

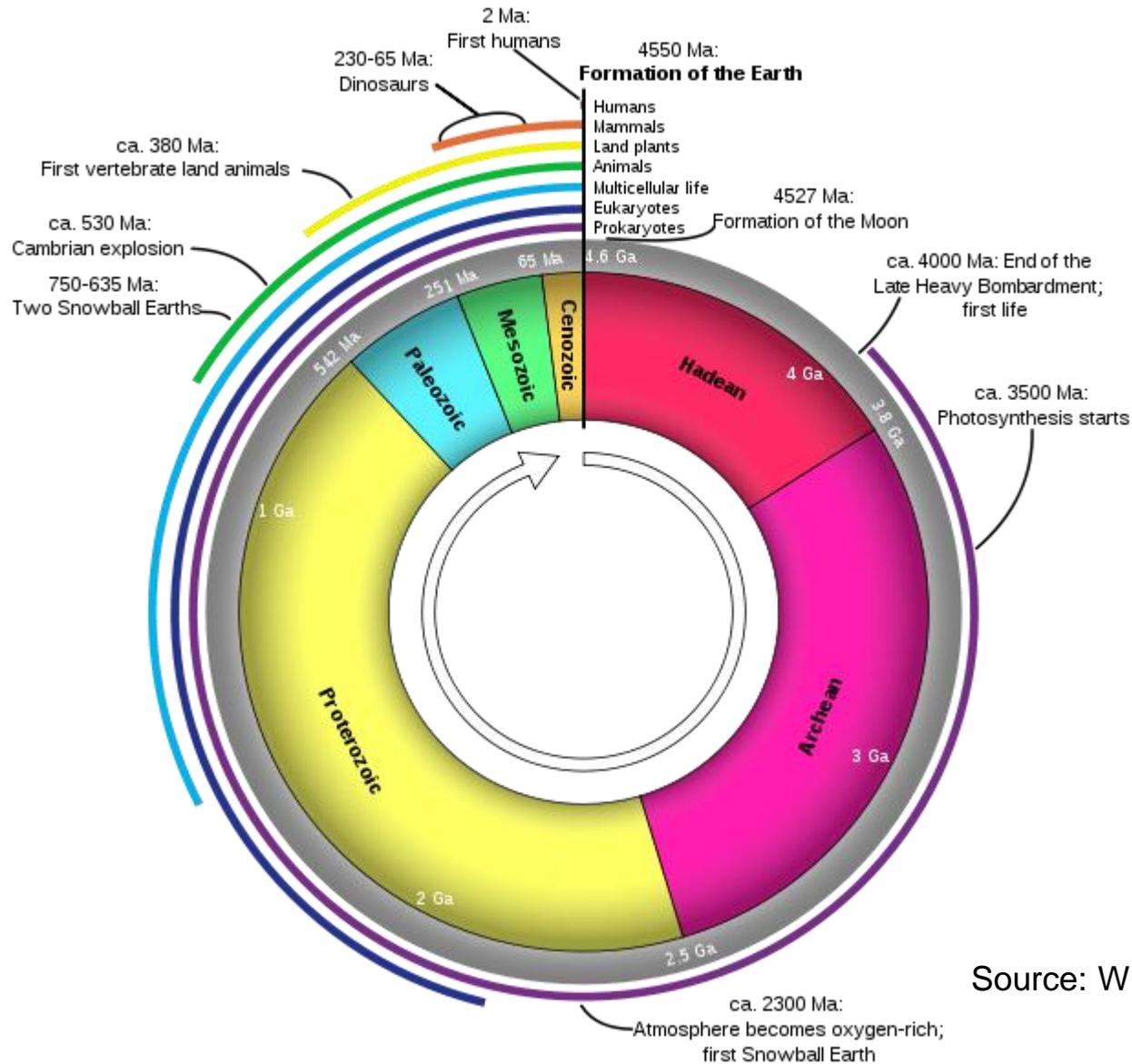
The food chain in the Anthropocene

Dr. Nico van Belzen
ILSI Europe

ILSI Europe Annual Symposium 2012
