

# Canaries in a Coal Mine



Here is how a canary  looks and  
sounds like:

[http://www.youtube.com/watch?v=03tsyw8\\_-  
Ic&feature=related](http://www.youtube.com/watch?v=03tsyw8_-Ic&feature=related)

# Canary #1: Colony Collapse Disorder

We begin with bees, for they provide a natural link between the subject we've just covered—genetic engineering, and our new subject—Frankenstein's Monsters



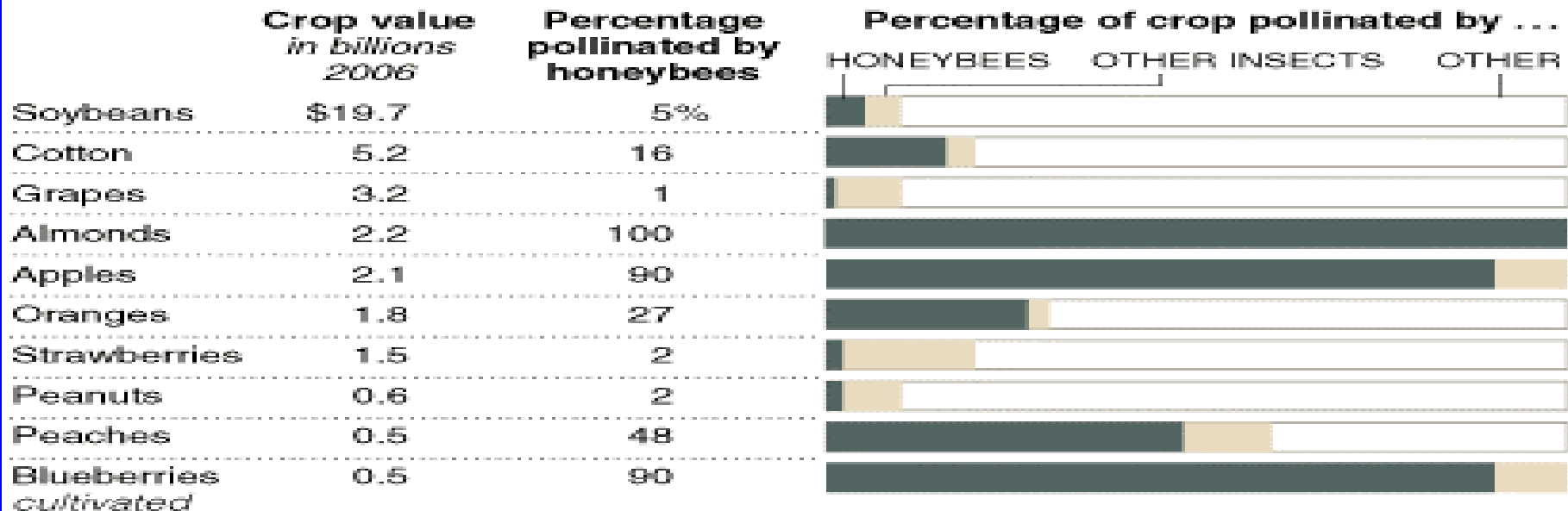
# Bees are an aesthetic and natural wonder

- Queen, female workers, drone
- Dance language
- Altruism—one dies for all
- Thermoregulation
- Fascinating behaviors, e.g., removal of dead bees from hives
- Many other unsolved mysteries

# Bees are also ecologically important: Honey, pollination

## Relying on Bees

Some of the most valuable fruits, vegetables, nuts and field crops depend on insect pollinators, particularly honeybees.



Besides insects, other means of pollination include birds, wind and rainwater.

