

The Logic of Nature Versus the Logic of Industrial Humans

Marty Walter

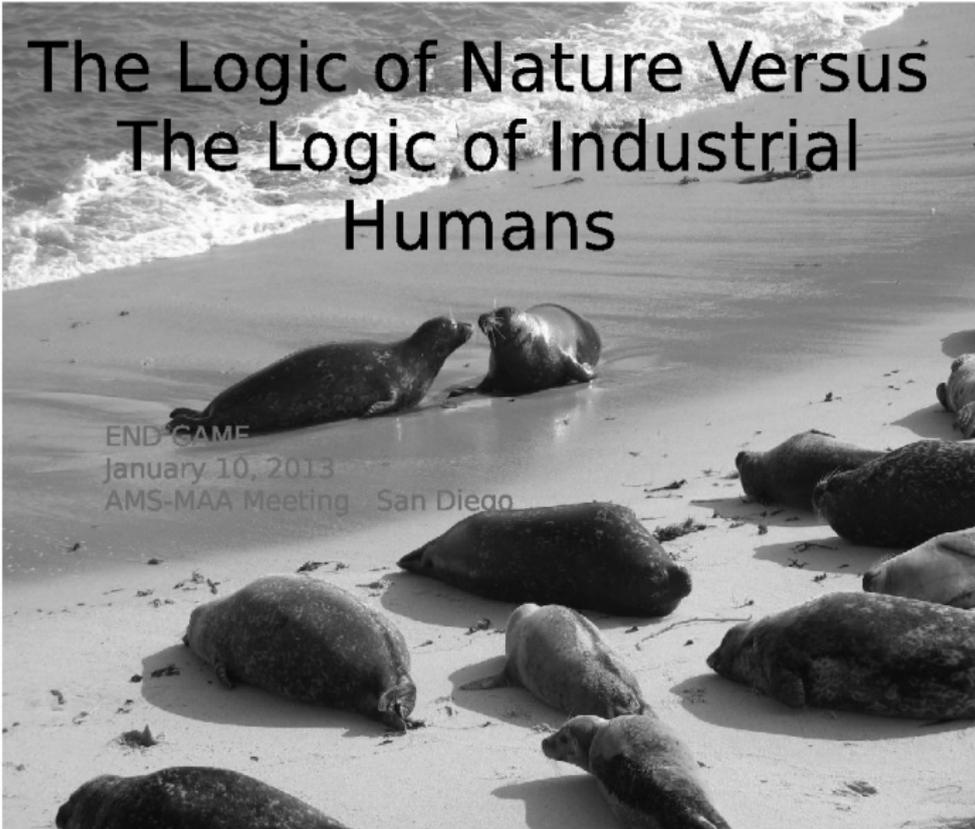
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CLIMATE CHANGE – CONNECTIONS

COUNTING AND CONNECTING EXERCISE

LOGICQUAKES

Humility is in Order



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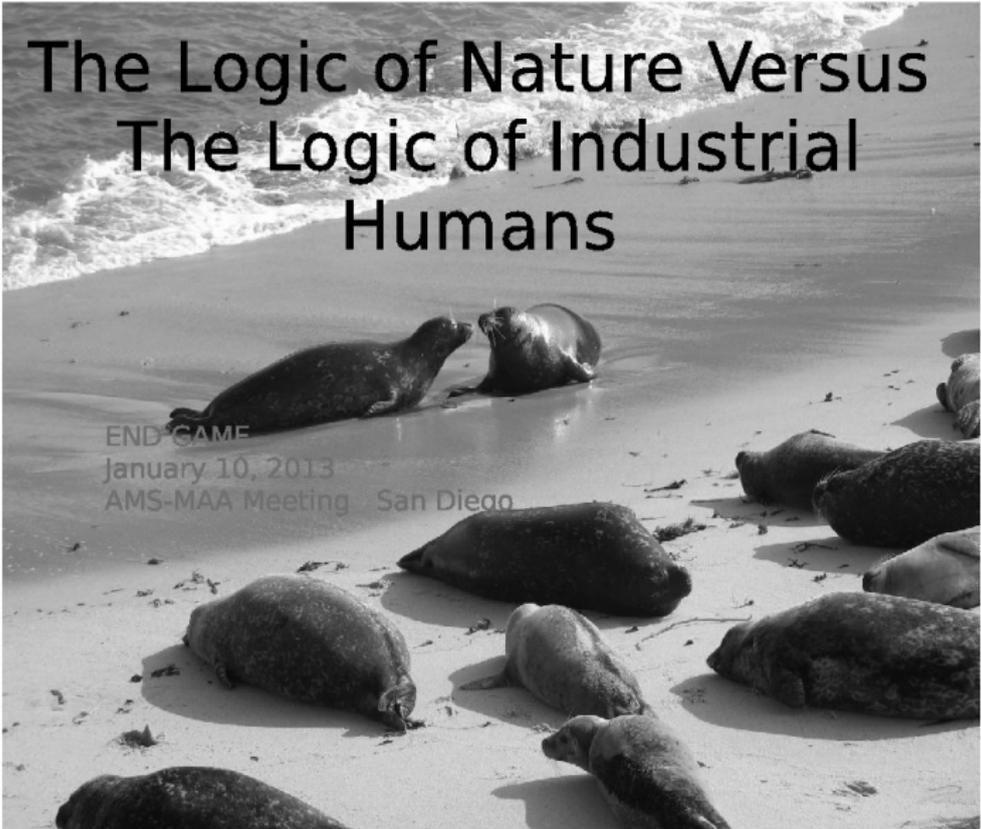
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The Logic of Nature Versus the Logic of Industrial Humans

