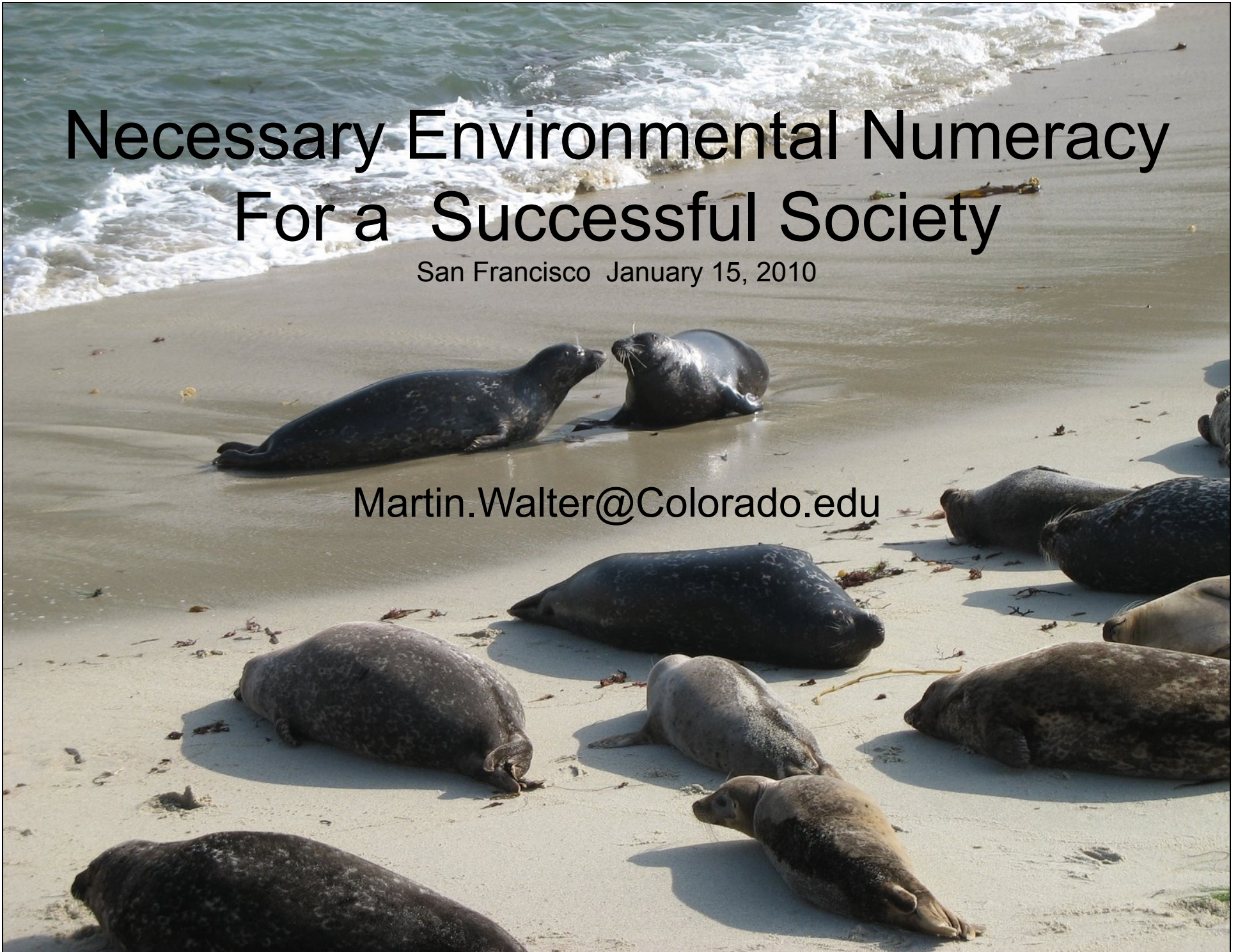


Necessary Environmental Numeracy For a Successful Society

San Francisco January 15, 2010

Martin.Walter@Colorado.edu



Level 0

PONZI

Level 1
investors

10%



Each ↑ means \$1 to PONZI

Level 0 Ponzi

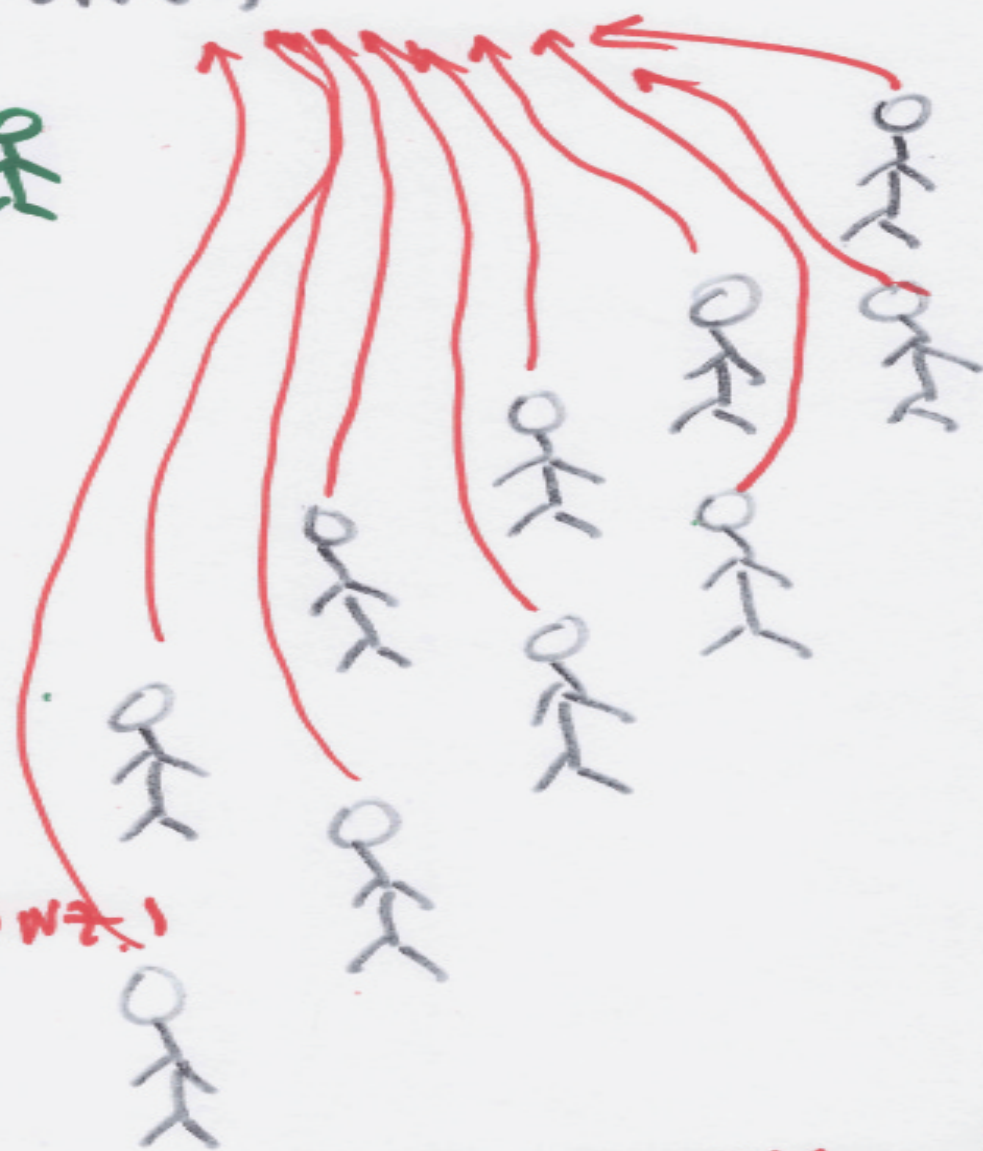
Level 1

you

Level 2
investors

Each $\uparrow = \$1$ to Ponzi
 $\$10$ to Ponzi
 $- 1.50$
 $\$8.50$ to Ponzi

$\$1.50$ to you!



Perhaps some of us should
spend some of our time tackling
humanity's most pressing
problems from a mathematical
perspective.

I define mathematics as the
search for and study of
patterns.

Get the Fundamentals Right or Fail.

Get the Fundamentals Right or Fail.



