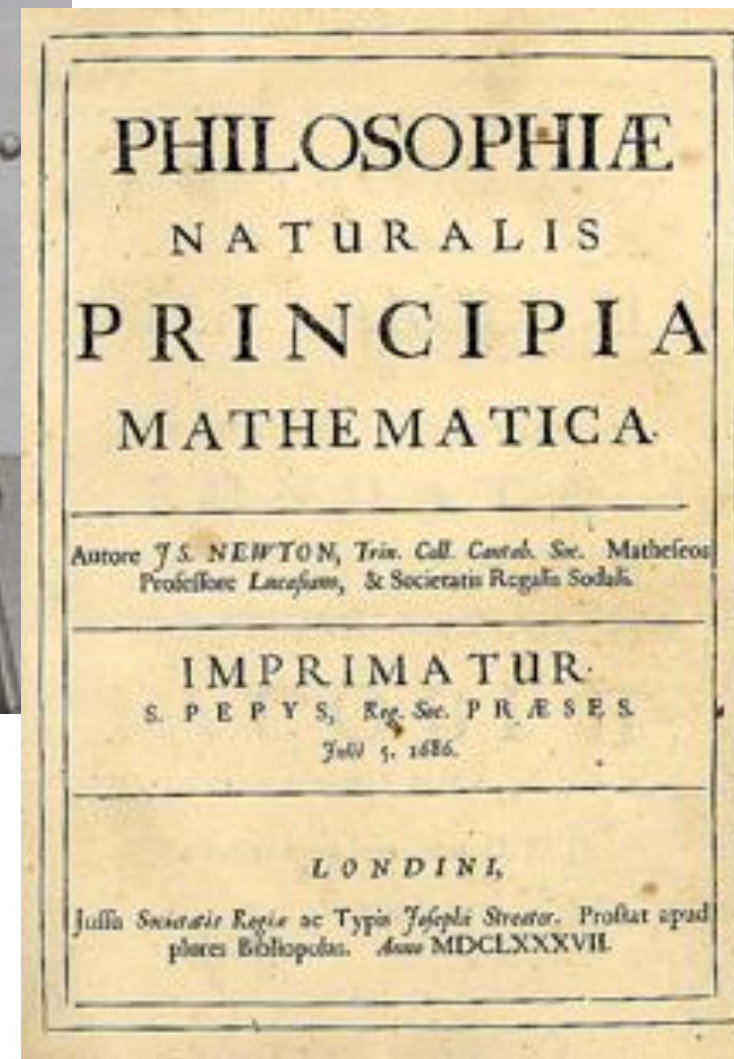


scientific information

History of Information

Feb 16, 2000





aob

"History of the World in 100 Objects"

<http://www.bbc.co.uk/ahistoryoftheworld/>



A Section of the Transatlantic cable

CLOSE

Museum

Birmingham conceived and made, a revolutionary cable which enabled the first successful transatlantic communication

Royal Society

<http://royalsociety.org/seefurther/>

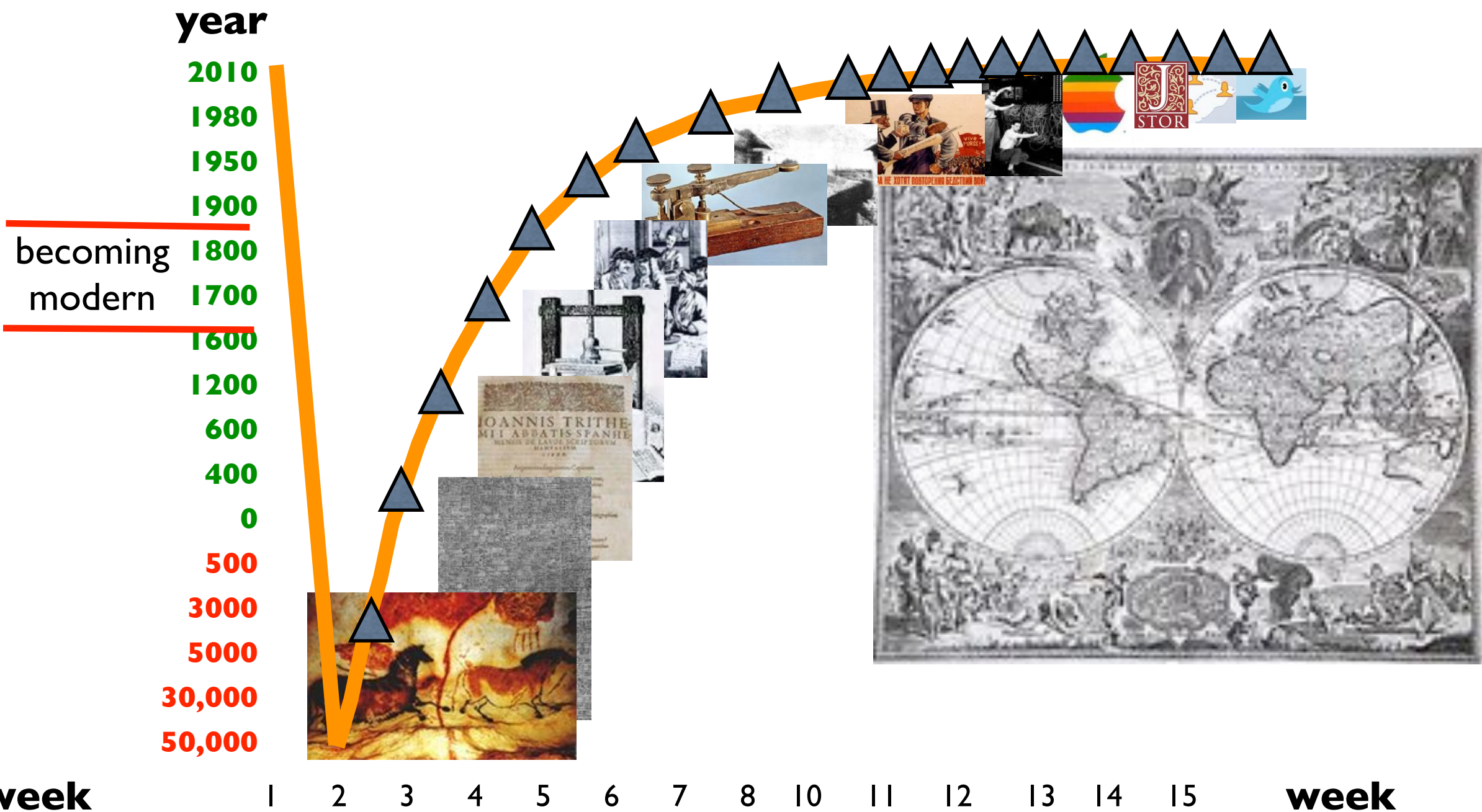
2010 is the 350th anniversary of the foundation of the Royal Society

