



NEWTON

and

His Apple

Creativity, Sexuality,
Religion & Science

林磊

美国加州圣何塞州立大学物理与天文系
中国科学院物理研究所
中国科协中国科普研究所

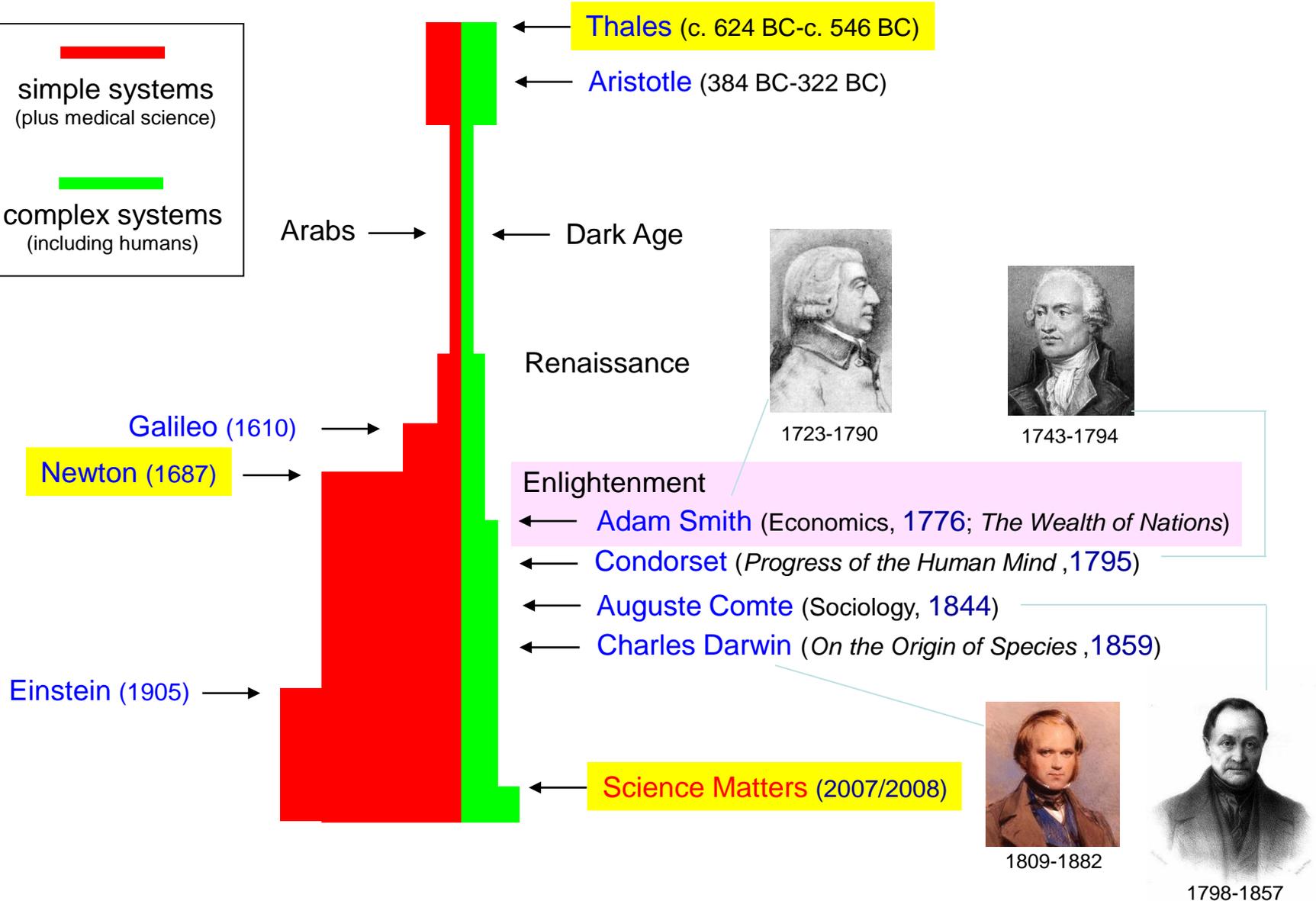
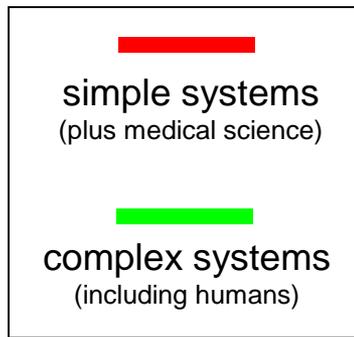
yr:1665

Three Apples in Western Culture



Isaac Newton

Newton's Position in Science History

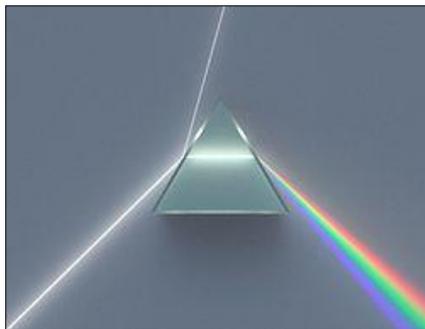


Newton's Life: Age 0-24

1642-1665 (Age 0-24)

Isaac Newton

1642-1727 (85 yr)

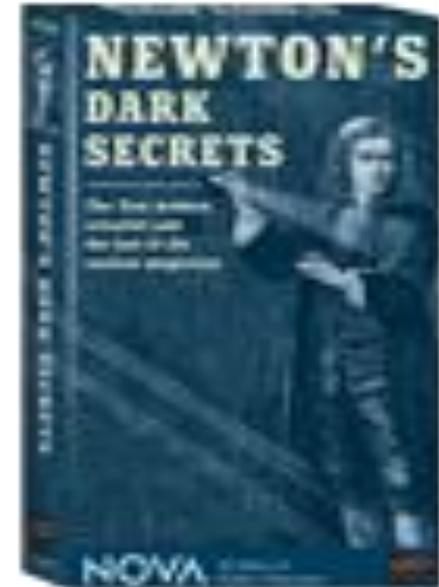
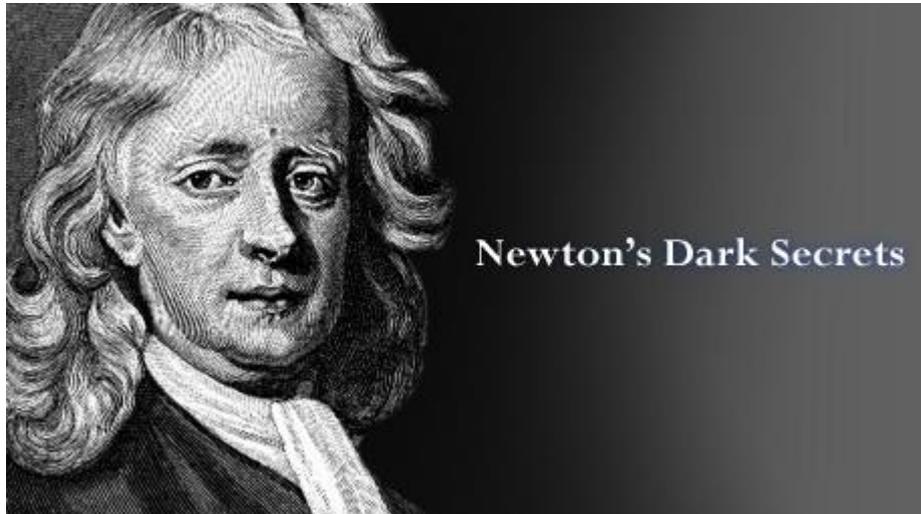