END GAME

Marty Walter

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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First a little history: Two Scientists.

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First a little history: Two Scientists.



Joseph Fourier

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First a little history: Two Scientists.



Joseph Fourier (1768-1830)

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First a little history: Two Scientists.



Joseph Fourier (1768-1830)

Invented term:

“greenhouse effect”

The CO_2 Greenhouse Gas Law of Svante Arrhenius

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Question

What is this law?

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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

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

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

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Question

What is this law?

Law

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

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

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

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Question

What is this law?

Law

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

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

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

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

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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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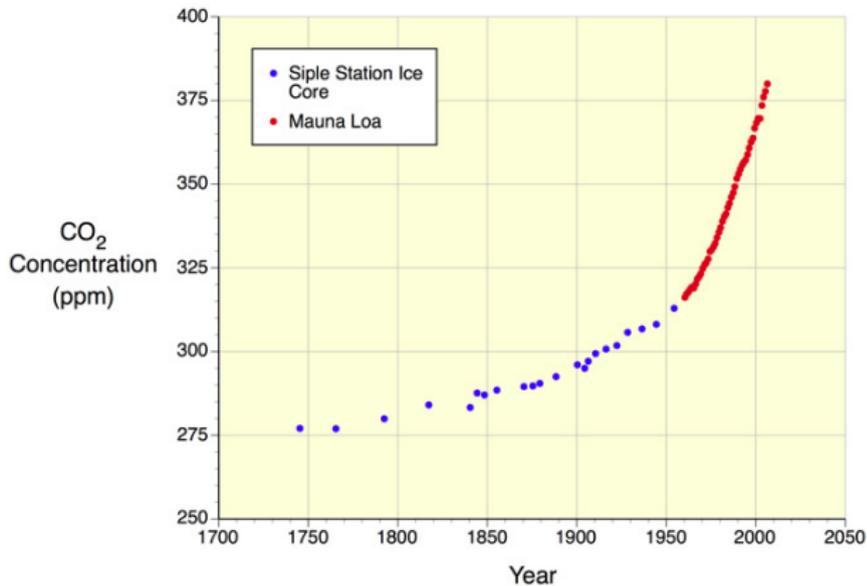
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Increasing Carbon Emissions

Atmospheric Concentration of Carbon Dioxide (1744-2005)