29 March 2012



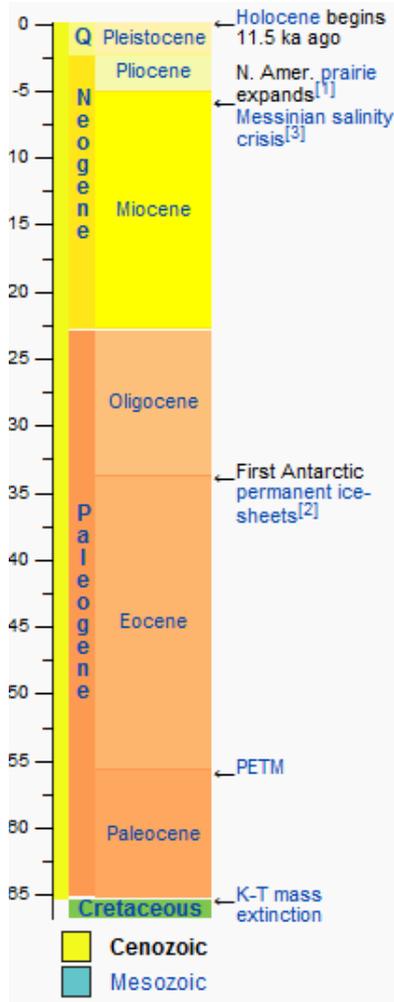
Earth's history



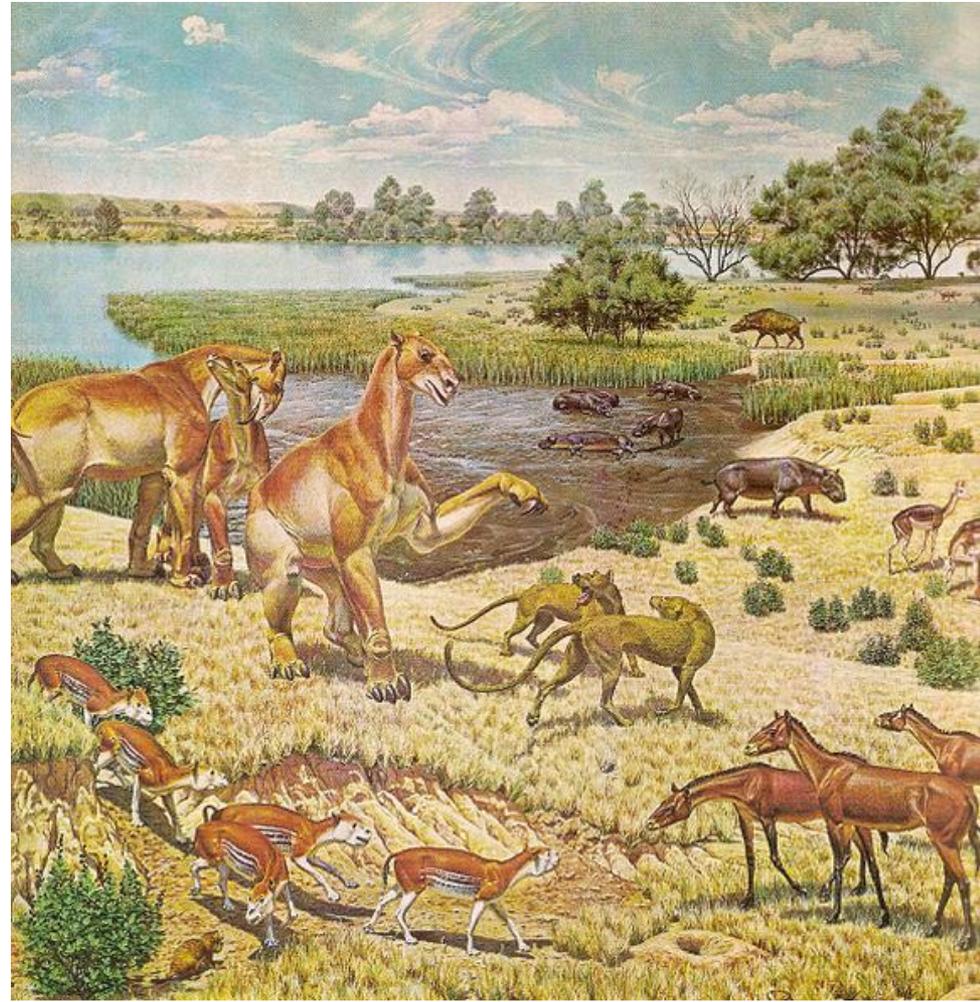
Source: Wikimedia Commons



