BETTERING HUMANITY

THE SCIMAT APPROACH

LUI LAM

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Contents

1. Two Types of Tragedies

Natural Disasters

Indonesia Tsunami, 2004

170,000 dead

Tangshan earthquake, 1976

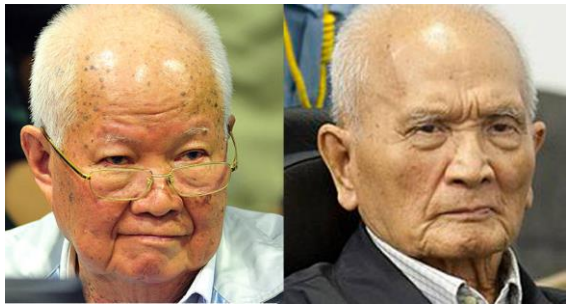
700,000 dead

Disastrous decision making

Cambodia (1975-1979)

- Some people mistook a social science hypothesis as a proven theory and decided to apply it in practice

2 million dead

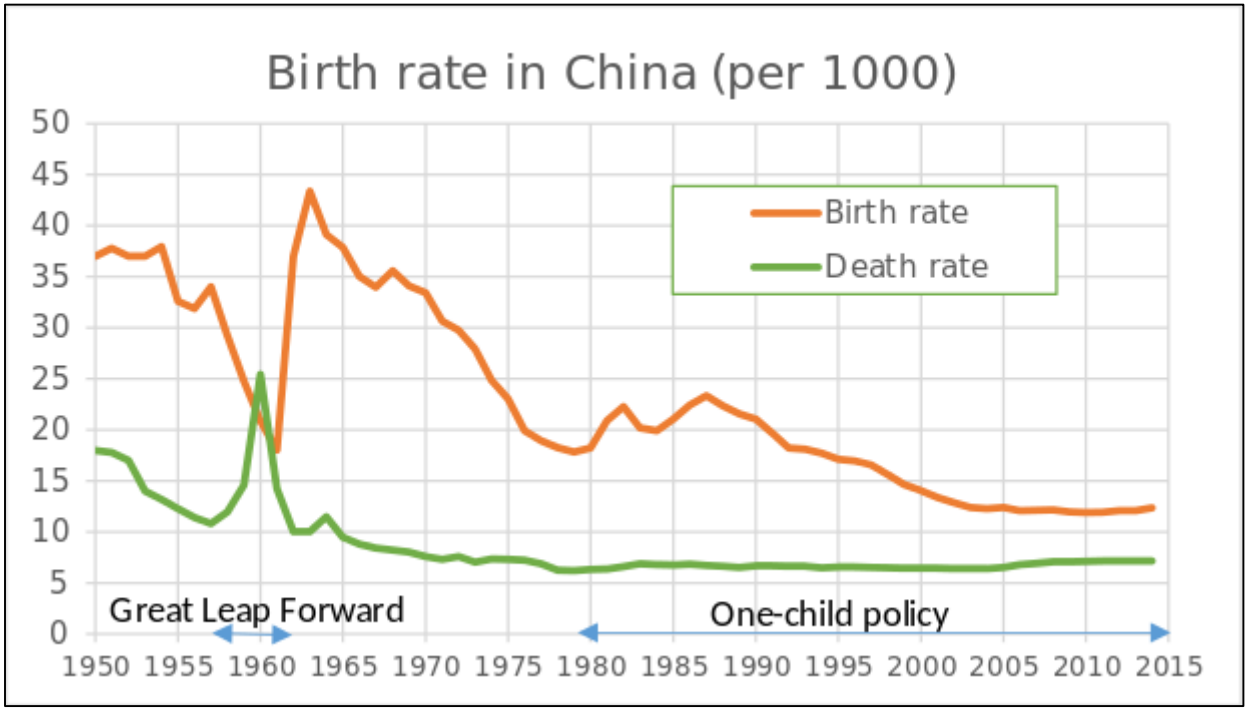


Holocaust in Germany (WWII)

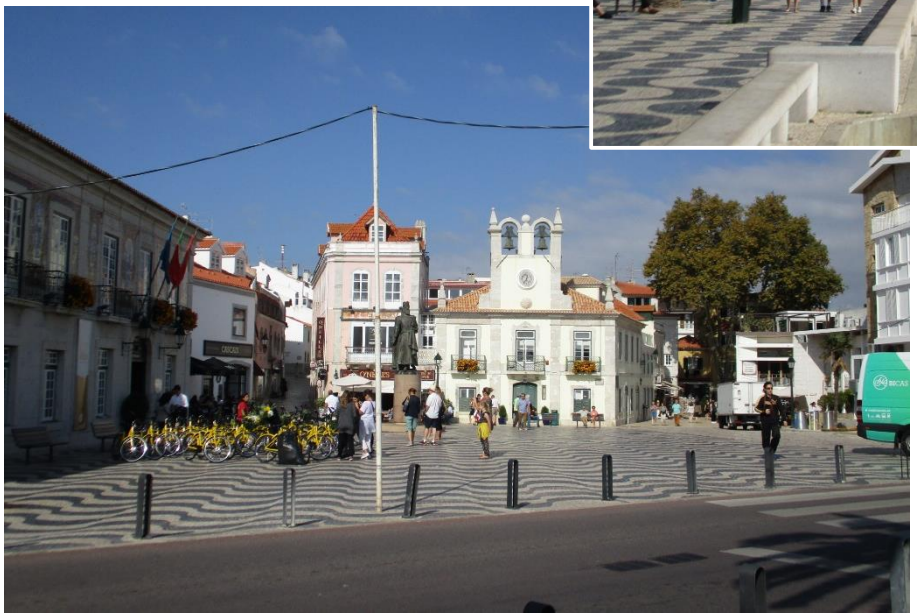
6 million dead

Unnatural famine, China (1959-1961)