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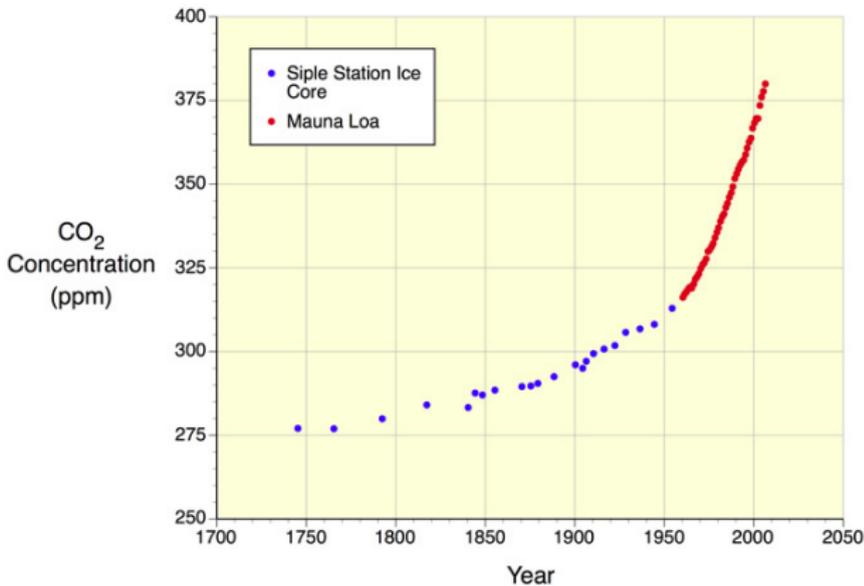
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Increasing Carbon Emissions

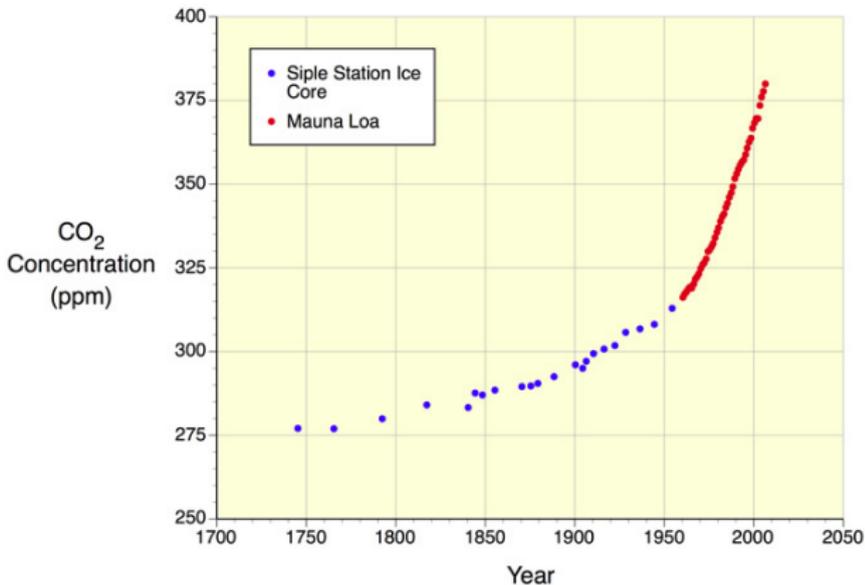
Atmospheric Concentration of Carbon Dioxide (1744-2005)



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

Increasing Carbon Emissions

Atmospheric Concentration of Carbon Dioxide (1744-2005)

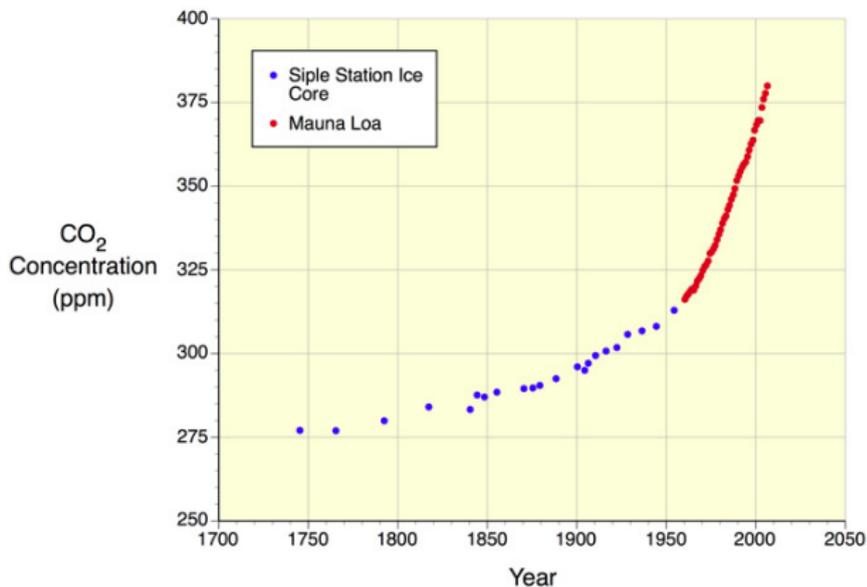


This graph accounts for only about **HALF** of the calculated emissions. Where did the other half go?