The Cenozoic

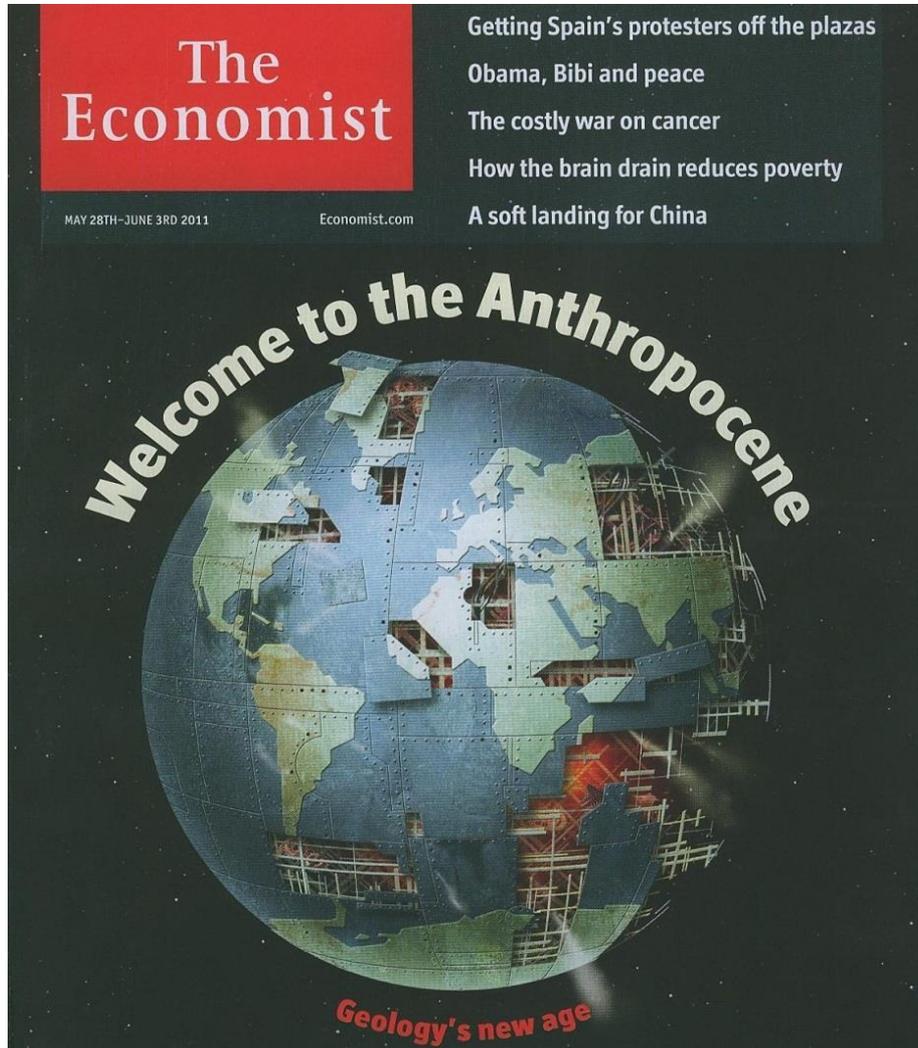


An approximate timescale of key Cenozoic events.
Axis scale: Ma before present.