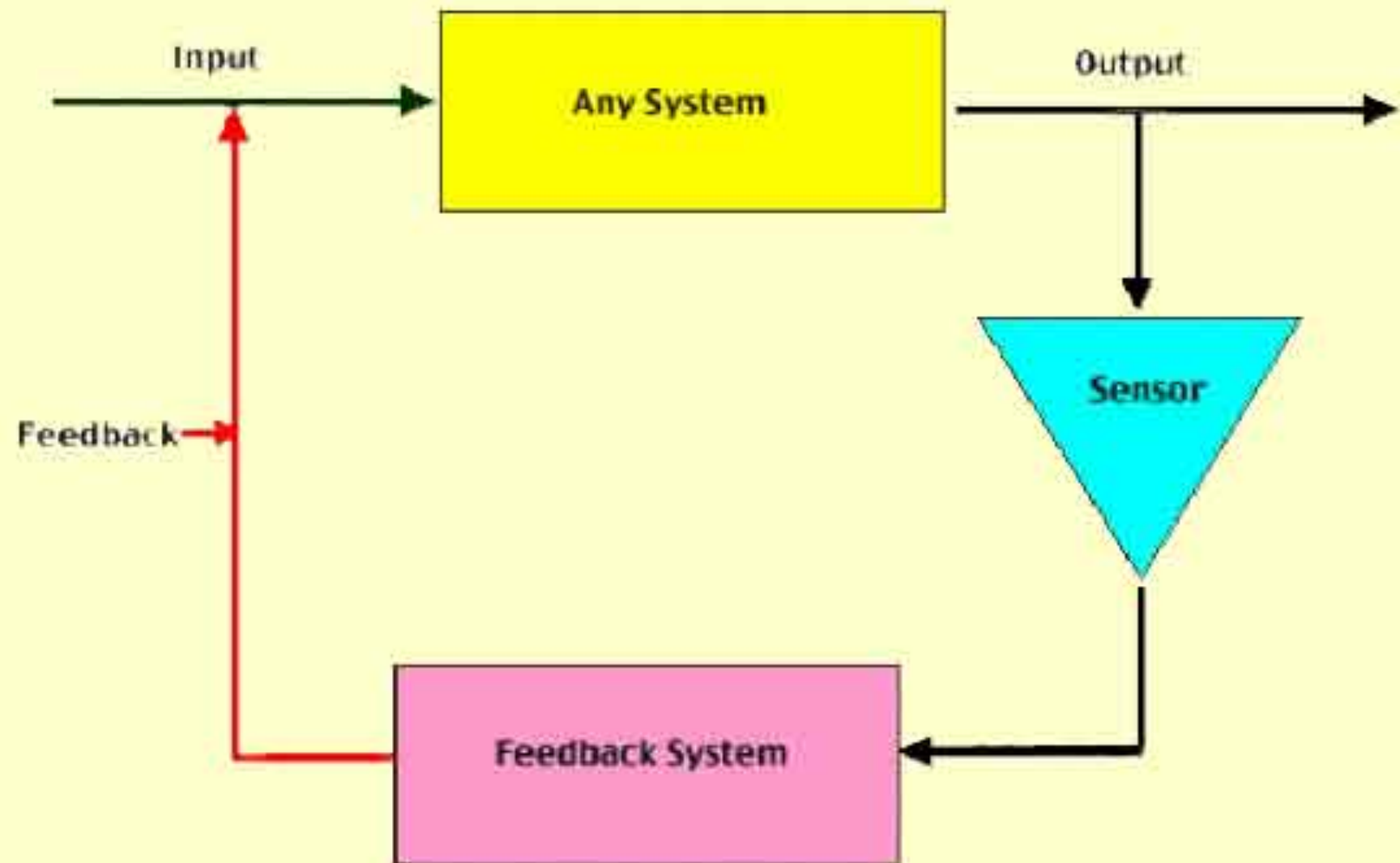
Get the Fundamentals Right or Fail.



Dunbar number = 147.8



Robin Dunbar



Simple Feedback Loop



Challenger Explosion



Bruce Weaver / AP

"All the News
That's Fit to Print"

The New York Times

Late Edition

Monday, January 19, 1986
Volume 100, Number 10,000
Published by The New York Times Company
Printed in the United States of America

Volume 100, Number 10,000

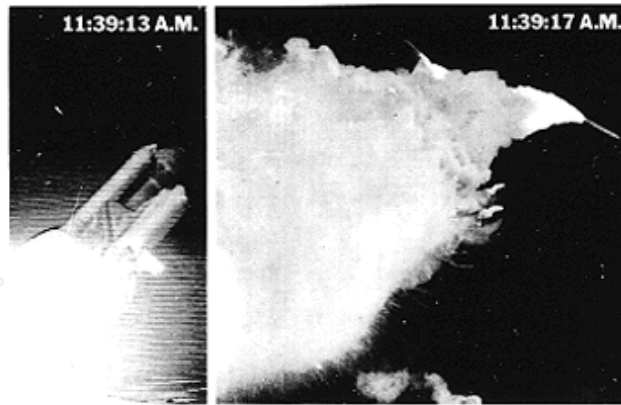
Published by The New York Times Company

NEW YORK, WEDNESDAY, JANUARY 19, 1986

Published by The New York Times Company

Page 1 of 1

THE SHUTTLE EXPLODES 6 IN CREW AND HIGH-SCHOOL TEACHER ARE KILLED 74 SECONDS AFTER LIFTOFF



Thousands Watch A Rain of Debris

By WILLIAM J. BRADY

CASEY, N.J., Jan. 19 — The space shuttle Challenger exploded in a ball of fire shortly after a 10-minute launch pad hold, and at seven minutes on board were lost.