Sources: United States Department of Agriculture;  
Roger A. Morse and Nicholas W. Calderone, Cornell University

# Bees, nowadays, are in the news!

e.g., an article in the *Palm Beach Post*,  
Monday, March 24, 2008

In the following slide we see a commercial  
beekeeper at work



Using smoke to calm his bees, Dave Hackenberg, examines a beehive March 30, 1999 near Dade City, Fla. He has about 2,600 of the boxy beehives, and his bees produce thousands of pounds of honey and pollinate tens of thousands of acres of blueberries, pumpkins, oranges, apples, and clover.

seemingly healthy adult worker  
bees suddenly abandon their  
hives, never to return

- A 2008 survey suggests: 37 percent of a sample of 230,500 from ten US states have been lost



# Causes of Colony Collapse Disorder (CCD)

Several roadblocks to unraveling this mystery:

- Powerful interests cover up their involvement? Pesticide, insecticide, GMO profiteers?
- Problem is complex
- Human beings are not very good in long-term planning

# Some possibilities

## Varroa mites?

These mites infest a colony, eclose, attach themselves to an adult bee, and suck her internal liquids, thus wounding and weakening her.



The varroa explanation is favored  
by money changers, but:

Varroa mites are not new: How did they  
become so mighty?

Organically-grown bees do not get CCD

The problem could be intestinal, and mites do  
not affect internal organs

# Toxic Overload

Heavy reliance on pesticides and herbicides could poison bees, just like it poisons us?

Supporting evidence:

Organically-grown bees do not have CCD

# cell phones may adversely affect the navigational abilities of bees?

It would be pretty simple to rule this  
explanation out (but if this is the case,  
would you give up your cell phone?)

# Genetically Modified Organisms?

Arguments for:

- Organically-grown bees do not die
- In some cases, e.g., Frankenstein Corn, the corn is engineered to produce an **INSECT TOXIN**. The plants are built to kill insects—and they succeed. The Sierra Club feels that this explanation deserves considerable attention.

# But by now you know the rules

Our politicians do not work for us, but for  
Monsanto, Dow Chemical, other corporations.  
So, our bees might well be on their last leg  
(wing?)

But doesn't the head of Monsanto like honey  
too? And almonds? And blueberries? I don't  
know the answer to this question except the  
suspicion that they are morons.

# Immediate Practical Applications

There is one practical conclusion to all this,  
which is also a moral imperative:

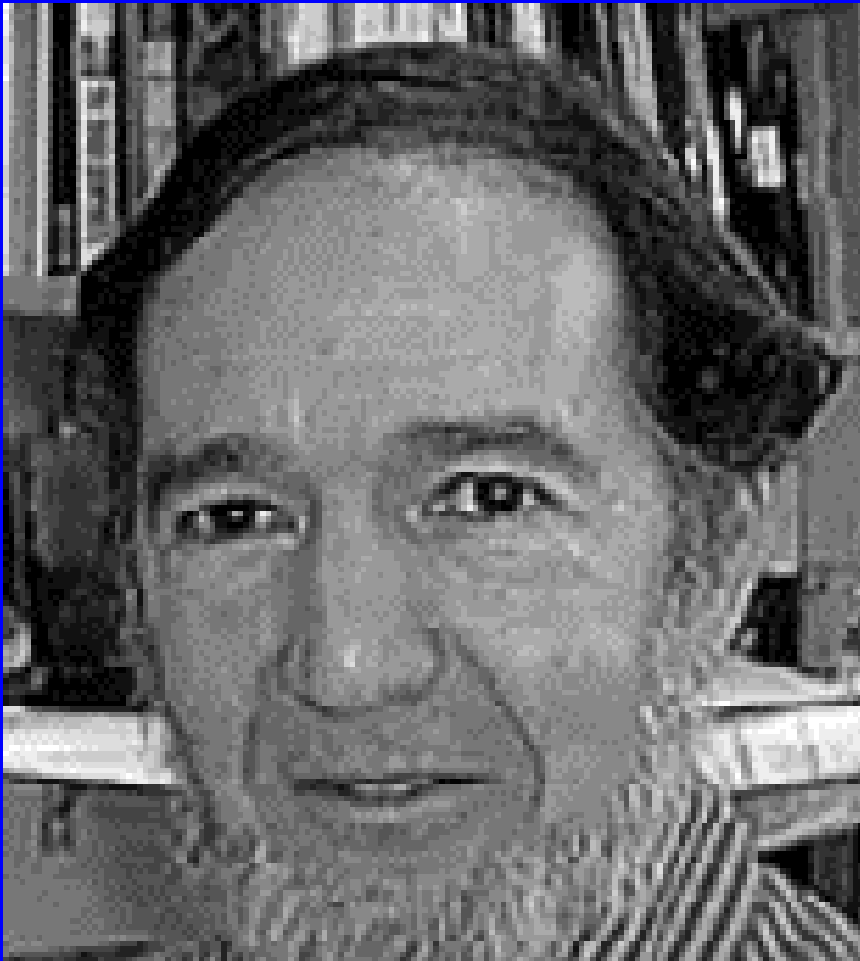
Whenever you can, eat:

**ORGANICALLY GROWN FOOD**

And, Don't drink THEIR water!