● **OCEAN ACIDIFICATION !**

Increasing Carbon Emissions Does it Matter?

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

Extensive dissolution of live pteropods in the Southern Ocean

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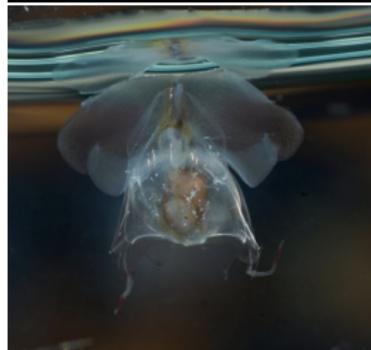
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Extensive dissolution of live pteropods in the Southern Ocean

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
Nature Geoscience
Volume: 5, Pages: 881 to 885
Published 25 November 2012



Yes It's a Matter of Life and Death

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

Martin E. Walter is professor of mathematics at the University of Colorado. His email address is walter@uic1.d.co1orado.edu.

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

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

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

Another Technical Detail

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Colorado, a year for bills that could make voting even easier for young people — perhaps allowing them to pre-register at age 16 when they're getting their drivers' licenses so they can vote as soon as they are 18.

Fenberg said the group also would like there to be options for people to change their voter

Political experts had predicted there would be a precipitous drop-off in young voter participation after 2008, when the youth were particularly

See Page 3A
GOP eyes Hispanic vote as key for future
See Page 7A

See OBAMA, 5A

OF REPRESENTATIVES

Craig Walker | The Denver Post

NCAR

Models with more warming show accuracy

By Joe Rubino
Camera Staff Writer

Two Boulder scientists have published an analysis of leading climate models that indicates those predicting a greater rise in global temperatures are likely to be more accurate than those showing a lesser increase.

National Center for Atmospheric Research scientists John Fasullo and Kevin Trenberth analyzed the accuracy of sophisticated climate models to measure relative humidity in the tropics and subtropics. The study appears in this week's issue of Science.

According to a news release issued by NCAR on Thursday, complex moisture processes such as relative humidity and associated cloud activity have a significant impact on global climate. Because cloud activity is difficult to measure via satellite, the study focused on how accurately climate models measured relative humidity in the subtropics during the dry season.

See STUDY, 5

By one metric the HOTTER models are more accurate!

Shelter brings neighbors out to share issues

Officials study bus use by clients to see impact

when its clients use the Skip bus on Broadway to see if there are conflicts or problems with commuters and schoolchildren.

That young children riding the bus to school had been having had, soon objection-

Speaker

Athabasca Tar Sands

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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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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 Seferat, 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 developing 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



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.



BY AP OUTREACH ASSOCIATED PRESS

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-

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 site revoked the protesters' permission to be there. Sheriff's deputies came with a cherry picker on a flatbed truck 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 spray.

One by one, the tree strikers were arrested.

After the police had left, protesters sat her in a wheelchair on the shoulder of the highway and dashed 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 DeBoon. "When there's contact with protesters, we contact law enforcement, and law enforcement takes appropriate action."

The company has also filed civil suits against protesters

Fracking for Gas 1

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This is XTREME 3

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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.*

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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.*

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

*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.

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

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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TO SOLAR OR WIND ENERGY

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We Can Run the World Economy on Renewable Energy

The Logic of Nature Versus the Logic of Industrial Humans

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There is enough renewable energy for all of us.

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- Put Solar Collectors on Urbanized Space—roofs etc.

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- Algae Biodiesel Exists

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- Electrolysis Alcohol Exists

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For a proof see my book!