The seven crew members in the shuttle, and space shuttle, it was launched by thousands of spectators who watched in wonder, then horror, as the ship took flight high in the air.

Flaming debris rained down on the launch pad for 15 minutes after the explosion, which occurred just after 11:39 A.M. It kept people from the launch pad, and the shuttle itself, from being seen for about 15 minutes after the explosion.

It seemed impossible that anyone could have lived through the terrible explosion of the shuttle, and officials said this afternoon that there was no evidence to believe that the two men and two women aboard had survived.

No debris fell as far as 10 miles.

Three people were in the launch pad at the time of the explosion. The space agency ordered its immediate evacuation, and said it was responding to all shuttle flights, and that it was conducting an investigation. Officials also said that the shuttle was launched on a flight that was scheduled to be the first of a series of flights that would be launched in the next few months.

After the shuttle was launched, the shuttle was launched on a flight that was scheduled to be the first of a series of flights that would be launched in the next few months.

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From the Beginning to the End

The shuttle flight of the shuttle Challenger ended about 11:39 a.m. when the shuttle exploded in a ball of fire. The shuttle was launched on a flight that was scheduled to be the first of a series of flights that would be launched in the next few months.

PUBLIC AFFAIRS OFFICER: The shuttle was launched on a flight that was scheduled to be the first of a series of flights that would be launched in the next few months.

FRANCIS R. SCOBEE, FRANK L. REAGAN, and other shuttle crew members were killed in the explosion.

How Could It Happen? Fuel Tank Leak Feared

By WILLIAM J. BRADY

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After the Shock, a Need to Share Grief and Loss

By NANA BAKER

The shuttle crew members, including the shuttle crew members, were killed in the explosion.

FRANCIS R. SCOBEE, FRANK L. REAGAN, and other shuttle crew members were killed in the explosion.

FRANCIS R. SCOBEE, FRANK L. REAGAN, and other shuttle crew members were killed in the explosion.