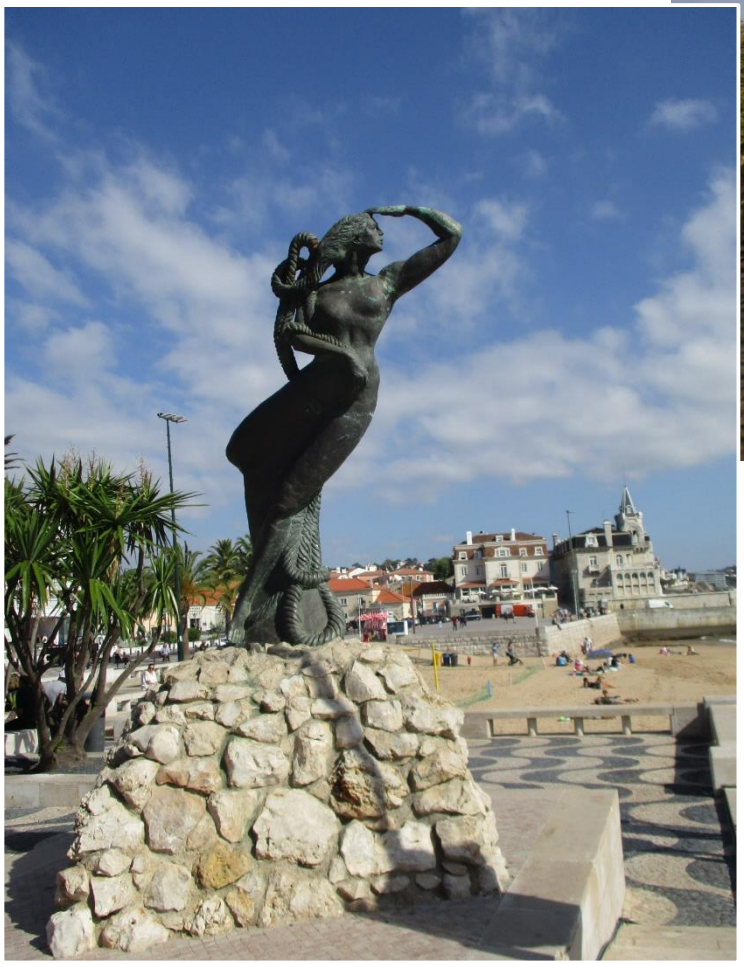
30 million dead



2. Does Humanity Worth Saving?




HOTEL BAÍA



3. Two Types of Bettering Humanity

- Religious based
- Secular

4. Three Secular Movements Before Us

A brief history of secular knowledge

Nonhuman systems

Human system

Thales (c. 624 BC-c. 546 BC)

Aristotle (384 BC-322 BC)

Arabs

Dark Age

Renaissance

Galileo (1610)

Newton (1687)

Einstein (1905/1915)

1723-1790

1743-1794

Enlightenment

Adam Smith (Economics, 1776; *The Wealth of Nations*)

Condorset (*Progress of the Human Mind* ,1795)

Auguste Comte (Sociology, 1844)

Charles Darwin (*On the Origin of Species* ,1859)

Vienna Circle

Humanism movement

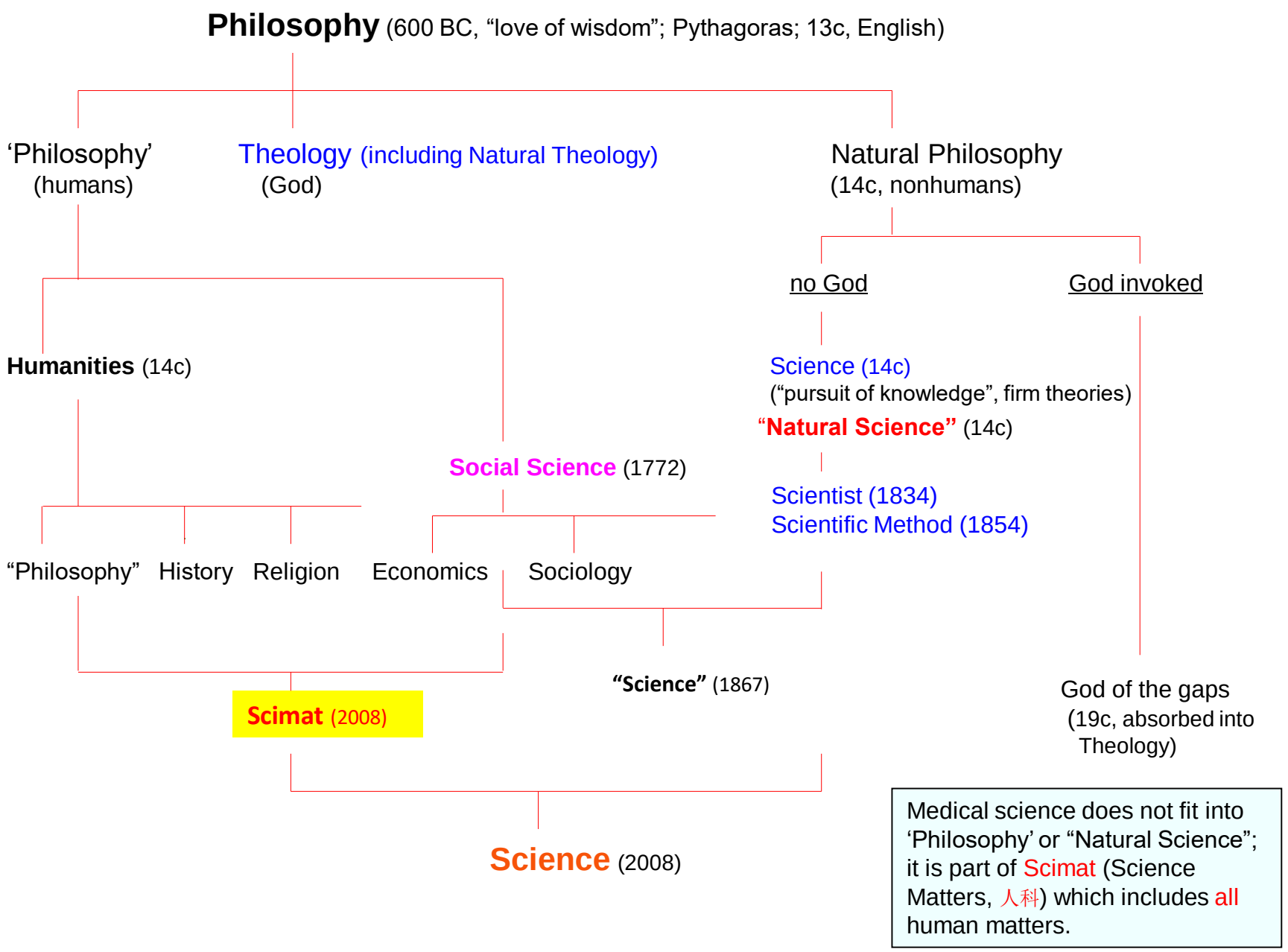
Scimat (2007/2008)

1809-1882

1798-1857

5. Why Science Is Not Enough

Birth of Disciplines & of Science



Medical science does not fit into 'Philosophy' or "Natural Science"; it is part of Scimat (Science Matters, 人科) which includes all human matters.