The Anthropocene



**“Anthropocene”
coined by Eugene
Stoermer, Paul Crutzen**

**“Human development has
reached a scale where it
affects vital planetary
processes”
(Rockström and Karlberg
2010)**

**E.g. carbon cycle, nitrogen
cycle, water cycle
Future fossil cities, fossil
tools**

Other organisms' influences on geology



Other organisms' influences on geology



<http://www.wy.blm.gov/minerals/coal/>



ILSI
Europe

Other organisms' influences on geology



Nico van Belzen



Why are we so successful?

- **Intelligence**
- **Manual dexterity**
- **Wide use of tools**
- **Increased habitat range by clothing**
- **Increased food range by food processing**



Cost of intelligence

The screenshot shows the WolframAlpha interface. At the top, the WolframAlpha logo is displayed with the tagline 'computational... knowledge engine'. Below the logo is a search bar containing the text 'brain energy use'. To the right of the search bar are icons for a star and a document. Below the search bar are icons for keyboard, camera, list, and share. To the right of these icons are links for 'Examples' and 'Random'. Below the search bar is a section titled 'Using closest Wolfram|Alpha interpretation: power expended by the human brain' with a question mark icon. Below this is a section titled 'More interpretations:'. Below that is a section titled 'Input interpretation:' containing the text 'power expended by the human brain'. Below that is a section titled 'Result:' containing the text '20 W (watts)'.

