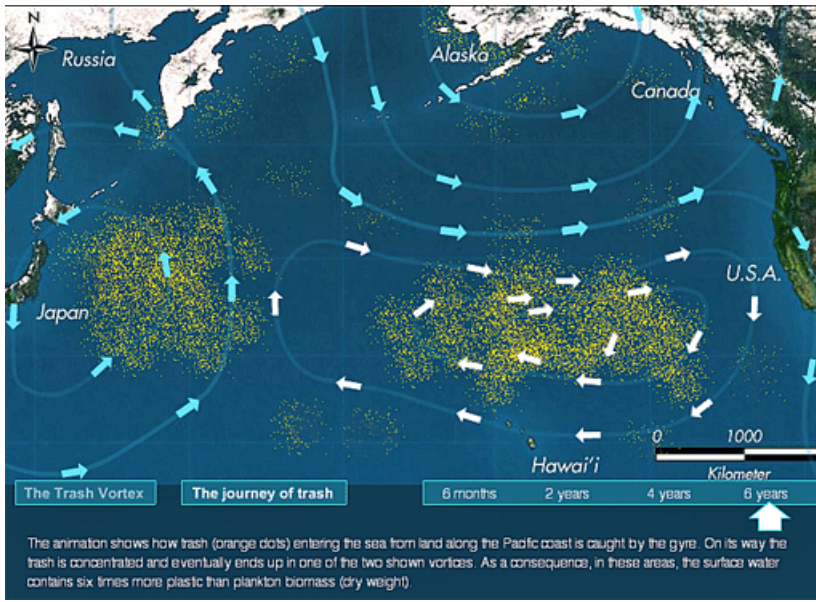
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There are FIVE Gyres

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70 Million Shark Deaths Globally per Year

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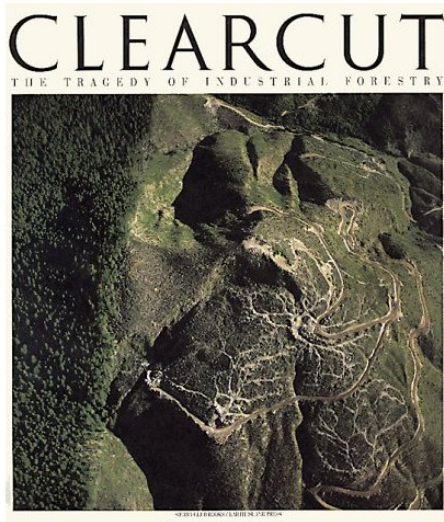
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Shawn Heinrichs: **NINETY PERCENT** of ocean's **BIG FISH**

are gone!

AT LEAST 90% of global WILDERNESS IS GONE



As of 1990: **NINETY SIX PERCENT** of U.S. **BIG TREES** gone

ENTROPY is just as important as ENERGY

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Humans take the *lowest entropy* fish.

Humans take the *lowest entropy* trees.

Humans take the *lowest entropy* everything.

(A century and a half ago one could find a 1 ounce nugget of nearly pure gold.

Today it can take 400 tonnes of gold ore to produce 1 ounce of gold.)

Human OUTPUT is *HIGH entropy* waste (pollution?)

We live on *low entropy* just as much as we live on energy.

This is one of the lessons of **ECOLOGICAL ECONOMICS**.

It takes TIME and ENERGY to LOWER ENTROPY.

Homework Calculation: Are we running out of time and/or energy?