Relationships of Disciplines

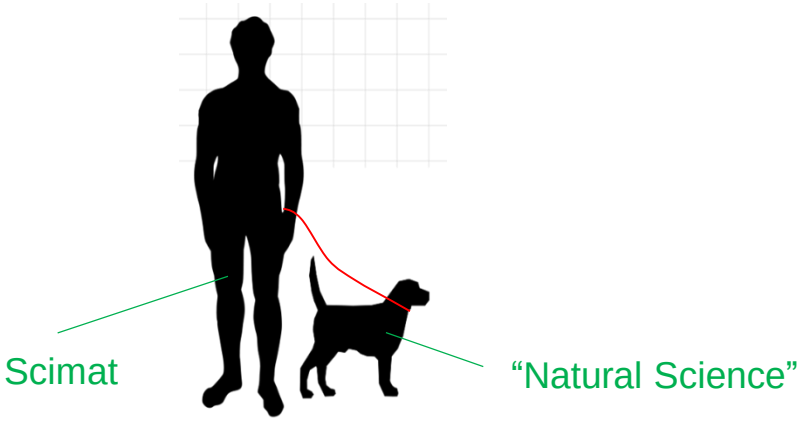
Science = Natural Science

= Science of nonhumans + Science of humans

"Natural Science" Scimat

Humanities + Social Science + Medical Science

The proper image of science:
Two linked animals (one controls the other)



(not test tubes or nuclear symbol…)

Science Is Built on Approximations

Theory means a confirmed hypothesis

- Every theory is an approximation of "reality" (or a better theory later)
- For an "exact" theory, it is rare to find exact solutions.
- An equation is confirmed by measuring the quantities and showing that the left-hand-side of eq. is equal to the right-hand side

$$F = ma$$

But every measurement has uncertainty (called error) dictated by the apparatus used.

And so the equation can only be confirmed approximately

- It is a myth that "exact science" ever exists.
- Science never proves anything, rigorously speaking (in the mathematical sense of proof).
- Science lives and thrives with approximations.

- Science is based on approximations
- It is very successful with simple systems
- Not that successful about complex systems (that include humans)
- People's impression that "science is very successful" is based on their neglect of basic differences between simple and complex systems

6. Why Rational Thinking Is Not Enough

Science: Living with Uncertainty

- Only simple systems in the classical world is certain (e.g., stone falling).
- The quantum world is inherently probabilistic (even though the equation is deterministic).
- The human world, though classical, is inherently probabilistic (due to unaccountable factors).

We are thus living with uncertainly, no matter how much science we know or can know.

- Learn basic probability
- Prepare for the "worse"
- Be humble as scientists

Physics Nobelist David Gross (2013):

A scientific "frontier" is defined as a state of confusion. … The public generally equates uncertainty with a wild guess. Whereas, for a scientist, a theory like the Standard Model is incredibly precise and probabilistic. In science, it is essential never to be totally certain. … Living with uncertainty is an essential part of science, and it is easily misunderstood.

- Rational thinking is never complete (e.g., irrational thinking becomes rational when more factors are considered; vice versa)
- Human system is probabilistic
- Any prediction about humans can only be given with probability
- Decision makings based on rational thinking thus always involve gambling
- In gambling (with incomplete information), other considerations are involved (e.g., empathy for the underprivileged, affordability of total loss…)

7. Educational Level of Political Leaders

Name	Born-death	Country	Primary school	Middle school	High school	College	Highest degree
Joseph Stalin	1878-1953	USSR	Yes	Yes	Yes		
Adolf Hitler	1889-1845	Germany	Yes	Yes	Drop out		
Mao Zedong	1893-1976	China	Yes	Yes	Yes		
Deng Xiaping	1904-1997	China	Yes				
Xi Jinping	1953-	China	Partly			Yes	PhD
Tsai Ing-Wen	1956-	Taiwan	Yes	Yes	Yes	Yes	PhD
George W. Bush	1946-	USA	Yes	Yes	Yes	Yes	MBA

8. The Dao of Scimat

In One Sentence

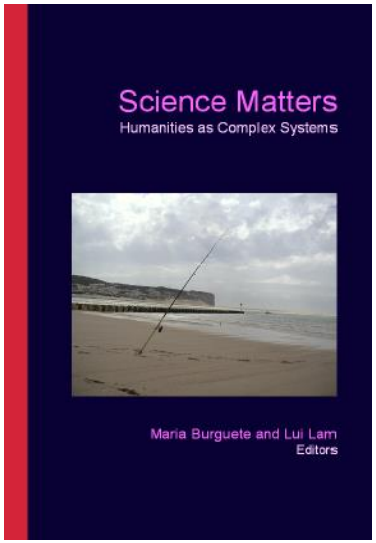
Scimat (Science Matters), a new multidiscipline introduced by Lam in 2007/2008, deals with the science of humans. It aims to raise the scientific level of the humanities by encouraging interaction between humanists and natural scientists.

In one sentence:

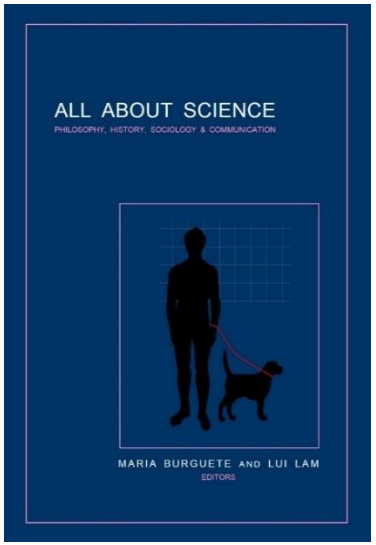
Everything in Nature is part of science !

That is, everything in Nature, humans included, are legitimate subjects of study in science.

Scimat website:
www.sjsu.edu/people/lui.lam/scimat



2008



2014

Four Tenets

Conceptually, scimat represents the four tenets:

1. Science is humans' effort to understand Nature without bringing in God or any supernatural.
2. Science covers everything in Nature.
3. Nature includes humans and all nonhuman systems.
4. All research on human matters, humanities in particular, are part of science.

Disciplinarily, scimat represents the collection of research disciplines that deal with humans:

Scimat = Humanities + Social Science + Medical Science

One Insight

The 1-2-3 insight:

One culture, two systems, three levels !