WolframAlpha™ computational... knowledge engine

brain energy use

Examples Random

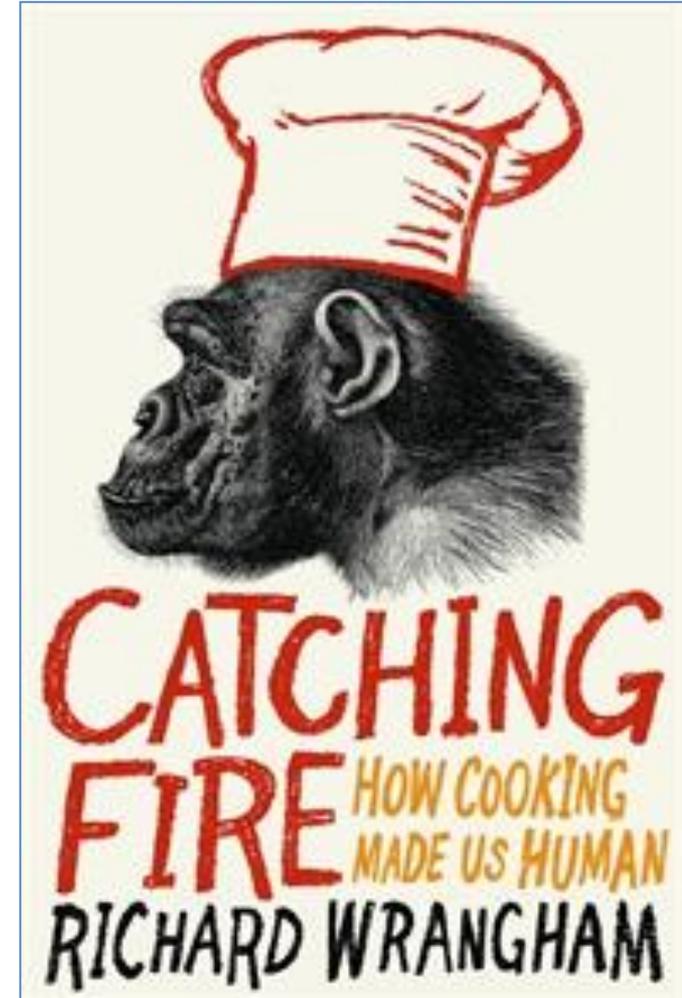
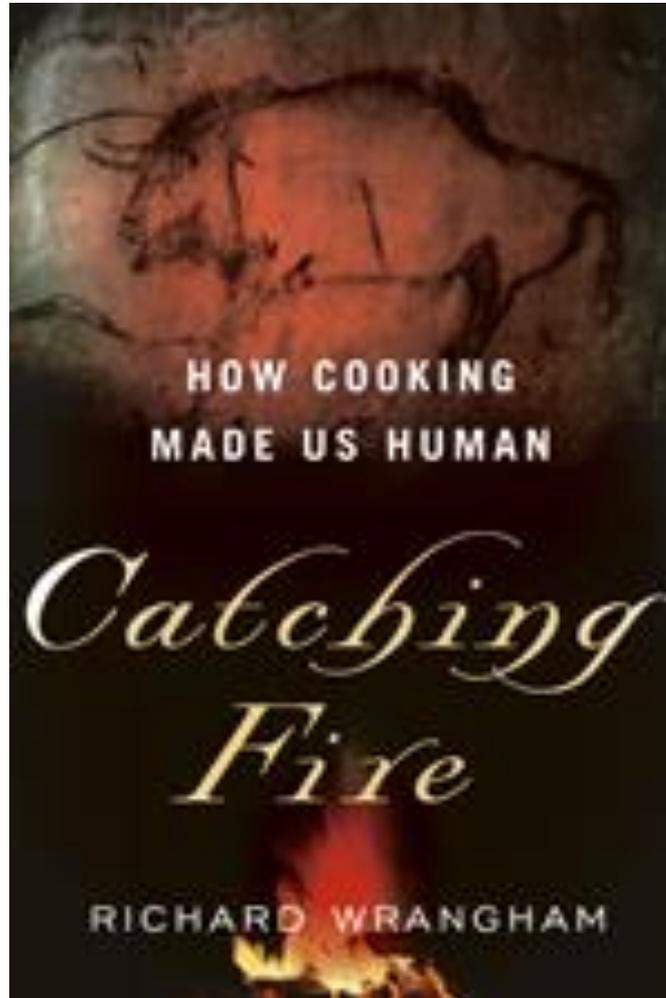
Using closest Wolfram|Alpha interpretation: **power expended by the human brain**

More interpretations:

Input interpretation:
power expended by the human brain

Result:
20 W (watts)

Cooking as the killer app of the human brain



“Coquo ergo sum”

(I cook, therefore I am)