- 1642 Isaac Newton born at Woolsthorpe Manor
- 1646 Hannah Newton marries the Rev. Barnabas Smith
- 1653 Hannah, widowed for the second time, returns to Woolsthorpe
- 1655 Isaac Newton enrolls at the King's School and boards in Grantham
- 1661 Isaac Newton enters Trinity College, Cambridge
- 1665 Newton awarded Bachelor of Arts degree
- 1665 Returns to Woolsthorpe Manor to escape the plague
- 1665-6 Newton's *annus mirabilis* at Woolsthorpe

<http://www.pbs.org/wgbh/nova/physics/newton-dark-secrets.html>

Newton's Dark Secrets

Centuries-old manuscripts reveal the hidden pursuits of a scientific genius Aired November 15, 2005 on PBS



He was the **greatest scientist of his day**, **perhaps of all time**. But while Isaac Newton was busy discovering the universal law of gravitation, he was also searching out **hidden meanings in the Bible** and pursuing the **covert art of alchemy**. In this program, NOVA explores the strange and complex mind of Isaac Newton.

Childhood

As a boy, he pored over a book called *The Mysteries of Nature and Art*

His father died before he was born, and when he was just three years old, his mother remarried and moved away, leaving young Isaac behind with his grandparents. Newton later confessed to such rage that **he wanted to burn his mother and stepfather in their house.**

He **worked seven days a week, 18 hours a day.** He had a library of his own that had about 1,600 or 1,800 volumes,

Woolsthorpe Manor Water Ln, Grantham NG33 5PD, UK



Woolsthorpe Manor

Key:

- 1 Tickets/Shop and Way Out
- 2 Entrance to the House
- 3 Apple Tree
- 4 Science Discovery Centre and Newton's Barn Coffee Shop
- 5 Activity and Film Room
- 6 Toilets and baby-changing facilities
- 7 Picnic tables
- 8 Parking spaces for disabled visitors
- 9 Second-hand books
- 10 Human sundial



Welcome to Woolsthorpe Manor

Sir Isaac Newton was born here on Christmas Day in the harsh winter of 1642. He was a premature and sickly baby who was not expected to survive, but he grew into a thoughtful and solitary child. We like to picture him on the farm at Woolsthorpe, annoying the servants with his endless questioning, or as a young man in 1665, newly returned from Cambridge, wandering in the orchard, full of revolutionary ideas about mathematics, optics, gravity and motion.

Isaac spent the early years of his long life here at Woolsthorpe. He came back to look after his mother in her last illness in 1679 before heading back to Cambridge. But somehow he's still here, a young man scratching drawings on the walls, making sundials, darkening his room and setting up his glass prisms to split the Lincolnshire sunlight into rainbow colours. We once measured the distance from the shutter to the wall for a television programme and it was 22 feet – just as in Isaac's notebook! That was a moment when we felt we could almost touch him.

We love this place – and we're delighted to welcome you to Woolsthorpe. We hope you have a very enjoyable visit.

The Woolsthorpe Team





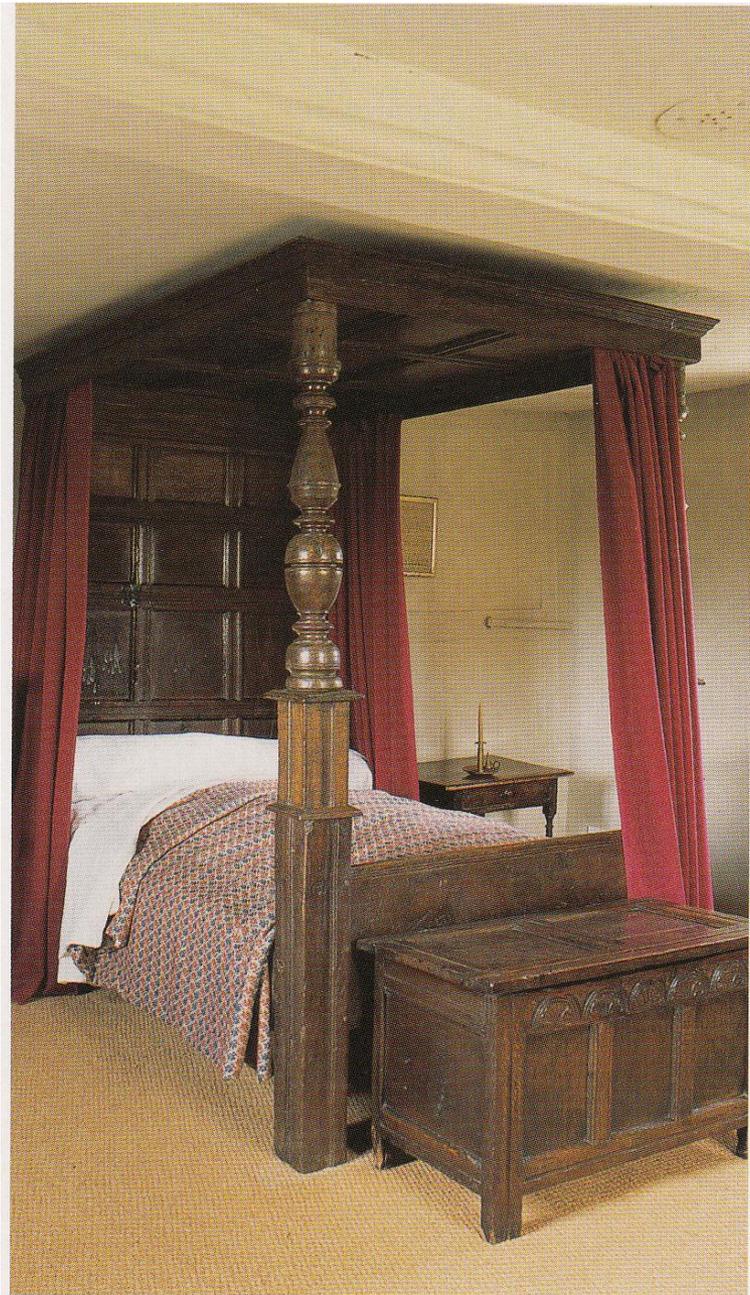
















Cambridge Student Years: Age 19-23



There's no evidence that anyone liked him at all, apart from his friend **John Wickins**.