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- Collect Wind Energy Without Killing Birds
- Algae Biodiesel Exists
- 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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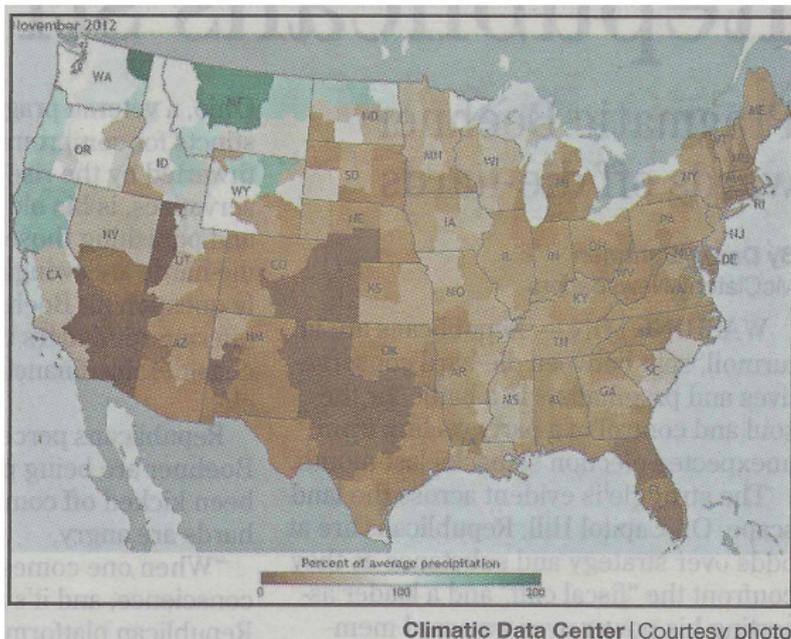
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Don't Forget Fire

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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?

POPULATION BOMB EXPLODES

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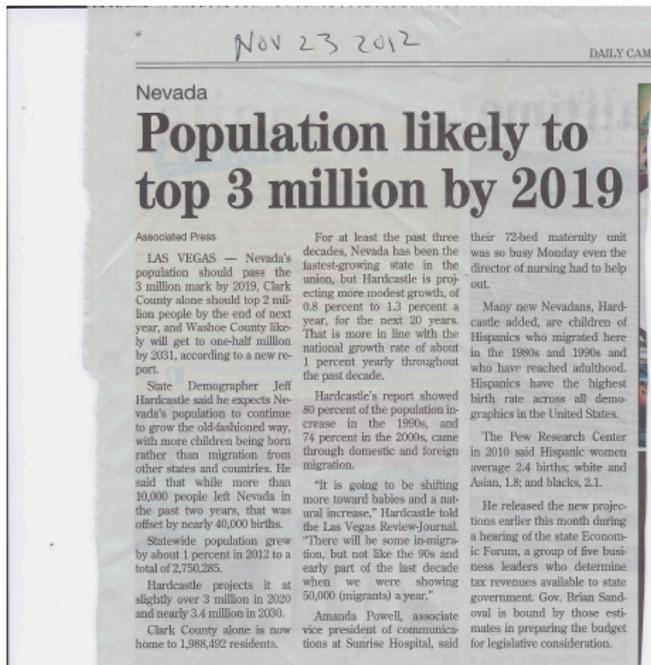
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Water in the SouthWest? In Las Vegas?

The Ice is Really Melting!

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ICES

Documentary | 'Chasing Ice'

Film sends chilling message about climate change

By Roger Moore
McClatchy-Tribune
News Service

"It is better to light a single candle than to curse the darkness" was a favorite Chinese proverb of late "Peanuts" cartoonist Charles Schultz.

Boulder-based photographer James Balog must have taken that to heart as he noticed changes to the wild world he documents and heard all the cursing dominating the discussion of global climate change.

So Balog took a candle — cameras, 25 of them — set up time-lapse gear and mounted them in front of a number of the world's glaciers for three years. And in starkly beautiful, simple and stunning images, he showed us climate change — glaciers disappearing so fast he had to re-aim his cameras just to follow their rapid decline.

"Chasing Ice" is a beautiful documentary that follows Balog, who often works for National Geographic, in his dogged quest to silence the blizzard of denial that the film sums up in montages of TV footage.

Ideologues such as Sean Hannity and Rush Limbaugh use "Al Gore" as a curse word to dismiss the overwhelming evidence and the unified scientific research that hurne

also of Boulder, rides along as Balog visits scientists who have the ice core samples that give testimony to the rising levels of carbon in the atmosphere. Film cameras sit in as Balog meets other scientists who link the longer droughts, harsher fire and tropical storm seasons to the warming planet.

And for folks who believe only what business people tell them, here's the head of the world's largest reinsurance company, the insurer to the

change" — glaciers, which are both retreating and "deflating," thinning out as they melt. That's where he and a small crew scrambled to set their cameras.

Orlowski, who followed with his film camera, takes awe-inspiring photos of pris



Courtesy photo

Like the glaciers on which it focuses, "Chasing Ice" is a beautiful piece of filmmaking.