Dr. Heribert Watzke

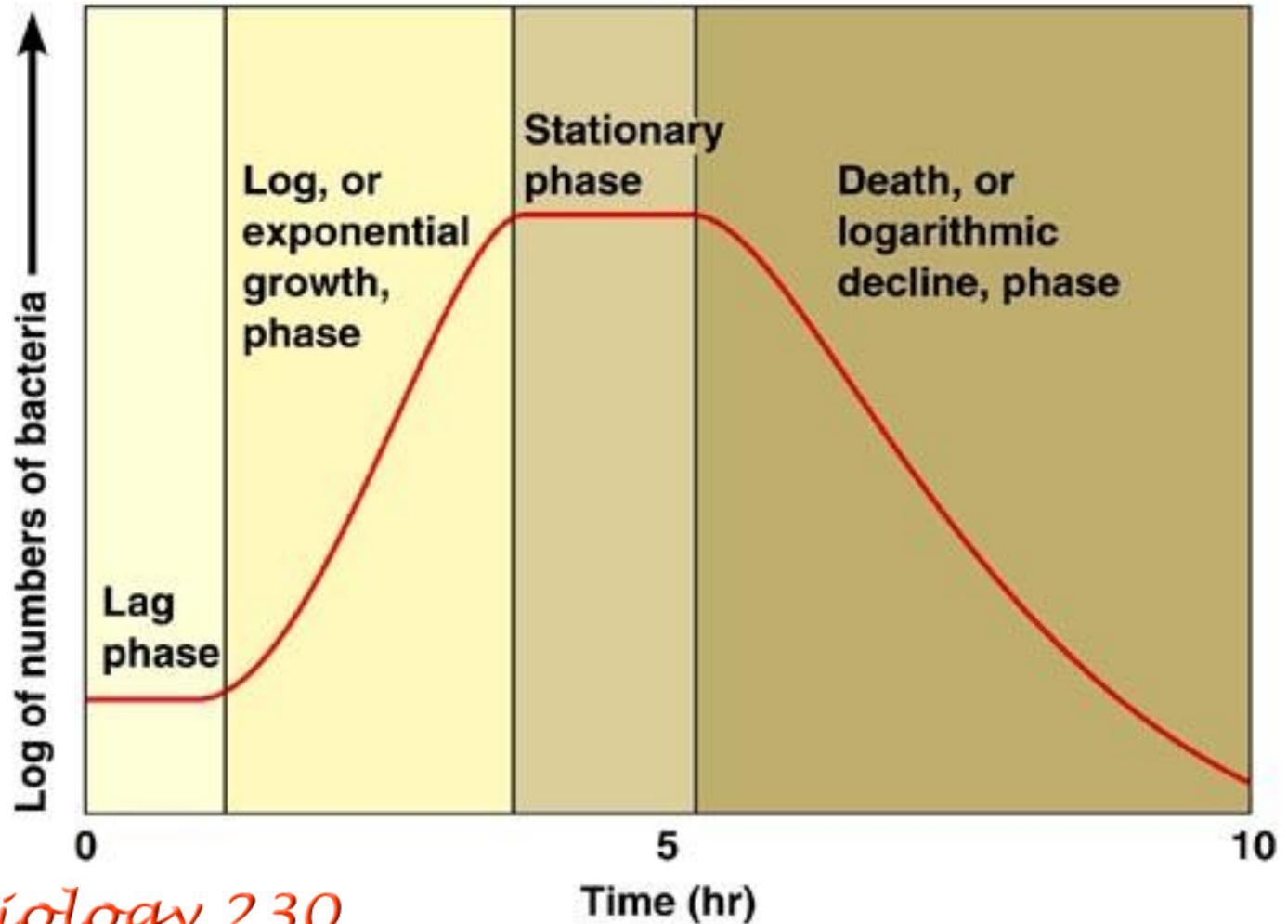
What about the Neanderthals?