They have a very peculiar relationship because Wickins is somebody who is of a higher status than Newton at Trinity and seems to have become Newton's amanuensis, i.e., his secretary, over the following 20 years. But they must have been very close.



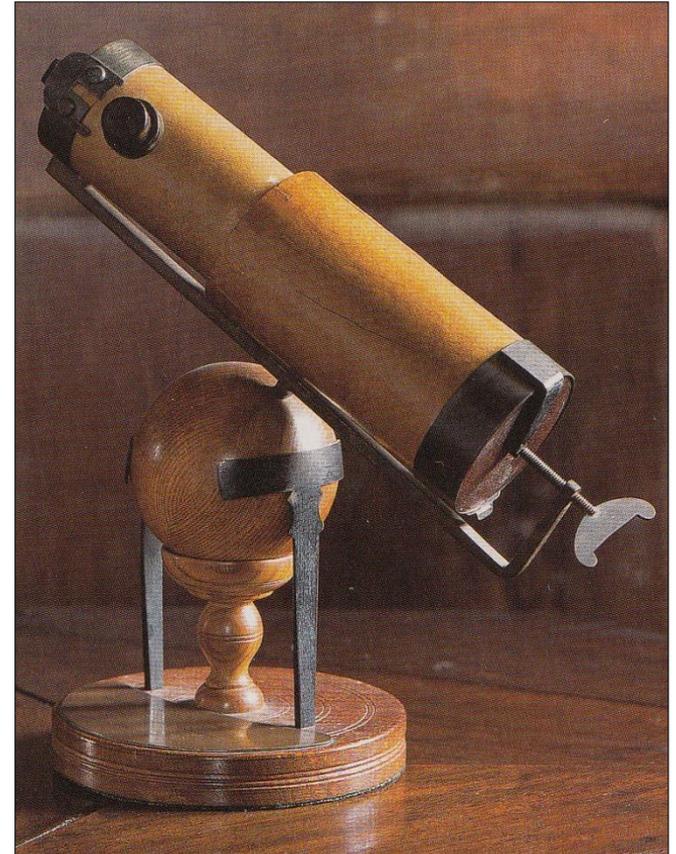
They lived in the same rooms for 20 years.

Trinity College

Cambridge Professional Years: Age 25-46

1667-1687

- 1667 Elected a Minor Fellow of Trinity College
- 1668 Elected Major Fellow of Trinity College
- 1669 Manufacture of reflecting telescope
- 1669 Becomes Lucasian Professor of Mathematics at Cambridge
- 1671 Shows reflecting telescope to the Royal Society
- 1672 Elected a Fellow of the Royal Society
- 1687 First edition of *Principia* published





Welcome to The Home of Genius

Like hitting a hole-in-one from 9,000 miles away!

NASA, the US space agency, achieved this stunning feat in 1989 when it guided the probe Voyager 2 to within 20 miles of its destination near Neptune.

It was only possible thanks to the genius of Isaac Newton





1669

A Dazzling Breakthrough

From the 1660s, Robert Boyle and others began to study the properties of gases. Boyle's experiments showed that the volume of a gas is inversely proportional to its pressure. This discovery was a key step in the development of the scientific method.



1671

The Plague Years

While the Great Plague of London is often remembered for its horror, it also led to important discoveries about disease. John Snow's work in the 1850s showed that cholera was spread by water, not air.



1689

1696

1699

Newton's 'Laws of Motion'

Newton's laws of motion are a cornerstone of classical mechanics. They describe the relationship between a body and the forces acting upon it, and its motion in response to those forces.

Still Going

Newton's laws of motion are still used today to describe the motion of objects in the real world.



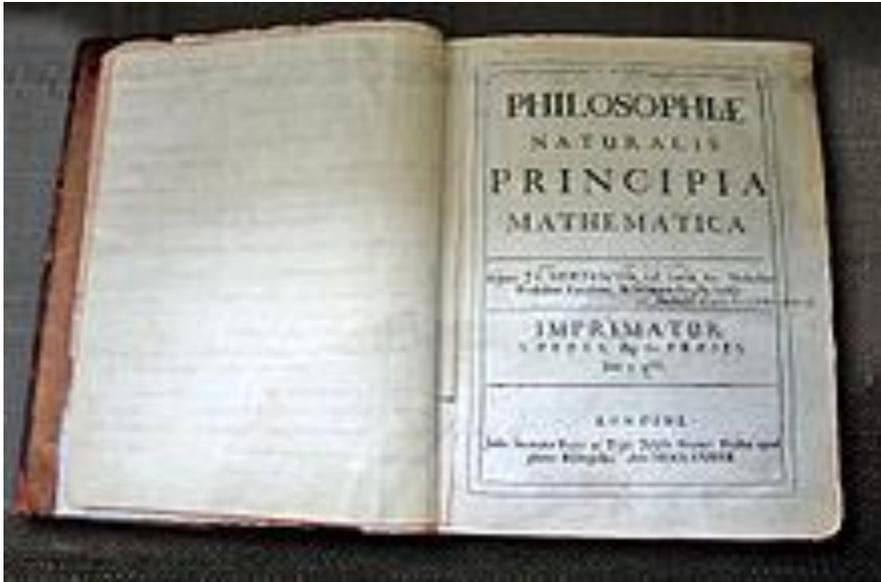
Of colours

Different World...

A New World

Discover the world of the 17th century through interactive exhibits and informational panels.

Why Newton delayed publication of *Principia* for 21 years



Newton's own copy of his *Principia* (1687), with hand-written corrections for the second edition

Newton was allergic to criticism, I mean really allergic. He went off the wall when people criticized him.