Drought Affects Transport/Food and Hydropower

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THE NEW YORK TIMES NATIONAL TUESDAY, NOVEMBER 27, 2012

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A17

After Drought, Reducing Water Flow Could Hurt Mississippi River Transport

By JOHN SCHWARTZ

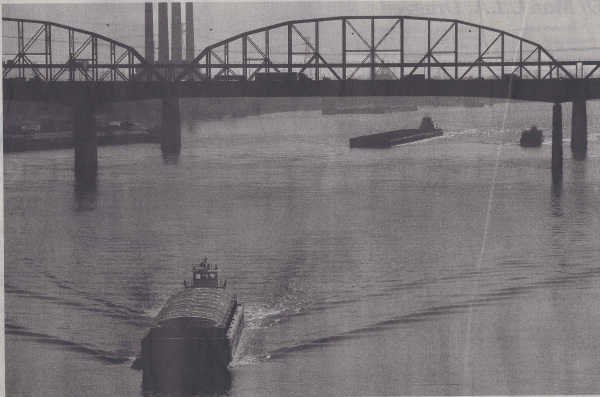
The drought of 2012 has already caused restrictions on barge traffic up and down the Mississippi River. But things are about to get a lot worse.

As part of an annual process, the Army Corps of Engineers has begun reducing the amount of water flowing from the upper Missouri River into the Mississippi, all but ensuring that the economically vital river traffic will be squeezed even further. If water levels fall low enough, the transport of \$7 billion in agricultural products, chemicals, coal and petroleum products in December and January alone could be stalled altogether.

"Without the river, we're in a world of hurt," said Kathy Mathers, a spokeswoman for the Fertilizer Institute. About half of the spring fertilizer that the industry

A routine annual process may affect \$7 billion in products.

sells to Midwestern farmers travels upriver, she said, and options to get the fertilizer to the fields by other means are few. "We know the rail cars aren't there," she said. The corps reduces water flow from the upper Missouri every year as part of its master plan for maintaining irrigation systems and meeting other water needs of the region, which stretches from Montana to St. Louis. This year, the Corps



Barges on the Mississippi River in St. Louis on Friday. A plan approved by Congress for maintaining irrigation systems is likely to affect shipping in the region.

BY AP/WIDEWORLD/ARND BRONKHORST

Extreme Weatherquakes are Expensive

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Mississippi | Drought could make state impassable to barges

ST. LOUIS — After months of drought, companies that ship grain and other goods down the Mississippi River are being haunted by a potential nightmare: If water levels fall too low, the nation's main inland waterway could become impassable to barges just as the harvest heads to market.

Any closure of the river would upend the transport system that has carried American grain since before steamboats and Mark Twain. So shipping companies are scrambling to find alternative ways to move tons of corn,

BUSINESS

News in brief

Weather | Sandy delivers heavy blow to U.S. economy

WASHINGTON — Superstorm Sandy packed a bigger economic punch than most people had thought.

In its sweep through the Northeast, the storm halted sales at major retailers at the start of the crucial holiday shopping season, closed factories and slowed home sales in one of the most densely populated areas of the country.

On Thursday, for example, Kohl's, Target and Macy's blamed the storm for weak sales in November. Macy's and Nordstrom Inc. reported their first monthly sales drop since late 2009, when the U.S. economy was just emerging from the Great Recession.

And the government said this week that new-home sales plunged 32 percent in the Northeast last month and nearly 12 percent in the South. By contrast, sales surged nearly 63 percent in the Midwest and nearly 9 percent in the West.

Sandy is being blamed for about \$62 billion in damage and other losses in the U.S., most of it in New York and New Jersey. It's the second-costliest storm in U.S. history after Hurricane Katrina, which caused \$128 billion in damage in inflation-adjusted dollars.

New York is seeking \$42 billion in federal aid, including about \$9 billion for projects to head off damage in future storms. New Jersey is seeking nearly \$37 billion in aid, including \$7.4 billion for future projects.

We FOCUS on ONE VARIABLE == ME

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Order

In the Dust Bowl farmers focused on producing WHEAT, to the exclusion of all other variables.

Society facilitated this focus. Fight WWII, government policy=homestead

We FOCUS on ONE VARIABLE == ME

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The latest financial crisis: The well situated FEW focused on ONE VARIABLE.

ACCUMULATE as much wealth as possible.

We facilitate the next financial collapse because we “bailed out” those who caused the last one – even after they caused it.