Wikimedia commons



Evolutionary success is risky

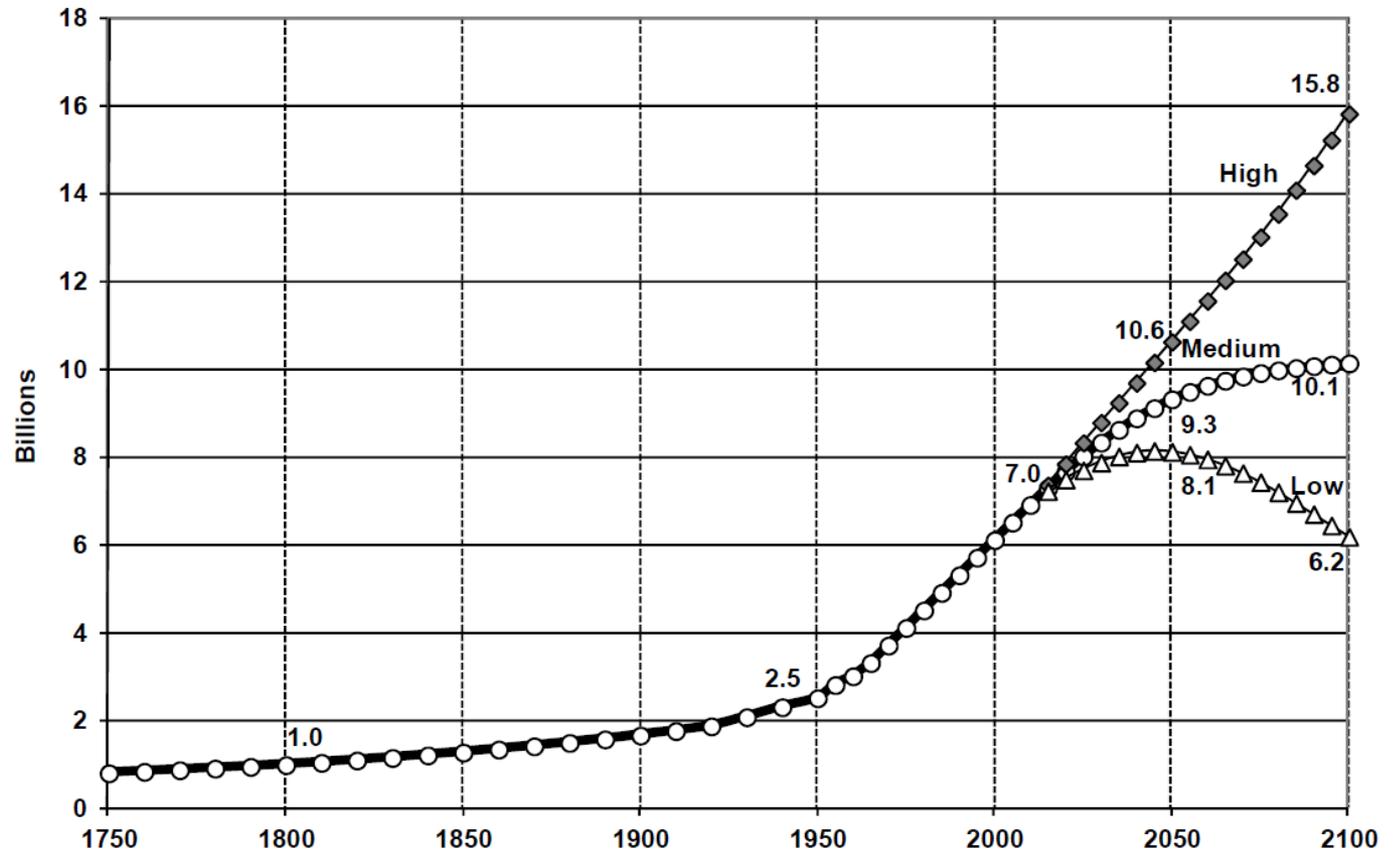


Biology 230

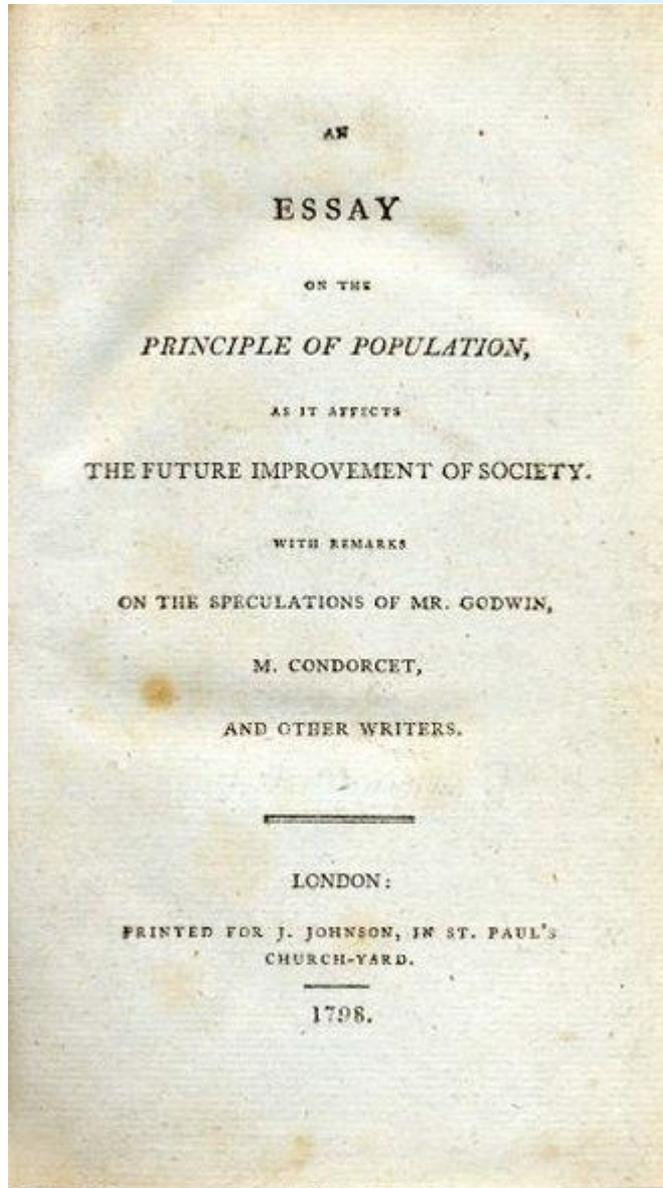
Christine L. Case, Ed.D.
Biology Professor
Skyline College

World population growth

Figure 1. The world population according to different projection variants, 1750-2100



Source: United Nations Department of Economic and Social Affairs, Population Division (2011).
World Population Prospects: The 2010 Revision, <http://esa.un.org/unpd/wpp/index.htm>



Thomas Robert Malthus, 1798

... but action is better



The Nobel Peace Prize 1970
Norman Borlaug

The Nobel Peace Prize 1970

Norman Borlaug



Norman E. Borlaug

The Nobel Peace Prize 1970 was awarded to Norman Borlaug.

Photos: Copyright © The Nobel Foundation

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http://www.nobelprize.org/nobel_prizes/peace/laureates/1970/

Unbalanced nutrition

Food

913,457,283 Undernourished people in the world

1,553,523,520 Overweight people in the world

517,841,174 Obese people in the world

19,252 People who died of hunger today

Water

742,501 Water consumed this year (billion L)

269,700 Deaths from water related diseases this year

835,075,077 People with no safe drinking water source

<http://www.worldometers.info/>



Where are the opportunities?

Across the entire food chain, e.g.