He cannot convince as many people as he wants that what he said is true. And that defeat, if you like to call it that, was very bitter for him. And by the mid 1670s (few years into chair professorship), he's withdrawn completely from the international world of science.

Newton vowed he would never publish a scientific paper again.

Almost 20 years later, after prompted by Edmond Halley to show the planets' orbits are ellipses, he spent 18 months to write up *Principia* at age 44.

Newton's Alchemy Research

In the isolation of Cambridge, Newton threw himself into **alchemy**.

Alchemy is an influential philosophical tradition whose practitioners have, from antiquity, claimed it to be the precursor to profound powers. The defining objectives of alchemy are varied, but historically have typically included one or more of the following goals:

- the creation of the fabled philosopher's stone;
- the ability to transform base metals into the noble metals (**gold** or **silver**);
- development of an elixir of life, which would confer youth and longevity.

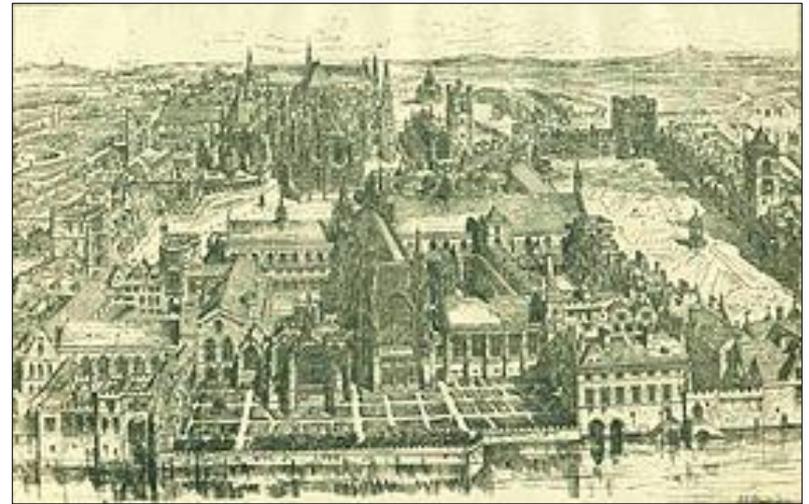
Newton believed that in the distant past, people knew great truths about nature and the universe. This wisdom was lost over time, but Newton thought it was hidden in **Greek myths**, which he interpreted as encoded **alchemical recipes**.

(Note that it is only after nuclear physics about 100 years ago that we know alchemy is impossible.)

Newton's London Years: Age 47-85

1688-1727 (Age 47-85)

- 1689 Elected as Member of Parliament for Cambridge
- 1696 Newton becomes Warden of the Royal Mint and settles in Jermyn Street, London
- 1701 Elected MP for Cambridge again and resigns Lucasian Professorship
- 1703 Elected President of the Royal Society
- 1704 First edition of *Opticks* published
- 1705 Knighted by Queen Anne
- 1710 Moves to house in St Martin's Street, London
- 1725 Moves to Orbell's Buildings in Kensington, London
- 1727 Newton dies and is buried in Westminster Abbey



Parliament (1707)

As Warden, and afterwards Master, of the **Royal Mint**, Newton estimated that 20 percent of the coins were counterfeit.

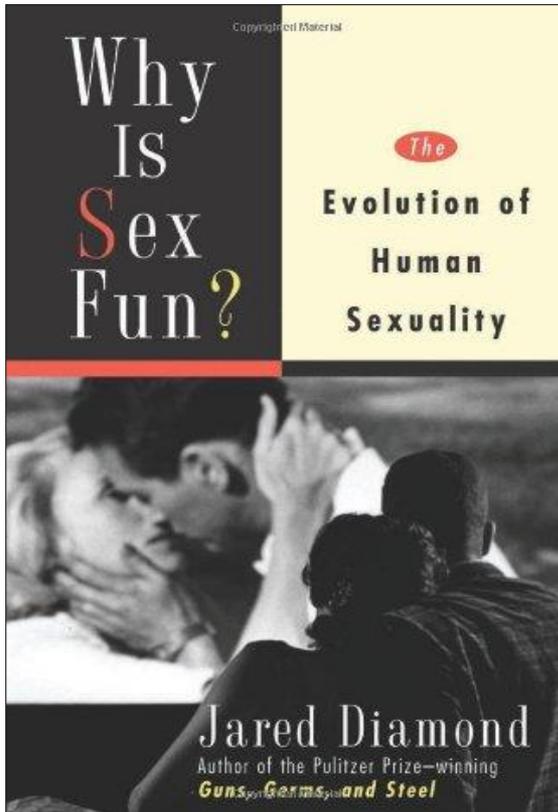
He **disguised** as a habitu  of bars and taverns, and **gathered much of that evidence himself**.

He conducted more than 100 cross-examinations of witnesses, informers, and suspects in 18 months (1698-1699) successfully **prosecuted 28 coiners**.

Creativity and Sexuality

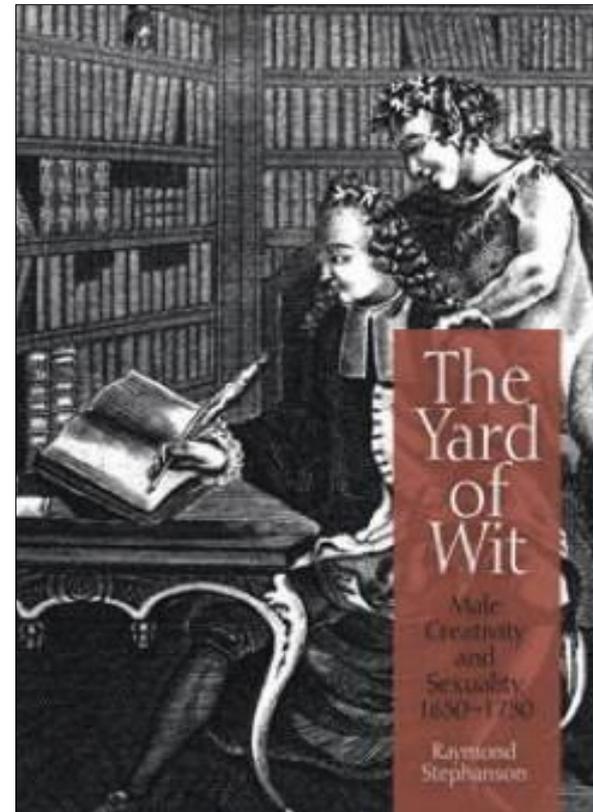
Confucius says:

Eat and sex are in humans' nature.