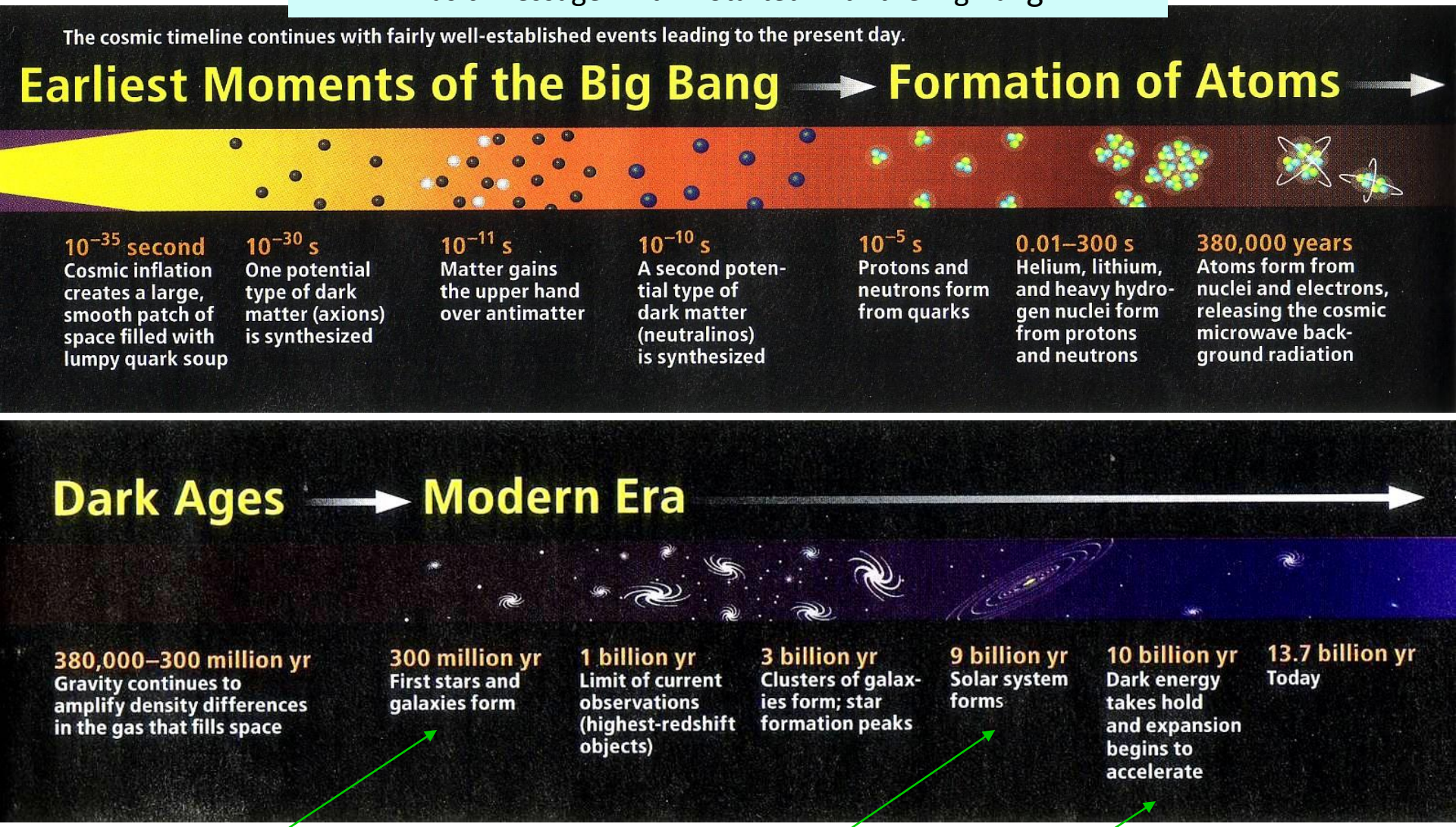
- There is only one culture—the scientific culture.
- All systems are simple or complex systems; the two are quite different.
- There are always three research levels (empirical, phenomenological, bottom-up) in any discipline.

9. The Scimat Approach in Bettering Humanity

Step 1

Put 3 messages into elementary education

Basic Message 1: It All Started with the Big Bang



Atoms formed in stars

Earth formed

Life began

Everything on Earth is made up of atoms (mostly came from the stars) !

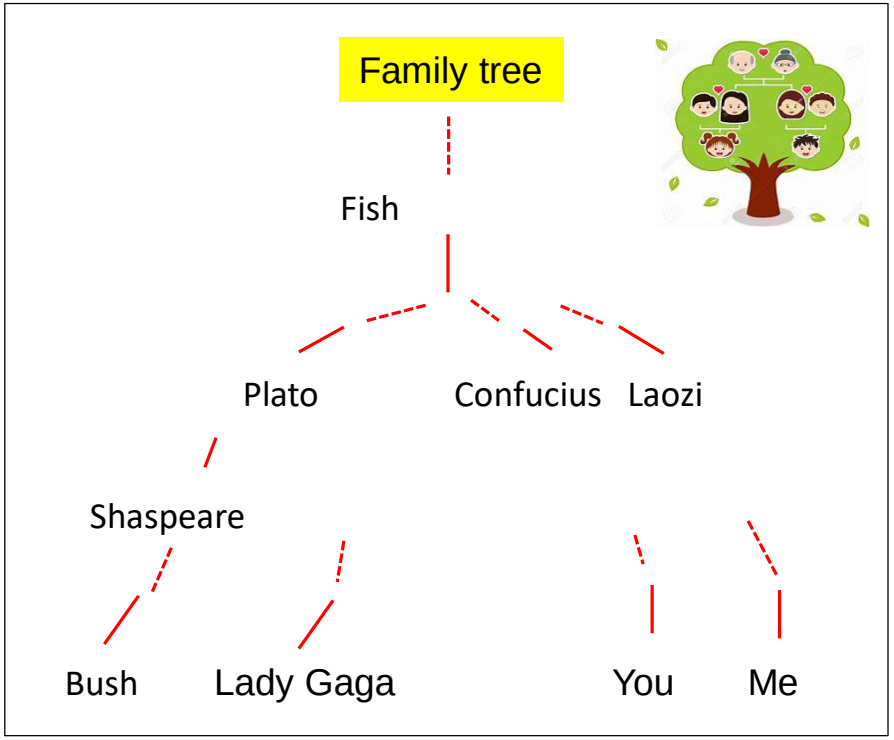
Basic Message 2: We Are One Family, Descendants of Fish