Francis R. Scobee
Crew member

Michael J. Smith
Crew member

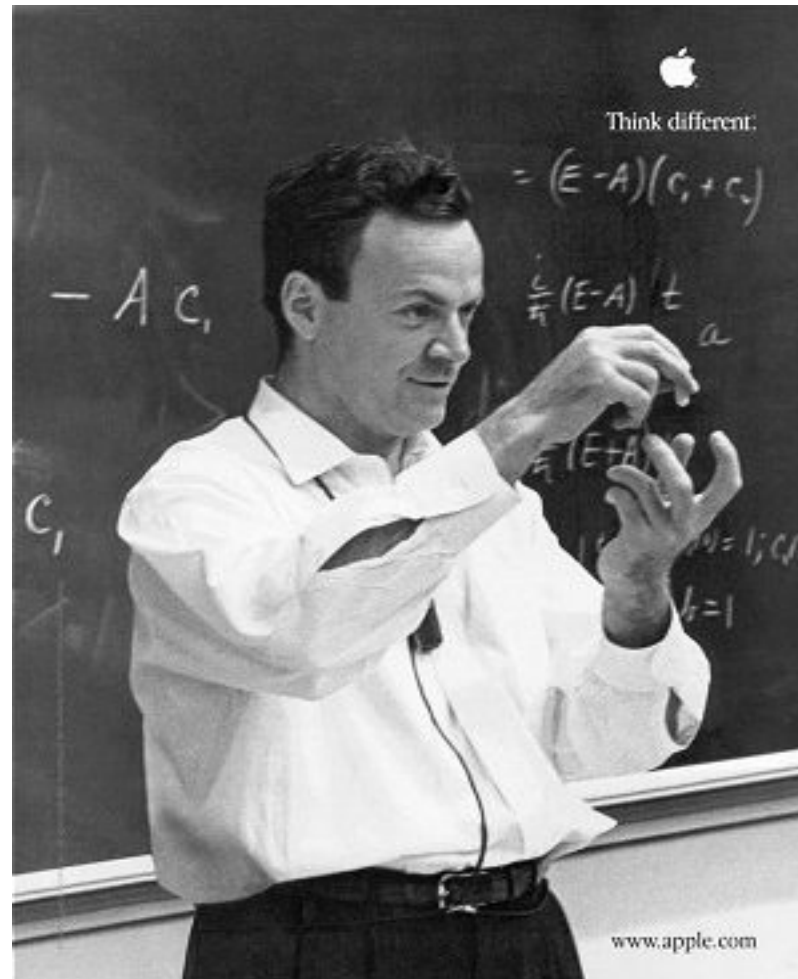
Judith A. Resnik
Crew member

Ellison S. Onizuka
Crew member

Ronald E. McNair
Crew member

Gregory B. Jarvis
Crew member

Cheri McArthur
Crew member



Richard P. Feynman (1918-1988)





Feynman O-ring Ice-Dunk Experiment

“For a successful technology,
reality must take precedence
over public relations, for Nature
cannot be fooled”.

(R. P. Feynman)

I define honesty as “being one with what is: “

Problem One:

The Current Economic
Malaise.

A few people have the power, without (short-term, possibly long-term) accountability, to make decisions that (negatively) effect us all.

A politically effective number of the population needs to understand and detect the mathematical differences among gambling, Ponzi schemes and more stable financial activities such as interest bearing savings accounts and actuarially based insurance. And understanding must result in action, e.g. oversight (public and/or otherwise) and laws (that are enforced).



John Kenneth Galbraith (1908-2006)



1968

“The financial bubbles that led to the Depression will return as soon as America is led by politicians who didn’t live through it. Capitalism has no permanent memories, but one of its permanent vices is gambling with other people’s money. So a post-Depression generation politics will dismantle the safeguards the New Deal put in place, and another financial collapse will then be inevitable.” John Kenneth Galbraith (1966)





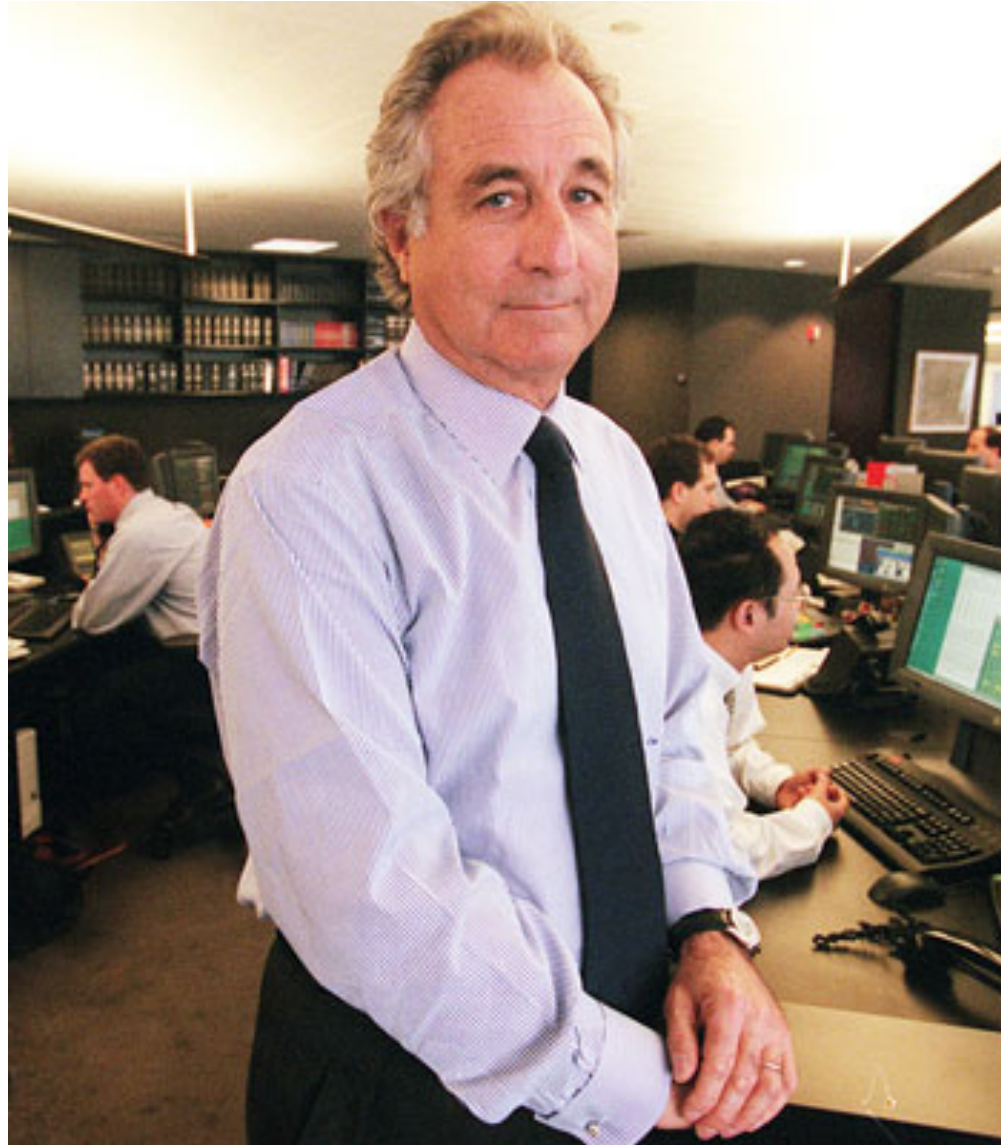
**Glass-Steagall Act (1933) erects firewalls separating banking/
insurance/gambling (stock market).**