1997

Jared Diamond
Medical scientist
biological philosopher



2013

Raymond Stephanson
Professor of English

Da Vinci

1452-1519 (67 yr)



Renaissance polymath:

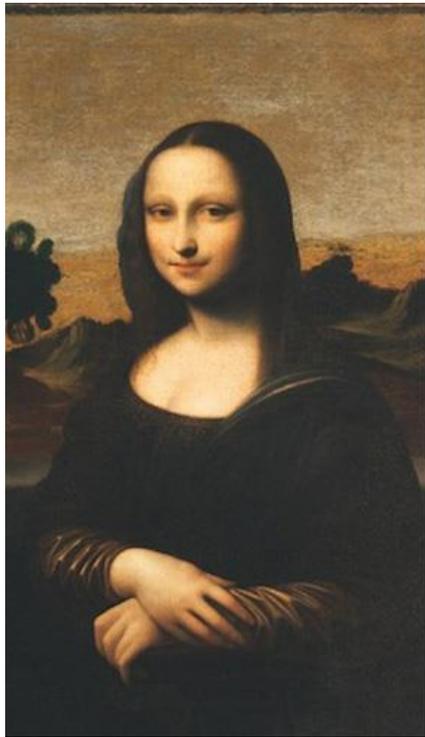
painter, sculptor, architect, musician, mathematician, engineer, inventor, anatomist, geologist, cartographer, botanist, and writer.

Born **out of wedlock** to a wealthy notary and a peasant woman

Leonardo appears to have **had no close relationships with women** except for his friendship with Cecilia Gallerani and the two Este sisters, Beatrice and Isabella. (He drew a portrait of Isabella.)

His **sexuality** has been the subject of satire, analysis, and speculation. His most intimate relationships were perhaps with his pupils Salai and Melzi. Court records of 1476, when he was **aged 24**, show that **Leonardo and three other young men were charged with sodomy** in an incident involving a well-known male prostitute. The charges were dismissed for lack of evidence, through influence of the court as speculated.

Da Vinci's
paintings



Young Mona Lisa



Mona Lisa



*Monna Vanna
a nude version of the
Mona Lisa*

by Melzi





John the Baptist (by Da Vinci)
Salai is thought to have been the model. (c. 1514)



Salai

1480-1524

He joined Leonardo's household at the age of 10 as an assistant. "A graceful and beautiful youth with curly hair, in which Leonardo greatly delighted." He left at 38.

He inherited several paintings including the *Mona Lisa* and half a vineyard. Through his estate, many of those works, notably the *Mona Lisa*, passed into the possession of Francis I of France.

Salai married at the age of 43; died at 44 due to duel wound.

It has been suggested, as early as the 16th century, that there was a sexually intimate relationship between Leonardo and Salai, but this cannot be known for certain.

Melzi

1491 - 1568/1570

Melzi joined Leonardo's household at 15.

He traveled to France with Leonardo and remained with him until Leonardo's death; inherited the artistic and scientific works, manuscripts, and collections of Leonardo, and a vineyard.

Melzi then married, and fathered a son,

Alan Turing

1912-1954 (42 yr)

OBE, FRS



During Turing's **childhood years** his parents traveled between UK and India, leaving their two sons to stay with a retired army couple

British mathematician, logician, cryptanalyst and computer scientist

Turing, **father of theoretical computer science and artificial intelligence**, was working at the UK'S Government Communications Headquarters (GCHQ) when he **cracked the Enigma code**, used by Germany to encrypt its military communications.

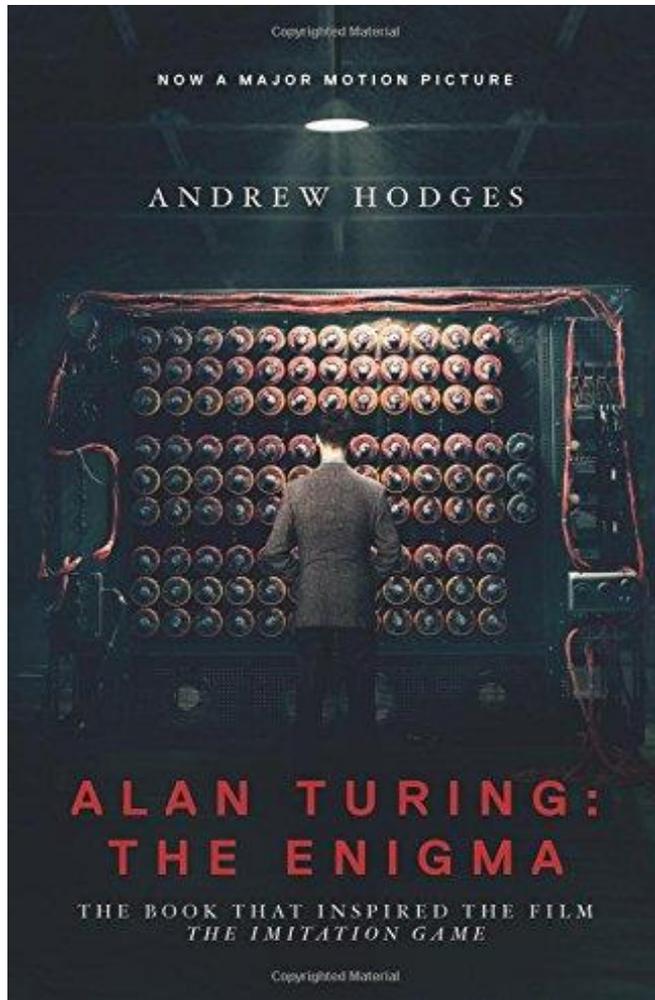
Turing was convicted of gross indecency in 1952 after admitting to a **homosexual relationship** and was forced to undergo chemical castration (taking female hormones) as an alternative to jail.

He committed suicide in 1954 by ingesting cyanide. Loss of security clearance, state distrust and surveillance may have been crucial factors in the two years leading up to his death in 1954.