Online

Read more about James Balog and "Chasing Ice" at www.dailycamera.com/movies

★★★

Cast: James Balog, Svavar Jonatansson, Louie Psihoyos, Adam LeWinter
Director: Jeff Orlowski
Running time: 76 minutes
Rated: Unrated, with moments of mild peril and a couple of instances of profanity
Etc: "Chasing Ice" opens today at Landmark's Chez Artiste in Denver. It's slated for a Dec. 12-15 run at The Booksticker in the Dairy Center for the Arts

James Balog
Chasing Ice
Montana
Alaska
Greenland
Iceland

Much Faster Than Predicted

The Logic of Nature Versus the Logic of Industrial Humans

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INTERNET OUT ACROSS SYRIA, World View 3A

Daily Camera

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Dry conditions raise burn concerns, Local 1B **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-



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

See **MELT, 8A**

Estimates Can Be Too Conservative!

The Logic of Nature Versus the Logic of Industrial Humans
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8A | FRIDAY, NOVEMBER 30, 2012

DAILY CAMERA

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

Continued from LA

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 Schaefer, 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 thaws 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.

tist 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

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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.)

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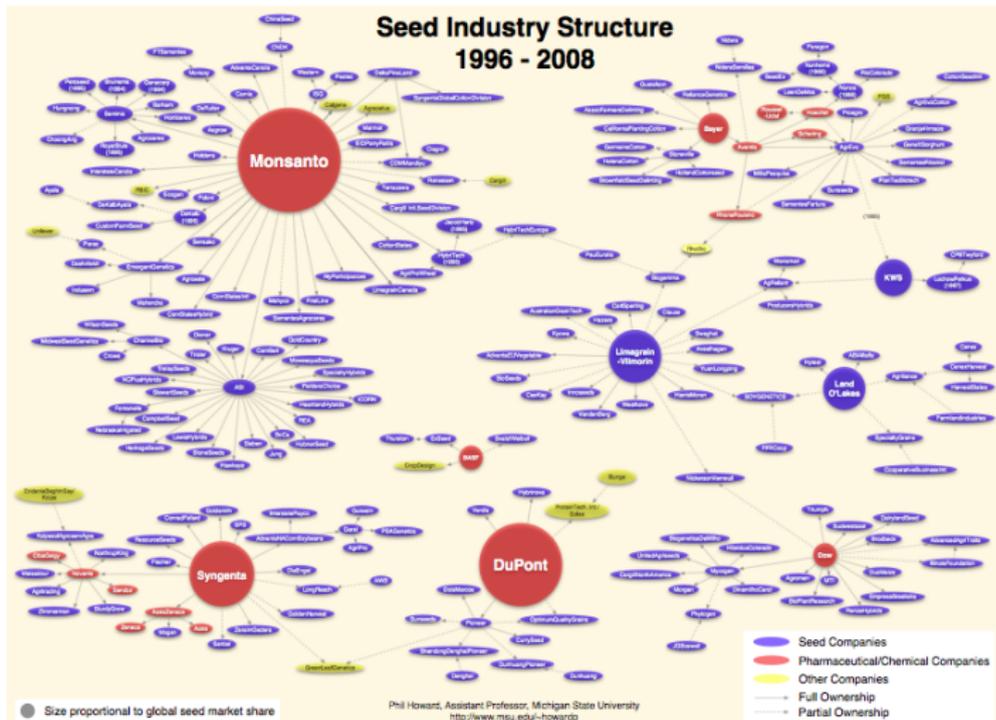
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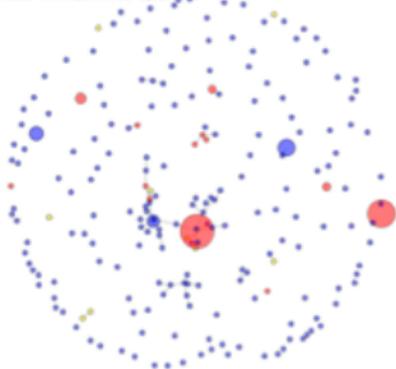


Where to Buy Organic Seeds?

The Logic of Nature Versus the Logic of Industrial Humans

Marty Walter

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



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



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The Logic of Industrial Agriculture is NOT Sustainable

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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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RUNNOFF

Precious Soil and Toxic Chemicals → Oceanic Dead Zones



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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?