Our ancestor

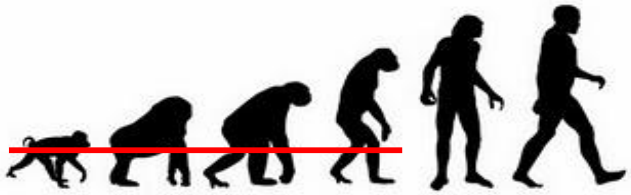
Microbrachius

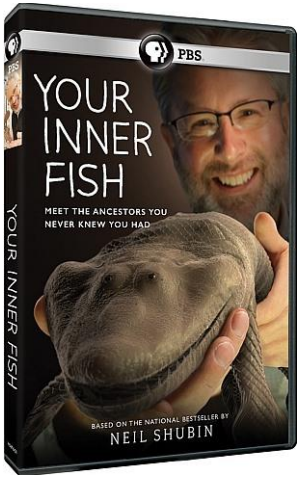
8 cm, 0.4 billion years ago

Family tree

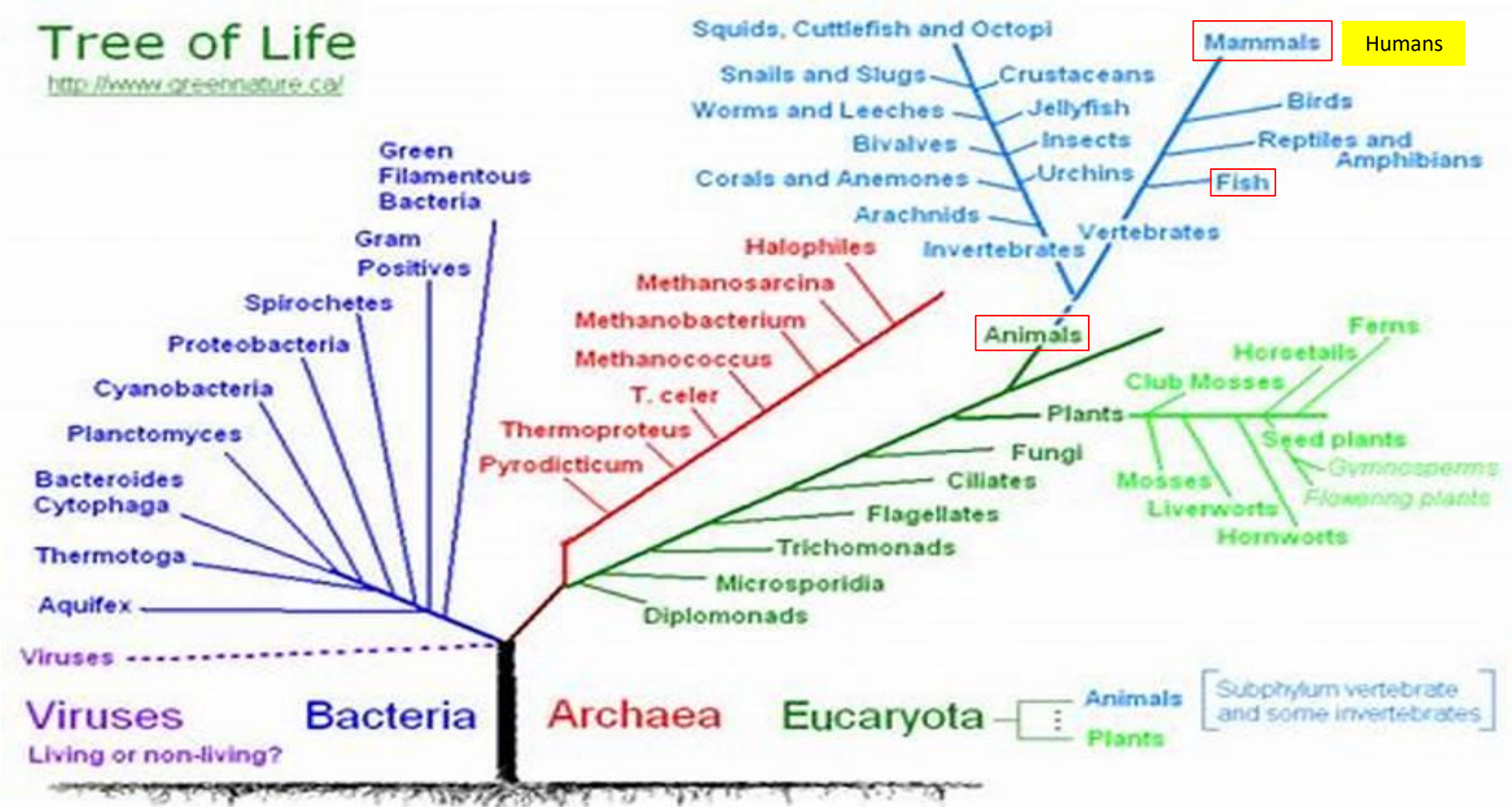


Darwin's evolutionary theory (1859)



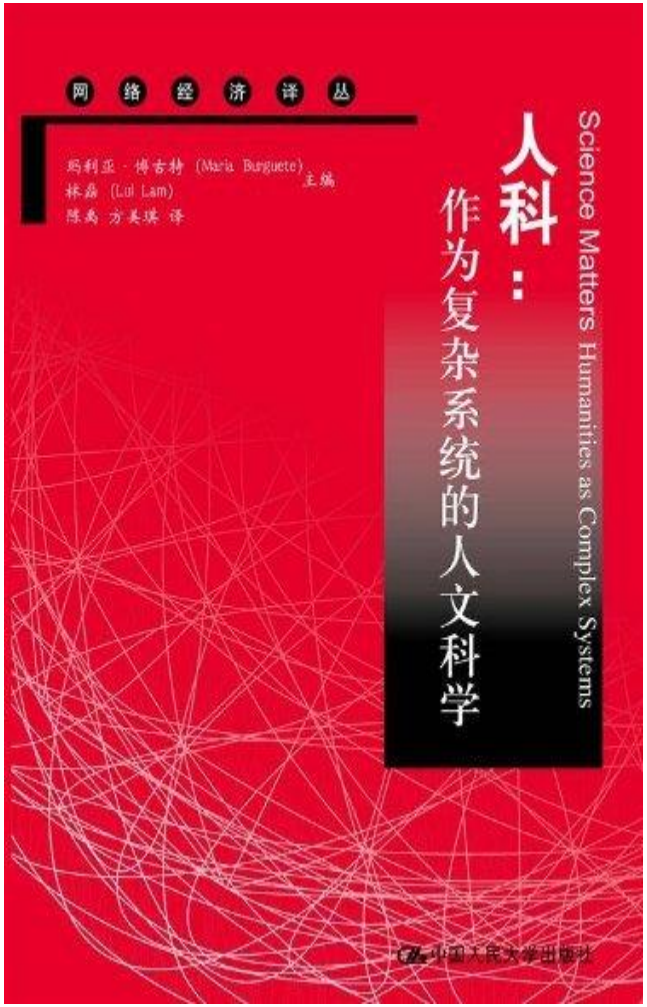


- Some 375 million years ago, the first fish crawled up onto land
- Fish Tiktaalik had enough strength in its front fins to do pushups and heave itself out of the water
- Our arms, legs, necks and lungs can be traced to fish (supported by DNA trace)
- Every one of us is just a (jury-rigged) fish



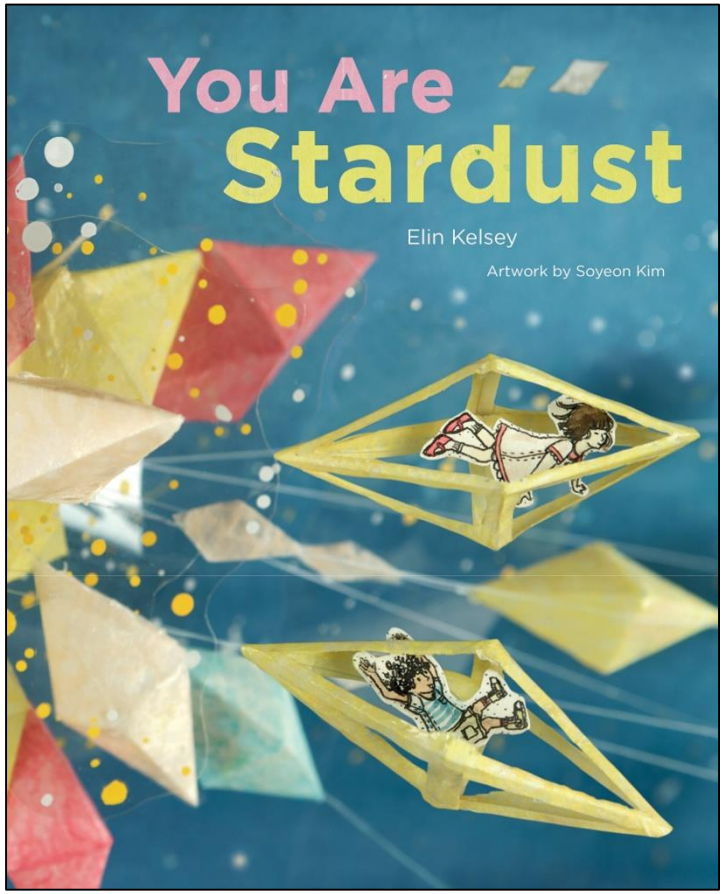
Basic Message 3: We Are Recycled Stardust