Glass-Steagall Act repealed (Phil Gramm-Leach Bliley Act (1999) at behest of Citicorp, et. al.).



The 1998 Citibank merger with Travelers Insurance is post facto legal, thanks to ``Saint Phil.''



Bernie Madoff – brilliant Wall Street guru for Over 15 years, with consistent returns \$\$.



Biggest Ponzi fraud in history 2008.



BERNIE MADOFF

“It took me 5 minutes to know that it was a fraud, it took me another almost 4 hours of mathematical modeling to prove that it was fraud.”

Harry Markopolos
(March 1, 2009)



Harry Markopolos went to the SEC in May 2000, Oct. 2001, Oct., Nov., Dec 2005, June 2007, April 2008 without result.

Derivatives = Bets= Gambling



Insurance company, AIG, insured derivatives.

**Derivatives exempted from gambling regulations
by the Commodity Futures**

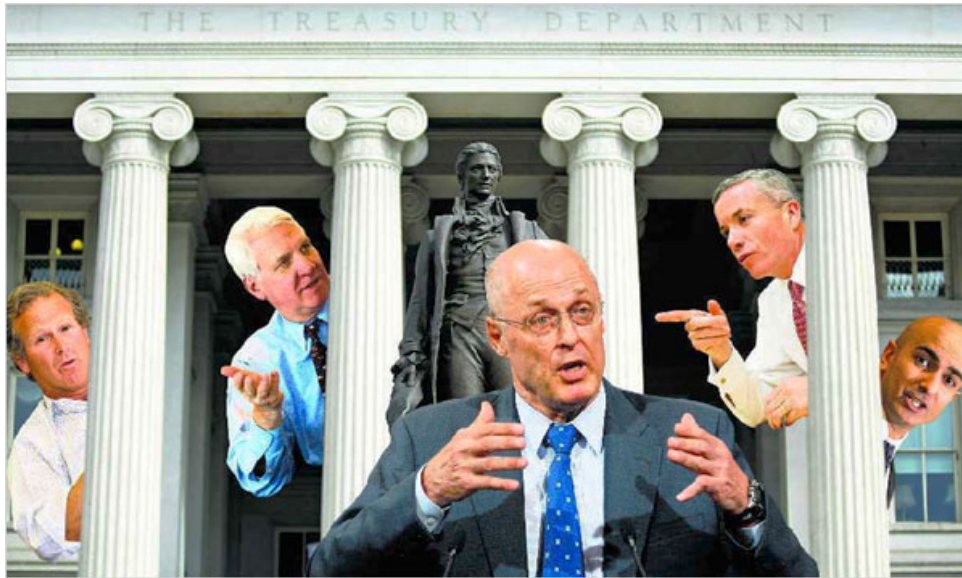
Modernization Act (2000), thanks to

Phil Gramm, et. al.



Joseph Stiglitz Nobel Prize in Economics 2001

Makes clear distinction between gambling and systemically important parts of the economy.



The Guys From 'Government Sachs' NYT Oct 2008

Senator Durbin on Congress: The banks ``own the place.’’



Senator DURBIN: And the banks -- hard to believe in a time when we're facing a banking crisis that many of the banks created -- are still the most powerful lobby on Capitol Hill. And they frankly own the place.

In 1950 29.3% of U.S. Gross Domestic Product was due to manufacturing and 10.9% was from financial services.

From 1950 to 2005 manufacturing's share gradually dropped to 12.0% while financial services share rose to 20.4%.

During this period effective caps on allowable interest rates were removed.