# Let's visit our second canary



This part of the lecture  
is based on the  
following required  
reading:

**Jared Diamond**  
**(1995). Adaptive**  
**Failure: Easter's**  
**End**



# The Environmental History of Easter Island

# Easter Island

- 64 square miles, far away from everything
- Belongs to the country of Chile, but it's 2,000 miles away
- Mild climate, excellent soil
- Inhabited originally by a mixture of Polynesians (as in Hawaii) and Europeans

So, all the ingredients of a paradise, no?

# A Surprisingly Impoverished Island:

- First brought to world's attention by the Dutch explorer Jacob Roggeveen, on Easter of 1722.

Appeared to him barren, only small trees

- Only native animals: insects
- Domestic animals: Only chickens

Only 2,000 people in the 18<sup>th</sup> century (now 4,000)

Lousy canoes—surprising for the sea-faring Polynesians!

Huge stone Statues: up to 65 feet  
and 250 tons! On huge platforms



Statues were pulled down in the 19<sup>th</sup> century,  
by the islanders themselves?

How did they build and transport the statues,  
without big trees, rope materials, draft  
animals? Did extraterrestrials built the  
statues?

# Science to the Rescue

Linguists can estimate how long they have been separated from other Polynesians—since about 400 AD.

Archeologists, carbon dating, again, same approximate date

Population once: 7,000-20,000 people

Statues built: up to year 1,500



# Pollen analysis

Can dig the earth, examine for pollen as you go down, look at it under the microscope

When people first came, in about 400 AD, the island was forested with huge trees that could be used for food, ropes, firewood, canoes, rolling the statues

Excavations show that the islanders captured dolphins at sea with sturdy canoes, and feasted on a variety of local birds (all gone by first contact with Europeans)

So they did come to a paradise? How did it become a wasteland?

# Population grew, so:

By about 1,500 AD: Extinction of almost all

- shellfish
- birds
- trees

so—no more good canoes, no more dolphins  
to eat

No trees—less streams and springs, more soil  
erosion

- Starvation and cannibalism set in
- Warfare became the norm
- Population crashed to less than a  
1/4 of former levels
- Statues were destroyed

Diamond asks: “What were they thinking when they cut down the last palm tree?”

Not so hard for us, who know about the demise of bees (and also bats, and birds in our backyards, and passenger pigeons, and bison, and . . . ) to answer this question, for we are repeating the Islanders’ mistakes—now on a biospheric scale!

Diamond believes the process was too slow for anyone to notice, and also, that there was the opposition of vested interests—the loggers, the priests, etc.

# Diamond: “Easter Island is Earth writ small”

Diamond does not give up in despair,  
because:

“My main hope for my sons’ generation is  
that we may now choose to learn from the  
fates of societies like Easter’s”

Do you share Diamond’s cautious optimism?

## Canary #3: Overpopulation and Rapid Population Growth

Would the Easter Islanders run into problems had they passed a two-child per family law, or decided to limit the island's population to 1,000?

The answer is NO. With a few people on a big, fertile, forested island, they would have indeed been living in a **sustainable** paradise!



This raises a question about earth: Are we repeating the Easter Islanders' mistake?

The answer here is clearer than it even was in their case. Scientists have been hollering from rooftops about this, but no one listens. It takes just one graph to capture the human predicament!