- Everything on Earth, humans included, is made up of atoms.
- All atoms came from the stars (except gold and silver which were produced from the black holes). We are thus stardust
- Every atom in our body is recycled from somewhere else, which could be other peoples' body, dead or alive, which you never know.
- We thus could be related to each other physically. We are recycled stardust

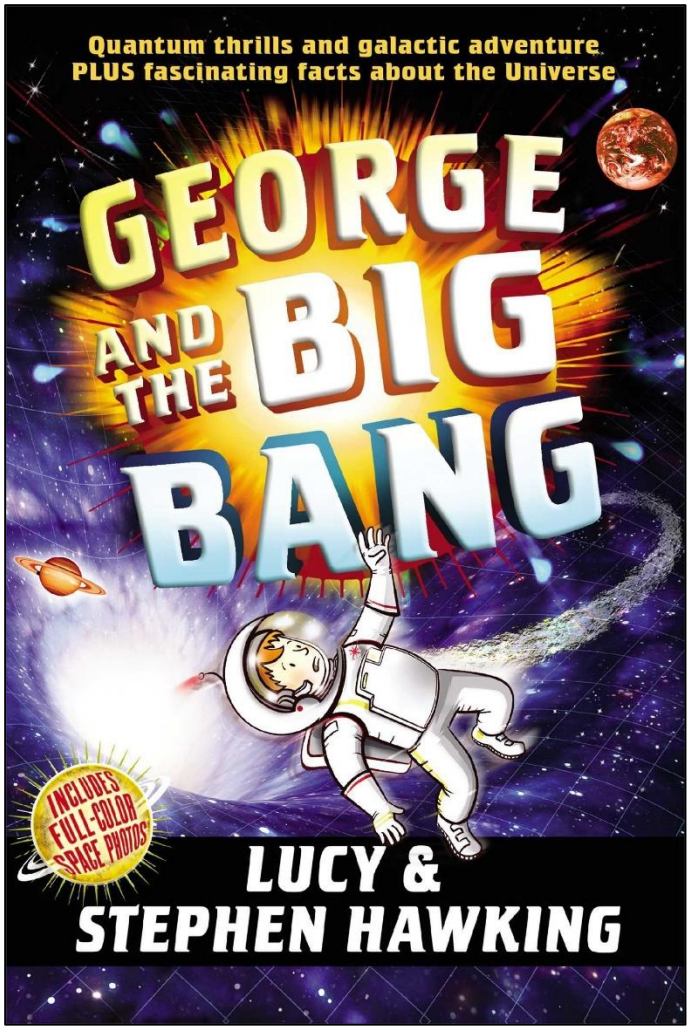


2013

Children books



2012



2013

Step 2

Teach the HSS GE Course in every university

Humanities Science Scimat

An Interdisciplinary Cross-Cultural Introduction

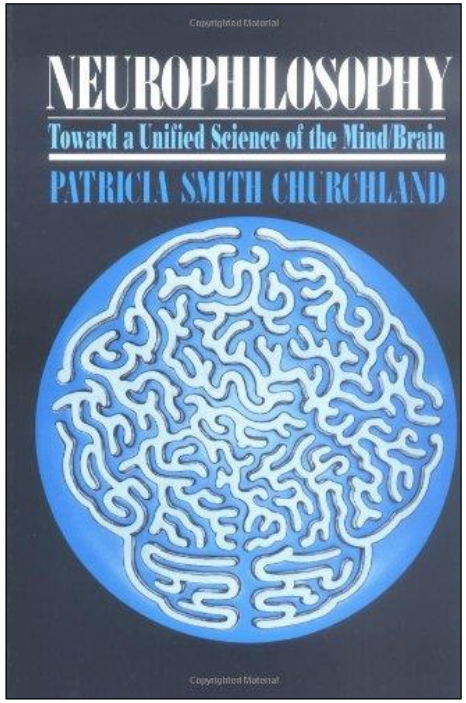
Lui Lam

Contents

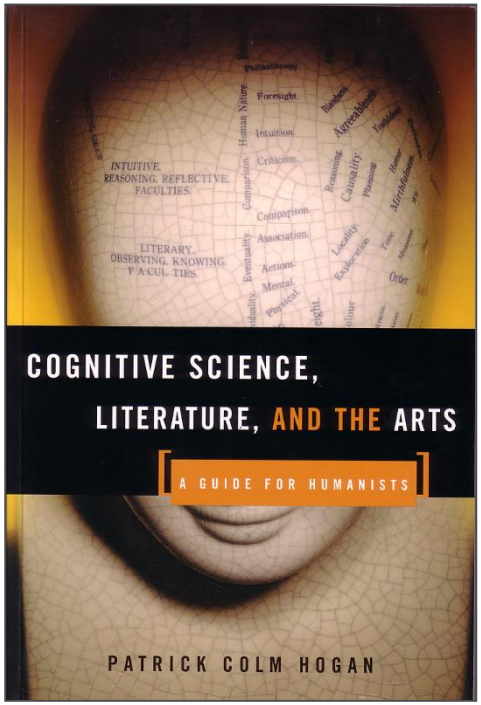
How to Raise Humanities' Scientificity

- Through the collaboration of humanists and "scientists"
- More research with the bottom-up approach.