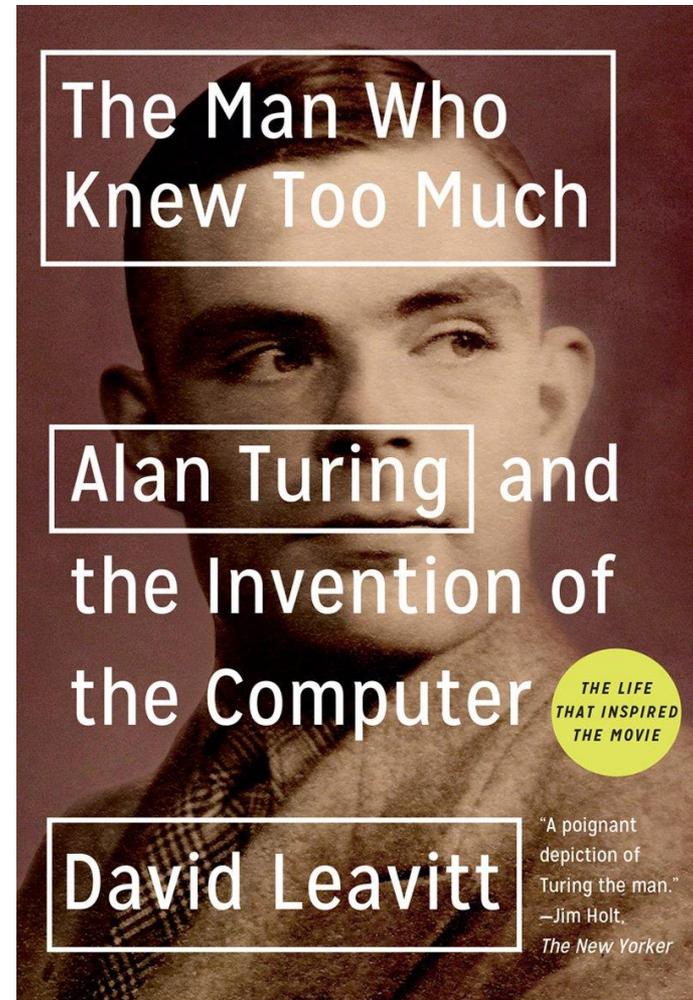
Royal pardon

2013

- The UK government had **apologized** for the conviction in **2009**, calling Turing's treatment "appalling."
- Turing was granted a **royal pardon** Dec. 24, **2013**, more than 60 years after being convicted for homosexual behavior and undergoing chemical castration. "Dr Turing deserves to be remembered and recognised for his fantastic contribution to the war effort and his legacy to science," U.K. Justice Secretary Chris Grayling said in a statement issued today.
- "A pardon from the Queen is a fitting tribute to an exceptional man."



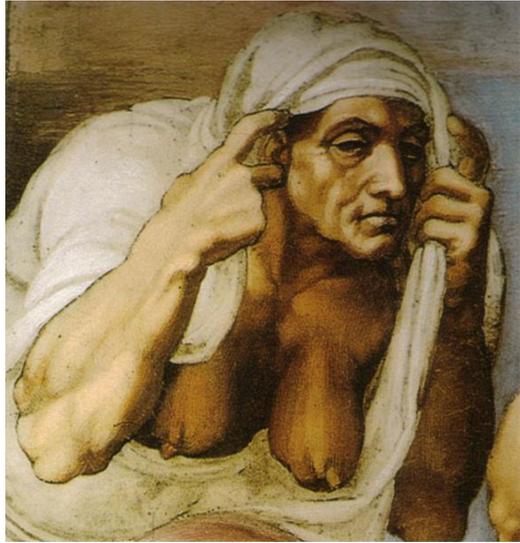
2014



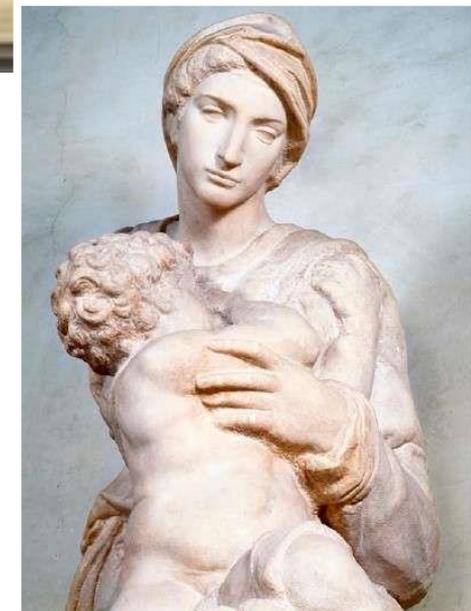
2006

MICHELANGELO

1475-1564



Buonarroti Last Judgment
1537-41



Medici Madonna

Sexuality of an artist (but **not** scientist) is reflected in his works, showing the basic distinction between art (human-dependent) and "science" (human-independent).

Summary

- One does **not** have to be a homosexual to be creative (many examples).
- But for whatever reason, historically, there are a number of homosexuals who had contributed significantly to humanity, ranging from science (Newton) to arts (Da Vinci) and to computer science (Turing).
- A possible reason that we see this is that creative people are oddballs, and homosexuals are considered odd in many societies.
- With these understandings, hopefully, people will see homosexuals from a fresh angle.

Religion and Science

Religion

Religion is an organized collection of **beliefs, cultural systems,** and **worldviews** that relate humanity to an order of existence.
(Roughly 4,200 religions in the world.)

Many religions explain the **meaning of life** and/or to explain the **origin of life** or the **Universe**.

From their beliefs about the **cosmos** and **human nature**, people derive **morality, ethics,** religious laws or a preferred **lifestyle**.