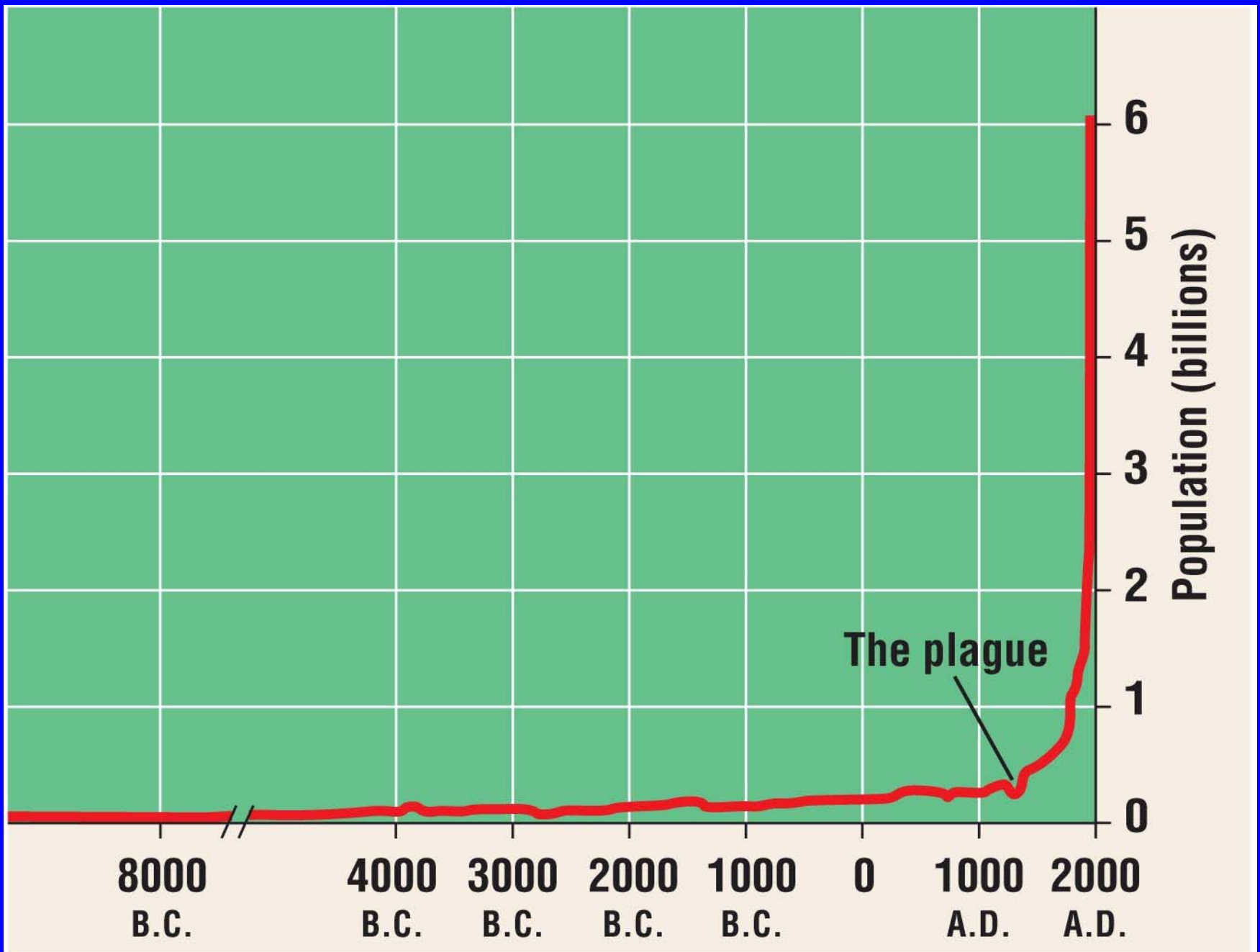
Relevant information: EB, pp. 393-6

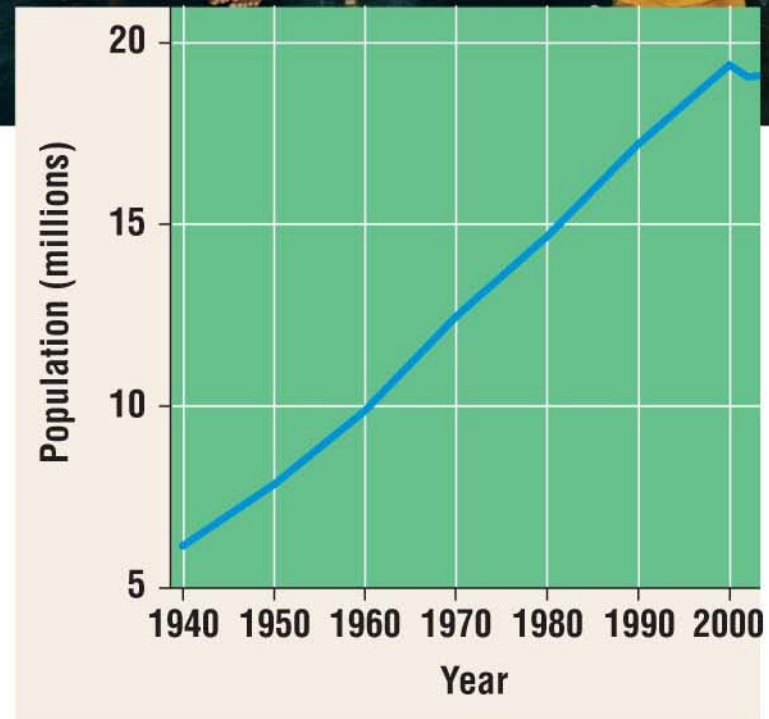
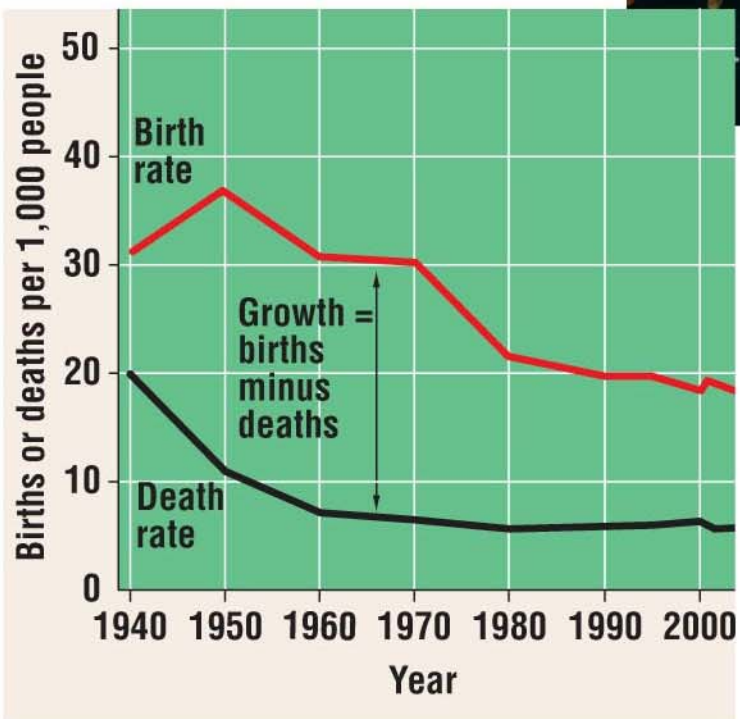
---

# *The History of Global Population Growth*

Human population Has been growing almost exponentially for centuries.

Please examine the next frightening graph:





**Changes in birth rate and death rate in Sri Lanka**

**Population growth in Sri Lanka**

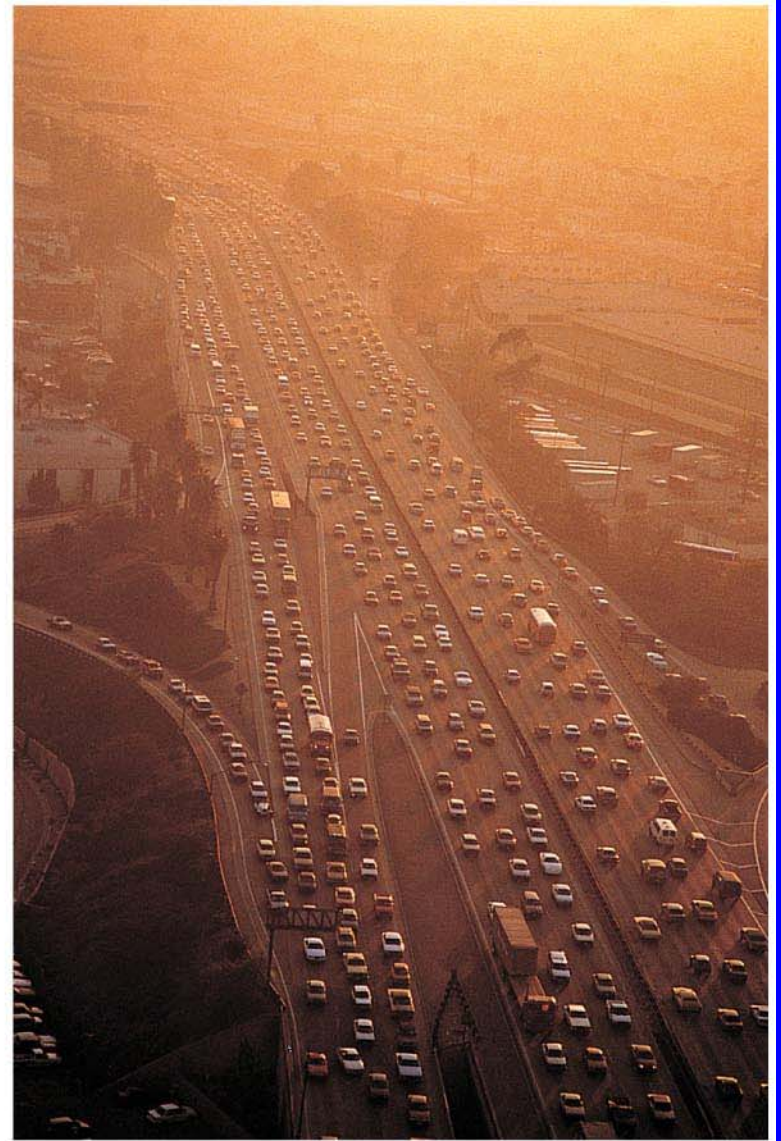
- Increases in the human population result in more people consuming resources and dumping pollutants into the biosphere.





**(a) Manila**

Copyright © 2007 Pearson Education Inc., publishing as Pearson Benjamin Cummings. All rights reserved.



**(b) Los Angeles**

There is a wonderful book called *Lies My Teacher Told Me*. Here is one example of why most of us are sleepwalkers—a widely used textbook (yours!) has only this to say about this catastrophe, this cataclysm, of exploding human populations:

“A unique feature of human population growth is that we can control it with voluntary contraception and government-sponsored family planning. Leaders in almost every country disagree as to how much support should be provided for family planning.”

One thing we can surely agree on is that textbooks, like schools and the media in general, are not passionately committed to the truth.

The truth is: We're walking in the footsteps of the Easter Islanders! The truth is: because more people mean more power for popes, and rabbis, and presidents, these "leaders" actively promote population growth. They care not for the biosphere's future!



These popes, imams, rabbis, and  
Congressmen do not want you to  
know this:


*Warning issued on November 18, 1992 :*

**World Scientists' Warning  
To Humanity**

“Human beings and the natural world are on a collision course. . . . Fundamental changes are urgent if we are to avoid the collision our present course will bring about”


Questions: Have there been any fundamental changes?

Answer: Of course there have—  
for the worse!

There are many, many more,  
canaries from whence the above  
  
3 came, e.g.,

- Massive species extinctions (and dying frogs, bees, bats, birds)
- Damaged ozone layer
- Destruction of oceans, topsoils, lakes
- Synthetic chemicals everywhere
- Nuclear power and nuclear bombs

- Growing space pollution
- Space warfare
- Increased global genocidal activities
- Resource scarcity
- Deforestation
- Lower sperm counts and higher rates of cancer, asthma, autism . . .

 Canary #4: But in our next two lectures, we'll limit ourselves to just one more tipping point:  
Climate Change

Instead of trying to cover everything, we'll just focus on that one 







