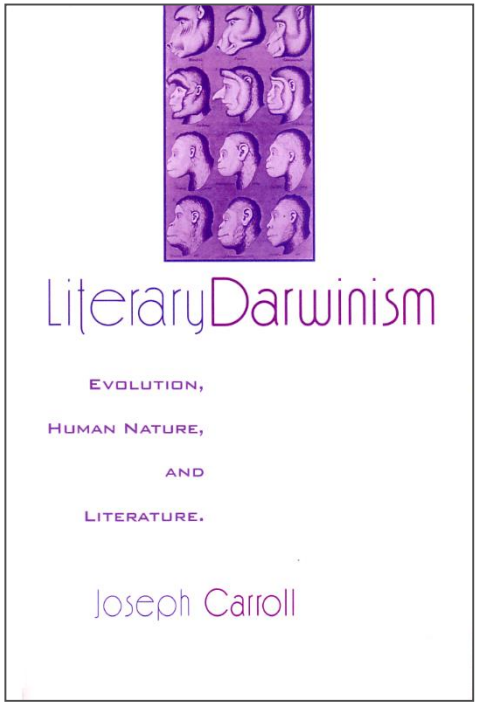
Examples: books by humanists



1986

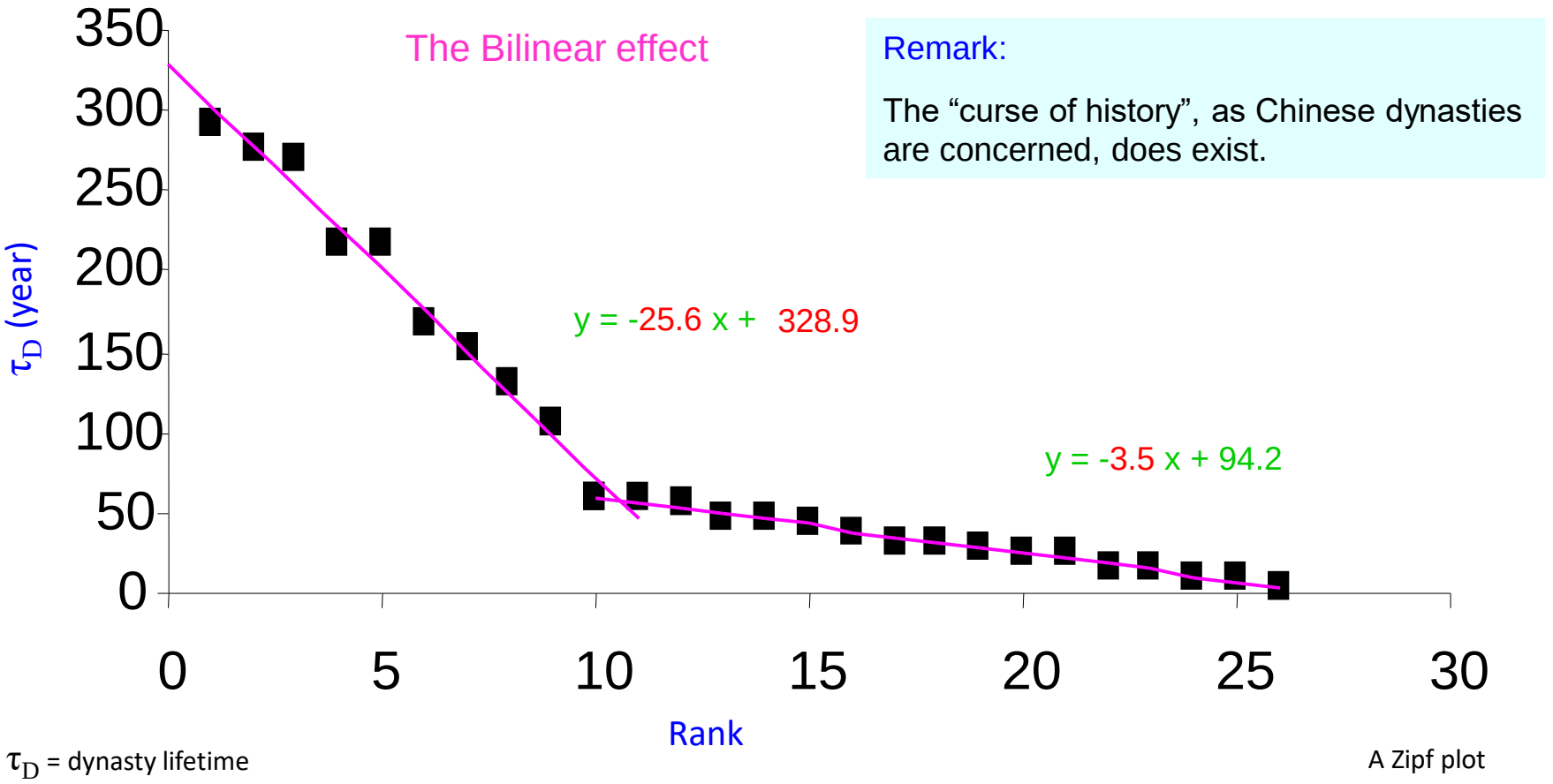


2003



2004

A Quantitative Law: A Chinese dynasty can survive every 3.5 years if it lasts less than 57 years; beyond that, every 25.6 years (i.e., dynasty lifetime is discrete, or "quantized").



Remark:

The "curse of history", as Chinese dynasties are concerned, does exist.

τ_D = dynasty lifetime

A Zipf plot

A quantitative prediction (assuming dynasties fall into the bilinear type):

Any dynasty after Qing, if exists, will either

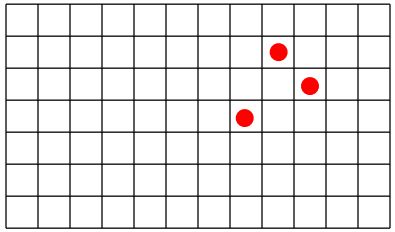
1. last 290 years or less and fall on the two lines, or
2. end definitely and exactly in its year 329.

Probability and Uncertainty

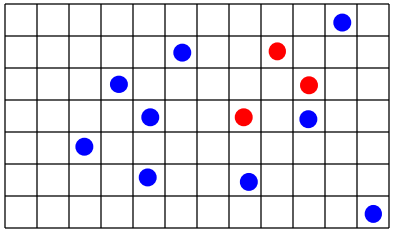
Why eventually there always is a winner in Lotto ?

Lotto first prize
→ one box will be hit

Winner is the one whose box is hit



1st round

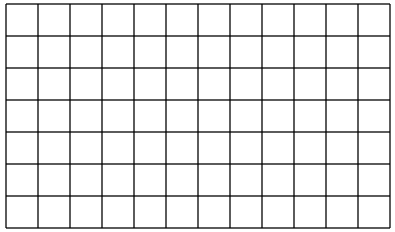


2nd round

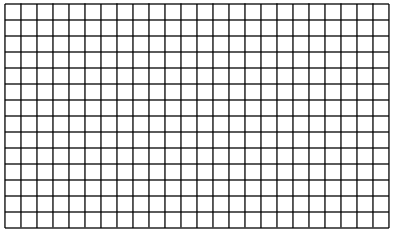
Events with small probability, no matter how small, could actually happen.

Given: a (zero-size) raindrop will fall on this graph paper

p = probability that a box will be hit



p = 1/84 = 0.012 (1.2%)



p = $1/(84)^2$ = 0.00014 (0.014%)

- Probability is an intrinsic part of the human world.
- We simply have to go on living with uncertainty, more *wisely* and *humbly*.