- **Crop improvement: resistance against drought, wetness, salt, cold, heat,**
- **Transport improvement: better logistics, less energy use**
- **Processing improvements: less energy and water use, less biomass waste**
- **Improved meat replacers**
- **Packaging improvements: less food and packaging waste, less energy use**
- **Less food waste throughout the chain**

Beyond the food chain, e.g.

- **Sustainable energy options**
- **Population size control**

The fittest species will survive – we have to innovate, or die

**To improve public health and safety
through advancement of science**





Assessment of Benefits & Risks

- Addition of nutrients to food
- Emerging Technologies
- Food intake methodology
- Functional foods
- Novel foods and Nanotechnology
- Risk analysis in food microbiology
- Risk assessment of chemicals in food
- Risk assessment of genotoxic carcinogens
- Threshold of toxicological concern

Food Chain

- Emerging Microbiological Issues
- Environment & health
- Packaging materials
- Process-related compounds and Natural Toxins

Societal Aspects

- Consumer science

Diet, Health & Disease

- Dietary carbohydrates
- Eating behaviour and energy balance
- Food allergy
- Metabolic imprinting
- Metabolic syndrome
- Nutrient requirements
- Nutrition and immunity in man
- Nutrition and mental performance
- Prebiotics
- Probiotics
- Weight management in public health

Collaboration is key