Science

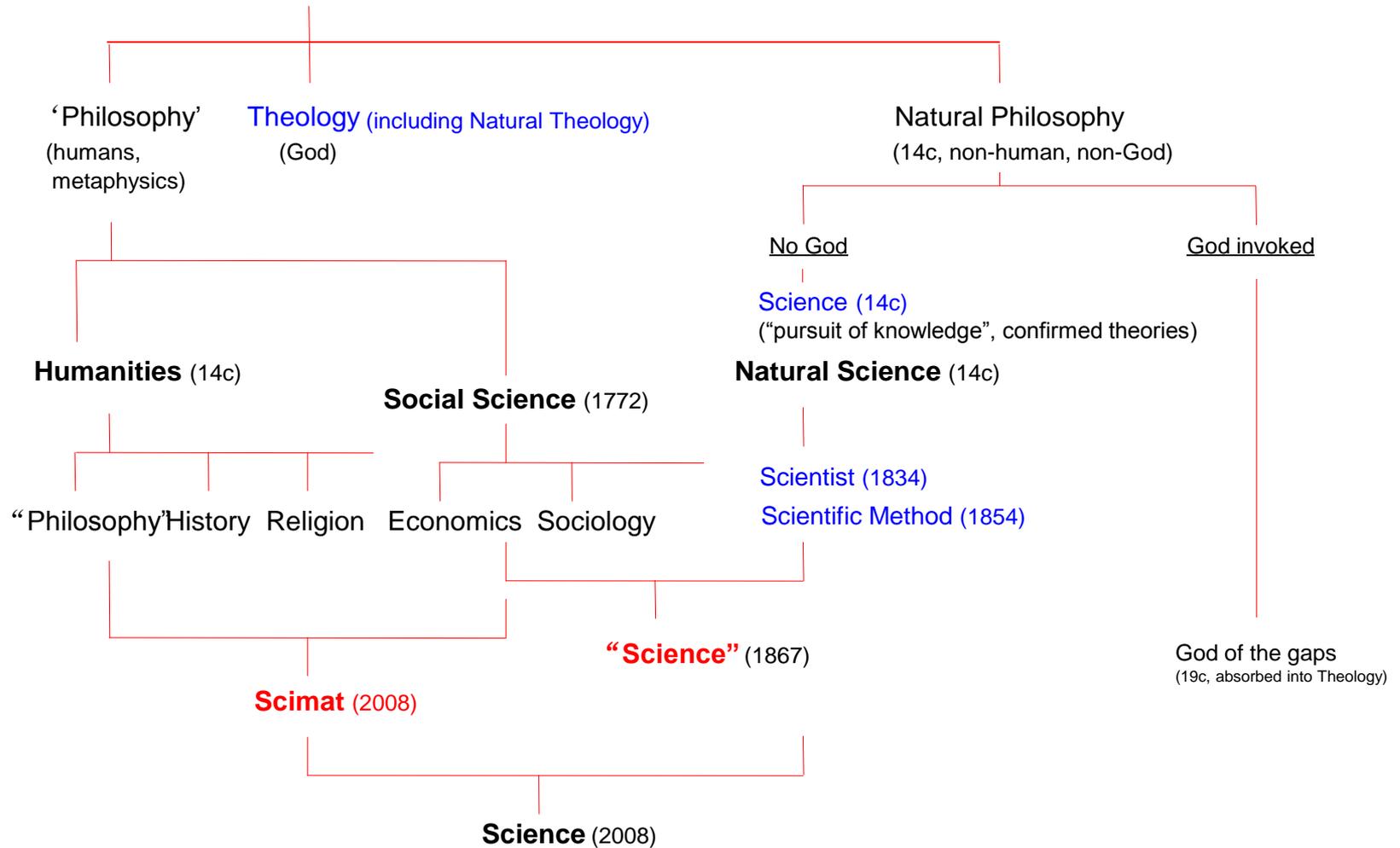
Scimat's definition (2008/2014)

Science is humans' pursuit of knowledge about Nature
(which includes the human and all nonhuman material systems)
without bringing in God or supernatural.

Science, by definition, has nothing to do with religion. Whenever the religious writings are in conflict with established scientific findings, then, it is the religious people who have to resolve the conflict, not the scientists.

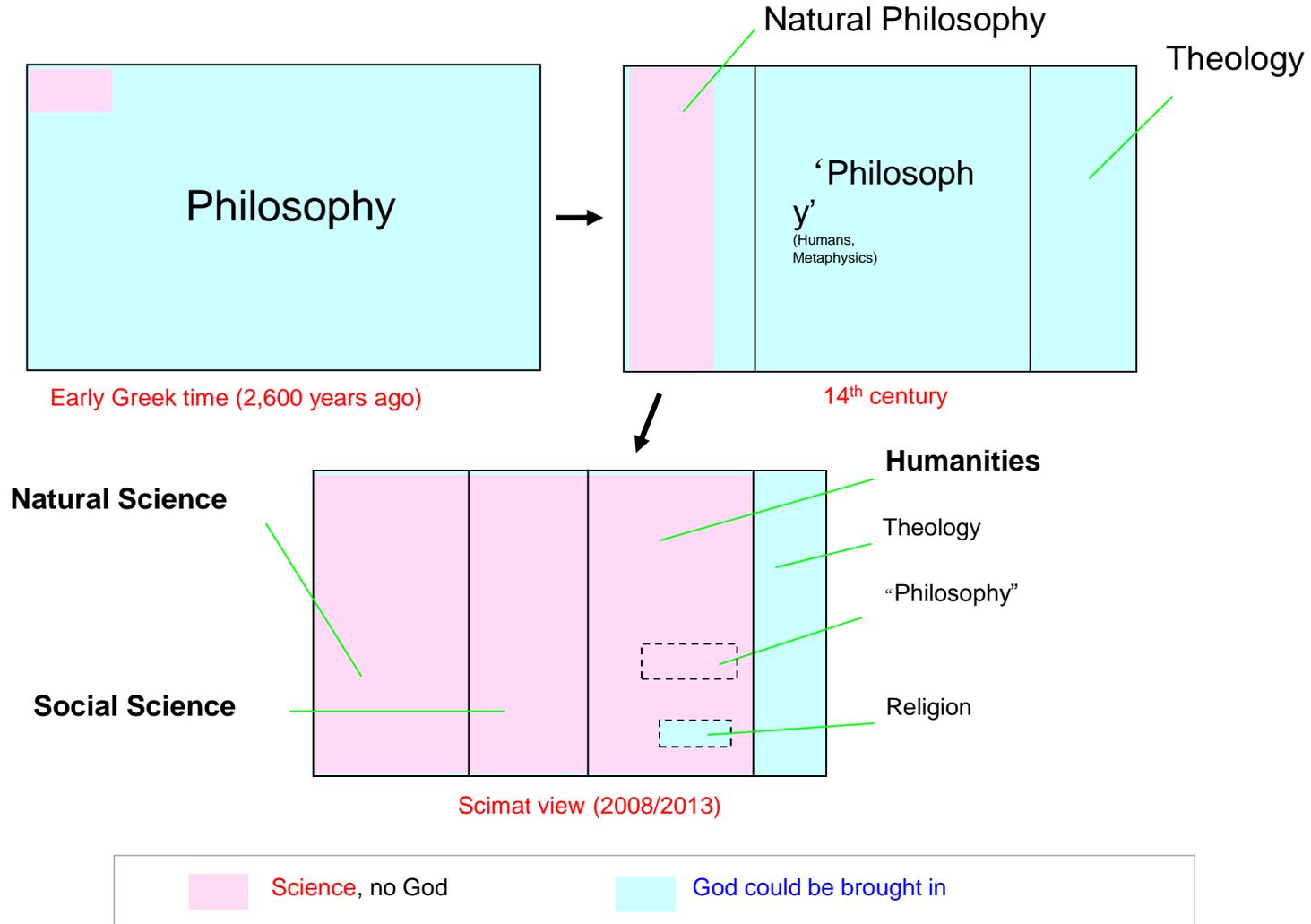
A Brief History of Words

Philosophy (600 BC, “love of wisdom”, Pythagoras; 13c, English)



Retreat of God and Expansion of Science

Science, defined as humans' research in understanding Nature (human and nonhuman systems) without bringing in God or any supernatural.