Error Bars and the Bell Curve

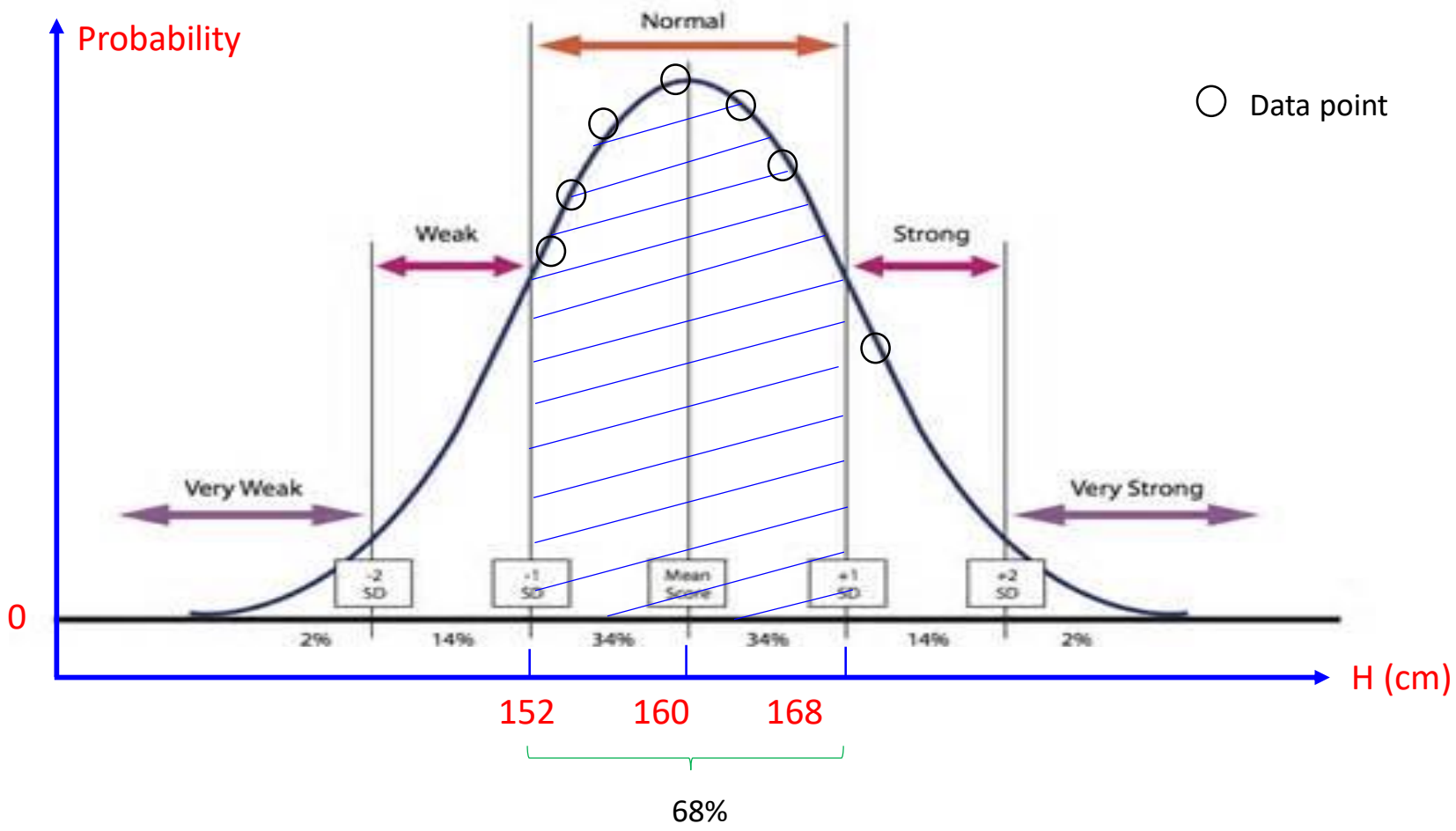
What it means to say the *height of students in class* H is given by

$$H = 160 \pm 8 \text{ cm}$$

It does not mean

$152 \leq H \leq 168$ cm

Mean = 160 cm
Standard deviation (SD) = 8 cm



Step 3

Establish 100 scimat centers worldwide

The Center is:

- To do fundraising to support the Center financially.
- To organize international workshops/conferences and summer/winter schools.
- To give out an Award every two years (for an individual who contributes significantly in the advancement of scimat).
- To host short-term visiting scholars (who will give lectures/short courses, who will also collaborate with existing faculty members and students of any discipline, especially from the humanities).
- To help match faculty members from humanities and science departments, and give them release time to create new interdisciplinary courses such as a course on “Science of History”.
- To help spread the new, ultimate general-education course “Humanities, Science, Scimat” for undergrads of all majors, in all universities worldwide.

Approach	Methodology	Religion
Enlightenment	Follow Newtonian mechanics	Against
Vienna Circle	Positivism	Yes/No
Humanism	Educational (outside system)	Against
Scimat	Educational (within system)	No position

10. The Bottom Line of Morality in Each Country

The role of peaceful religions

- Ready answers
- Quick fixes

The price to pay is to give up one's critical thinking on those ready answers

Conclusion

The scimat approach in bettering humanity is realistic and viable !

Sixth International Science Matters Conference, "Bettering Humanity: Historic Secular Movements"
October 25-27, 2017, Cascais, Portugal

Bettering Humanity: The Scimat Approach

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Large scale tragedies in the world can roughly be divided into two types: natural or human caused. The former includes volcano eruptions, earthquakes and tsunamis; the latter, unnatural famines, wars and genocides. Quantitatively speaking, human caused tragedies may be more damaging than the natural ones. And being human caused, they could be avoided or minimalized through human efforts

Efforts to bettering humanity through reduction of human tragedies in the past can also be divided into two types: religiously based or secular types. Important secular movements of historical significance that cut across country boundaries include, in the recent past, the Enlightenment (1688-1789) and the Vienna Circle movement (early 20th century), and presently, the Humanism movement in UK and the USA. Fair to say, in spite of some successes, we cannot claim that all these movements were successful by looking at the world around us.

The Scimat (Science Matters) program was started 10 years ago with the first international science matters conference in Portugal (see: www.sjsu.edu/people/lui.lam/scimat). Scimat focuses on the science of humans as a means of bettering humanity. In this talk, we will discuss what the scimat approach is and how it agrees and differs from the previous movements. The emphasis is on educating the policy makers, present and future. And since we don't know who would be the future policy makers we will have to work on the education of everybody, starting from grade schools and through the universities. Among other things, we will discuss why science is not enough and why rational thinking is not enough in making humanity better.

Lui Lam, humanist and physicist, obtained his BS (First Class Honors) from University of Hong Kong, MS from University of British Columbia, and PhD from Columbia University. He is a physics professor and recipient of the Distinguished Service Award (2016-2017) at San Jose State University, California, and guest professor at Chinese Academy of Sciences *and* the China Association for Science and Technology. Lam invented Bowlics (1982), one of three existing types of liquid crystals in the world; Active Walks (1992), a new paradigm in complex systems; and two new disciplines: Histophysics (2002) and Scimat (Science Matters, 2007/2008). He published 16 books and over 180 scientific papers. He is the founder of the International Liquid Crystal Society (1990); cofounder of the Chinese Liquid Crystal Society (1980); founder and editor of two book series: Science Matters (World Scientific) and Partially Ordered Systems (Springer). His current research is in philosophy and complex systems. *Email: lui2002lam@yahoo.com*