INTERNET NEUTRALITY
(YES)

Electronic Voting Machines
(NO)

PROBLEM TWO:

(Negative) Human Impacts on the
Environment

The human economy cannot
(materially) grow beyond all
bounds.

CLIMATE CHANGE

In April of 1949 a Chicago federal jury convicted General Motors of having criminally conspired with Standard Oil of California (now morphed into Exxon-Mobil), Firestone Tire and others to replace electric rail transportation (“street cars/trolleys”) with gas and/or diesel powered cars and buses.

On April 1, 2008, during a congressional hearing Exxon-Mobil Senior Vice President, Stephen Simon, had this to say in reply to Representative Jay Inslee's discussing America's energy portfolio in 2050 and questioning Exxon-Mobil's investing less than one percent of their profits in renewable energy:

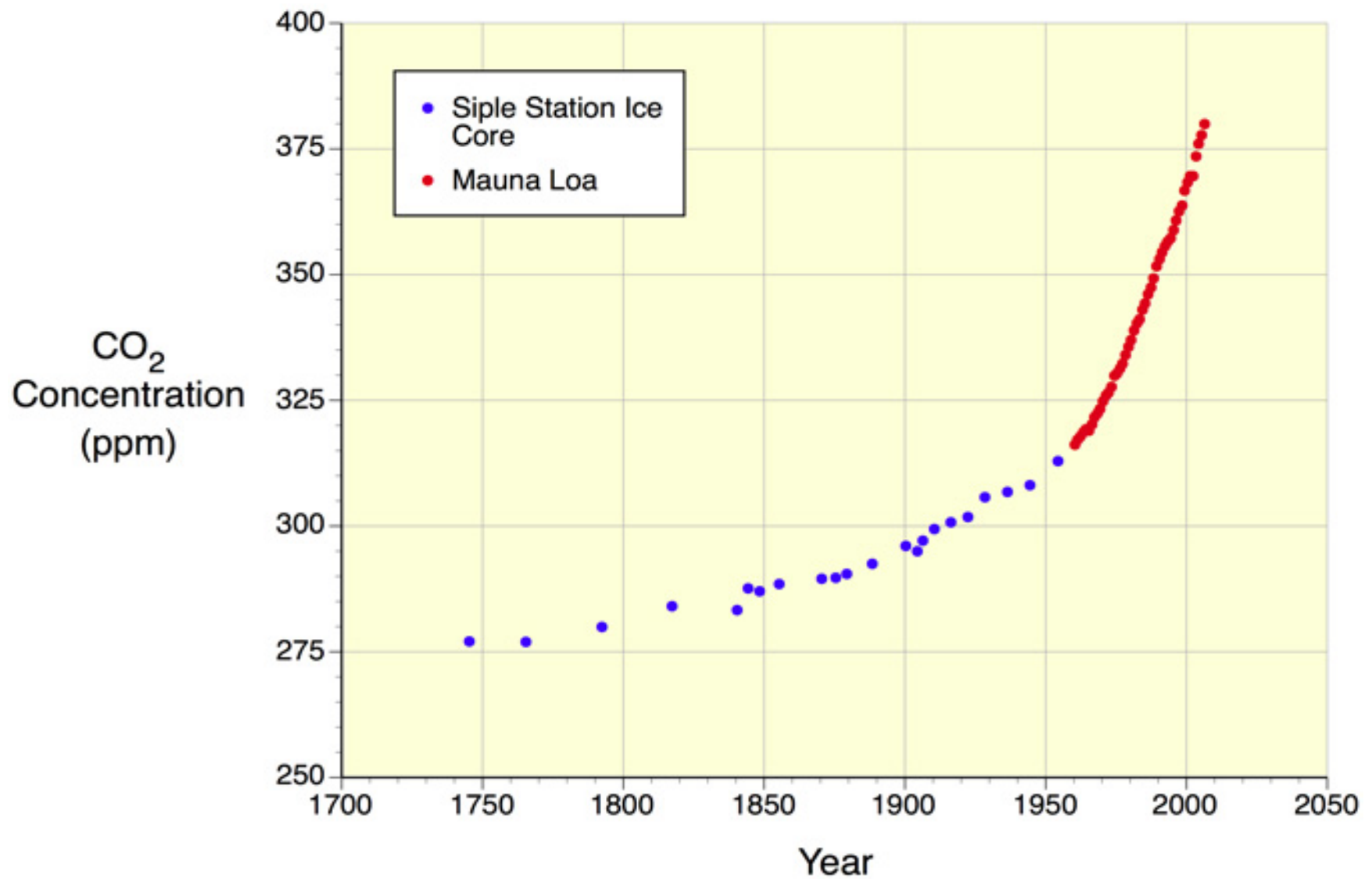
“..., but the fact is that we are going to have oil and gas and coal, and its going to constitute about 80 percent of the energy equation. With that as a given”



Svante August Arrhenius formulated his CO_2 Greenhouse Law in 1896. It remains unchanged today – it has never been repealed.

$$\Delta F = \alpha \ln \left[\frac{c}{c_0} \right]$$

Atmospheric Concentration of
Carbon Dioxide (1744-2005)



We must reduce CO₂
concentrations to below
350 ppm(v) as soon as possible.