Newton

On the one hand, we can recognize Newton as a scientist, but on the other hand, he's pursuing an activity which we now label as a **pseudoscience**.

Newton's calculation of the date the Bible said the world as we know it would end in the Battle of Armageddon: the year 2060.

We've made Newton in a rationalist, enlightened image. That's just not Newton.

Turing

In high school, Turing formed an important friendship with fellow pupil Christopher Morcom, which provided inspiration in Turing's future endeavours. However, the friendship was cut short by **Morcom's death** in 1930 (**Turing age 18**) from complications of bovine tuberculosis contracted after drinking **infected cow's milk** some years previously.

This event shattered Turing's religious faith. He became an **atheist** and adopted the conviction that **all phenomena, including the workings of the human brain, must be materialistic**, but he **still believed in the survival of the spirit after death**.

The Apple







THE TREE COUNCIL
IN CELEBRATION OF
THE GOLDEN JUBILEE OF
HER MAJESTY
QUEEN ELIZABETH II
has designated
NEWTON'S APPLE TREE
one of fifty
GREAT BRITISH TREES
in recognition of its place
in the national heritage
JUNE 2002

Supported by National Grid



National Grid

What About the Apple?

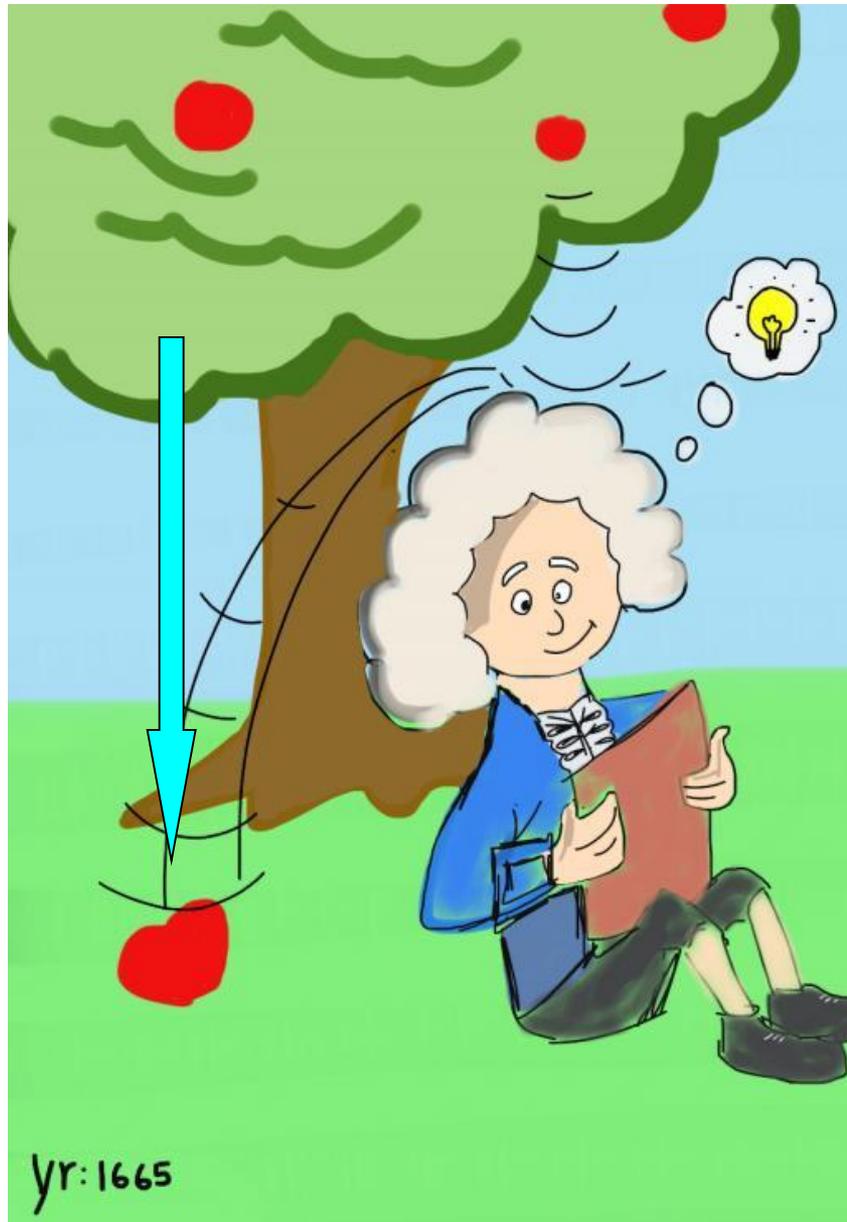
The official story of apple falling was told like this in the book *Woolsthorpe Manor: Birthplace of Issac Newton* (National Trust, 2006, £3.5) p. 7:

The Apple falls

Everyone knows the story of the apply falling on Newton's head, but this famous tale is a misconception that is regularly resurrected in everything from cartoons to computer ads.

Newton told a number of people about the occasion, but did not always mention the apple. After a conversation with Newton in 1726, his friend [William Stukeley](#) recorded:

The notion of gravitation...was occasion'd by the fall of an apple, as he [Newton] sat in contemplative mood. **Why should that apple always descend perpendicularly to the ground, thought he to himself, why should it not go sideways or upwards, but constantly to the earth's centre?** Assuredly, the reason is that the earth draws it...there is a power, like that we here call gravity, which extends itself thro' the universe.



Lam: Here no mention where the apple fell.

That it fell on Newton's side and not on his head was told to me by an official guide (probably a volunteer, dressed in clothes of Newton's time) during my visit there (Oct. 19, 2013).

Note that Newton died in 1727 (age 85), the next year Newton and Stukeley had this conversation.

With Newton's status at age 84, near his end, my guess is that he had no need to invent and reiterate this apple falling story if it never happened.

Conclusion



Newton statue on display at
the Oxford University
Museum of Natural History

Scientists are humans, like you and I.

Some are not like you and I, like
Newton.

They are not just brighter, but
tormented and darker
—not entirely their fault.

Some genius, like Newton, not just
contributed more, but suffered more,
too.

And humanity owes them a lot.