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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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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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The Trash Vortex

The journey of trash

6 months

2 years

4 years

6 years

The animation shows how trash (orange dots) entering the sea from land along the Pacific coast is caught by the gyre. On its way the trash is concentrated and eventually ends up in one of the two shown vortices. As a consequence, in these areas, the surface water contains six times more plastic than plankton biomass (dry weight).

There are FIVE Gyres

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70 Million Shark Deaths Globally per Year

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

are gone!

AT LEAST 90% of global WILDERNESS IS GONE

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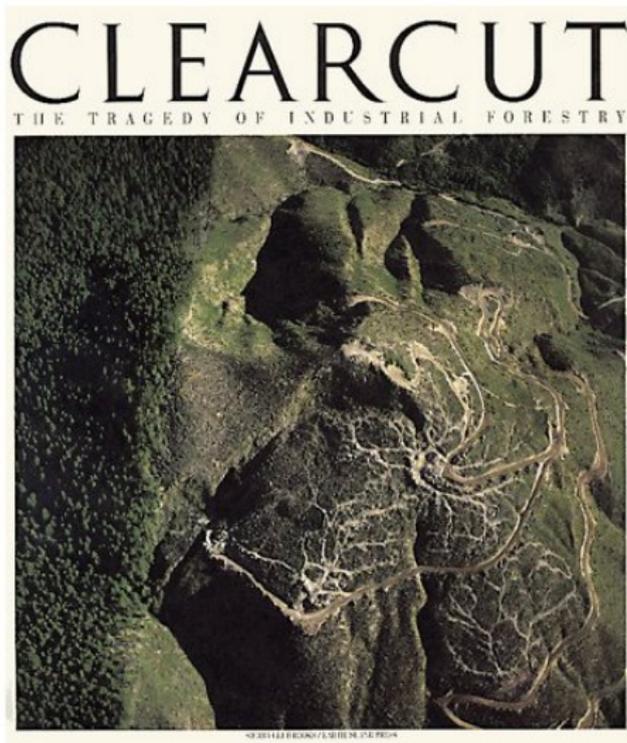
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As of 1990: **NINETY SIX PERCENT** of U.S. **BIG TREES** gone

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

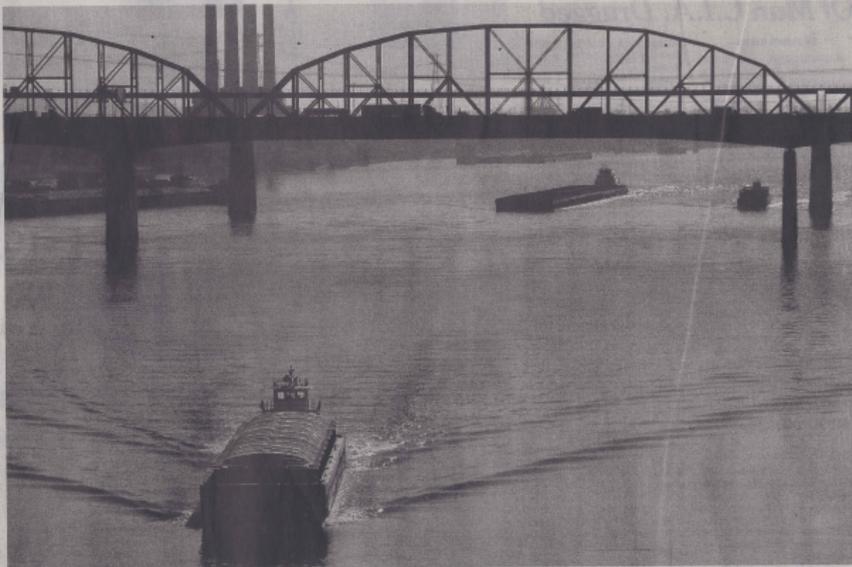
The drought of 2012 has already caused restrictions on barge traffic up and down the Mississippi River. But things are about to get a lot worse.

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 is



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 ROBSON/ASSOCIATED PRESS

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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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

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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.

The Greatest Failing of the Human Race?

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Our addiction 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.”

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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

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Humans are but one part of the **BIOSHPERE**,
NOT
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*Human history becomes more and more a race
between education and catastrophe.*

H.G. Wells

Diverse versus Centralized Control/Decision-Making

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Diverse versus Centralized Control/Decision-Making

Who owns our “seed corn”?

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“...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.).”

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

George Orwell

Obstacles to Publication

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

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Humility is Required

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