Six Corporations Control Over Half of ALL MEDIA

The Logic of Nature Versus the Logic of Industrial Humans

Marty Walter

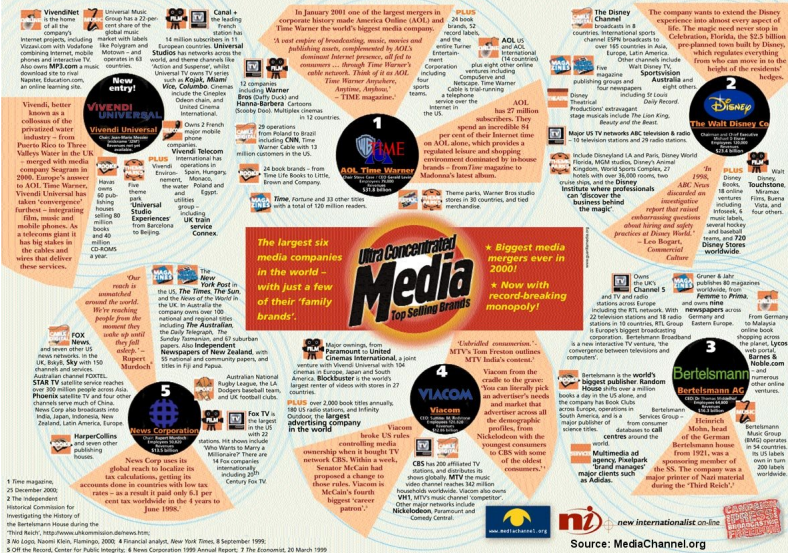
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CLIMATE CHANGE – CONNECTIONS

COUNTING AND CONNECTING EXERCISE

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Humility is in Order



The Greatest Failing of the Human Race?

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LOGICQUAKES

Humility is in
Order

Our addicition to **GROWTH**, population growth in particular, led Professor Albert A. Bartlett to say:

“The greatest shortcoming of the human race is our inability to understand the the exponential function.”

The Greatest Failing of the Human Race?

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Given Arrhenius’s Law, I would add

And our inability to understand the INVERSE of the exponential function.

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Given Arrhenius’s Law, I would add

And our inability to understand the **INVERSE** of the exponential function.

But I think there is an even greater failing: A **LOGICAL** one (logic = patterns in thought)

We focus on one variable in Nature, **ourselves**. We do our best to live in a reality of our own creation, detached from daily feedback from Nature.

Society at large facilitates rather than regulates this tendency.

ANTIDOTE: The Bio-Copernican AXIOM

The Logic of
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Humans are but one part of the BIOSHPERE,
NOT
the CENTER of the BIOSPHERE.

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Humans are but one part of the BIOSHPERE,
NOT
the CENTER of the BIOSPHERE.

*Human history becomes more and more a race
between education and catastrophe.*

H.G. Wells

Diverse versus Centralized Control/Decision-Making

The Logic of
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Diverse versus Centralized Control/Decision-Making

The Logic of
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Who owns our “seed corn”?

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Who owns our “seed corn”?

“...In 1949 a federal jury convicted GM (General Motors), Standard Oil of California, Firestone Tire, and others of conspiring to dismantle trolley lines throughout the (U.S.A.).”

Diverse versus Centralized Control/Decision-Making

The Logic of
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- You have just had a lesson in MEDIA LITERACY if you have never heard of this crime before—OR—you know not how to document it.

Diverse versus Centralized Control/Decision-Making

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Diverse versus Centralized Control/Decision-Making

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Diverse versus Centralized Control/Decision-Making

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- “In a time of universal deceit, telling the truth is a revolutionary act.”

George Orwell

Obstacles to Publication

The Logic of
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- Publisher 1: We do not want to be sued.

Obstacles to Publication

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Order

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- Publisher 2: We do not have an editor that can deal with so many different topics.

Obstacles to Publication

The Logic of
Nature Versus
the Logic of
Industrial
Humans

Marty Walter

WELCOME

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