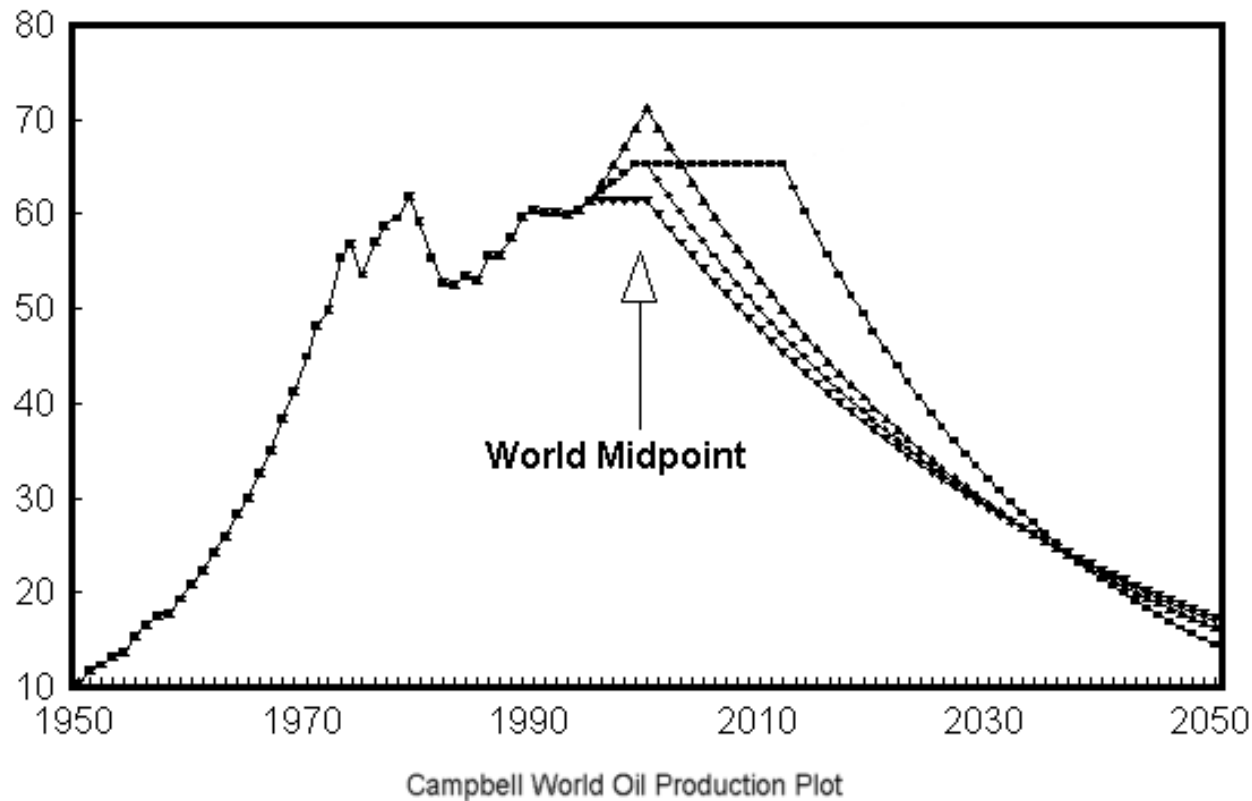


Figure 2

Graph showing Production (Mbd) against Time (Years), based on Campbell's data.

The four different lines correspond to different possible scenarios taking place from 1996 onward. It can be seen that whichever scenario actually occurs, the end result is reasonably constant. This is because the Ultimate is a constant value, so that more oil now means less in the future: whilst it may be possible to alter the shape of the curve, one cannot alter the area beneath it. The 'premature peak' in the early 1970s corresponds to the oil crisis of 1973.

“Human history becomes more and more a race between education and catastrophe.”

H.G. Wells

Martin E. Walter

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<http://www.colorado.edu/math/earthmath>