On November 30th 1660 a dozen men gathered to hear the young Christopher Wren give a lecture on astronomy. In the discussion that followed they decided to form a society for the study of the new and still controversial Experimental Philosophy. Two years later Charles II made it his Royal Society and in the 350 years since it was founded, its Fellows have given us gravity, evolution, the electron, the double helix, the internet and a large part of the modern world. In 2010 we celebrate 350 years of scientific brilliance and fearless doubt.



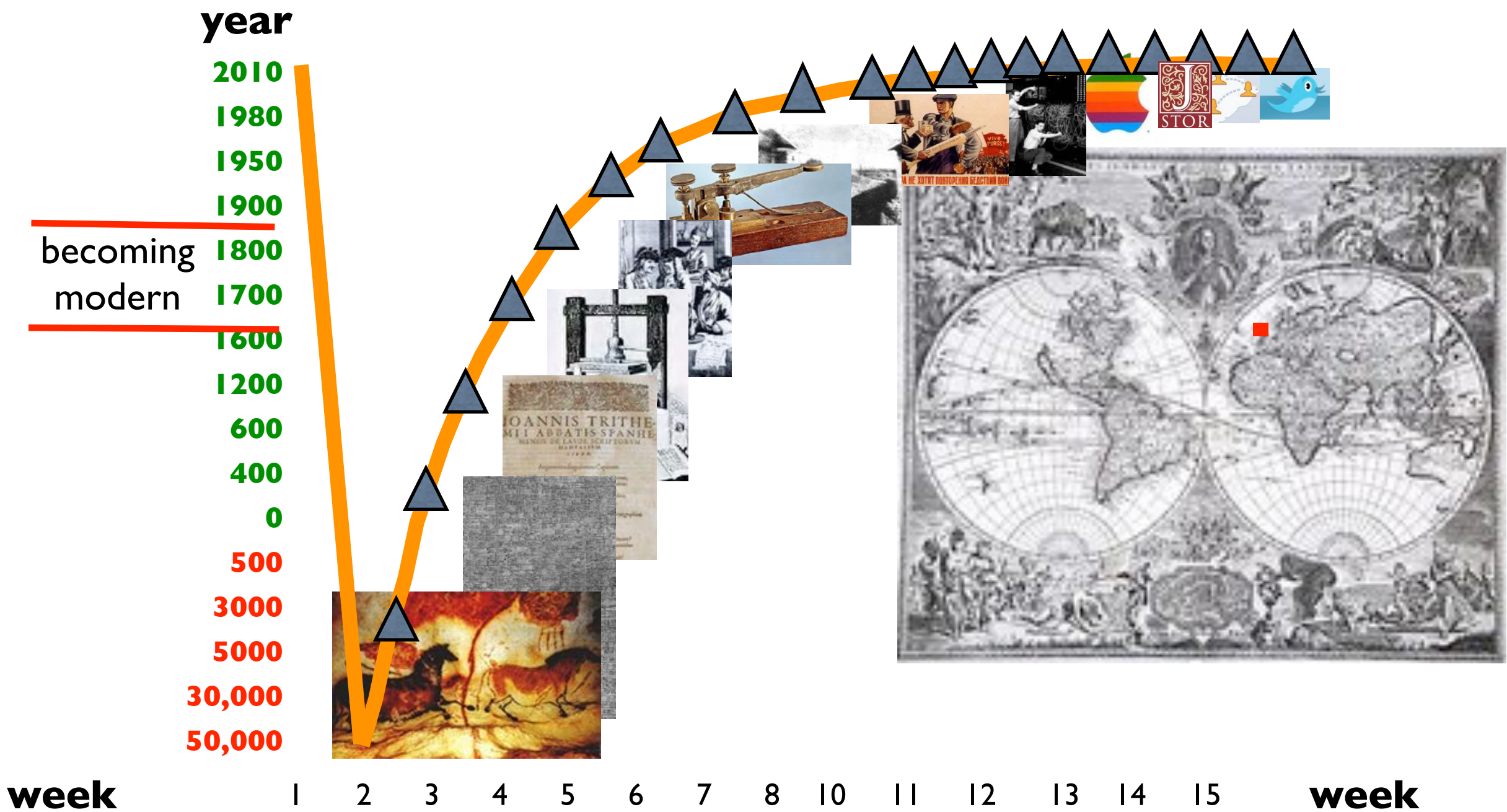


where we are going



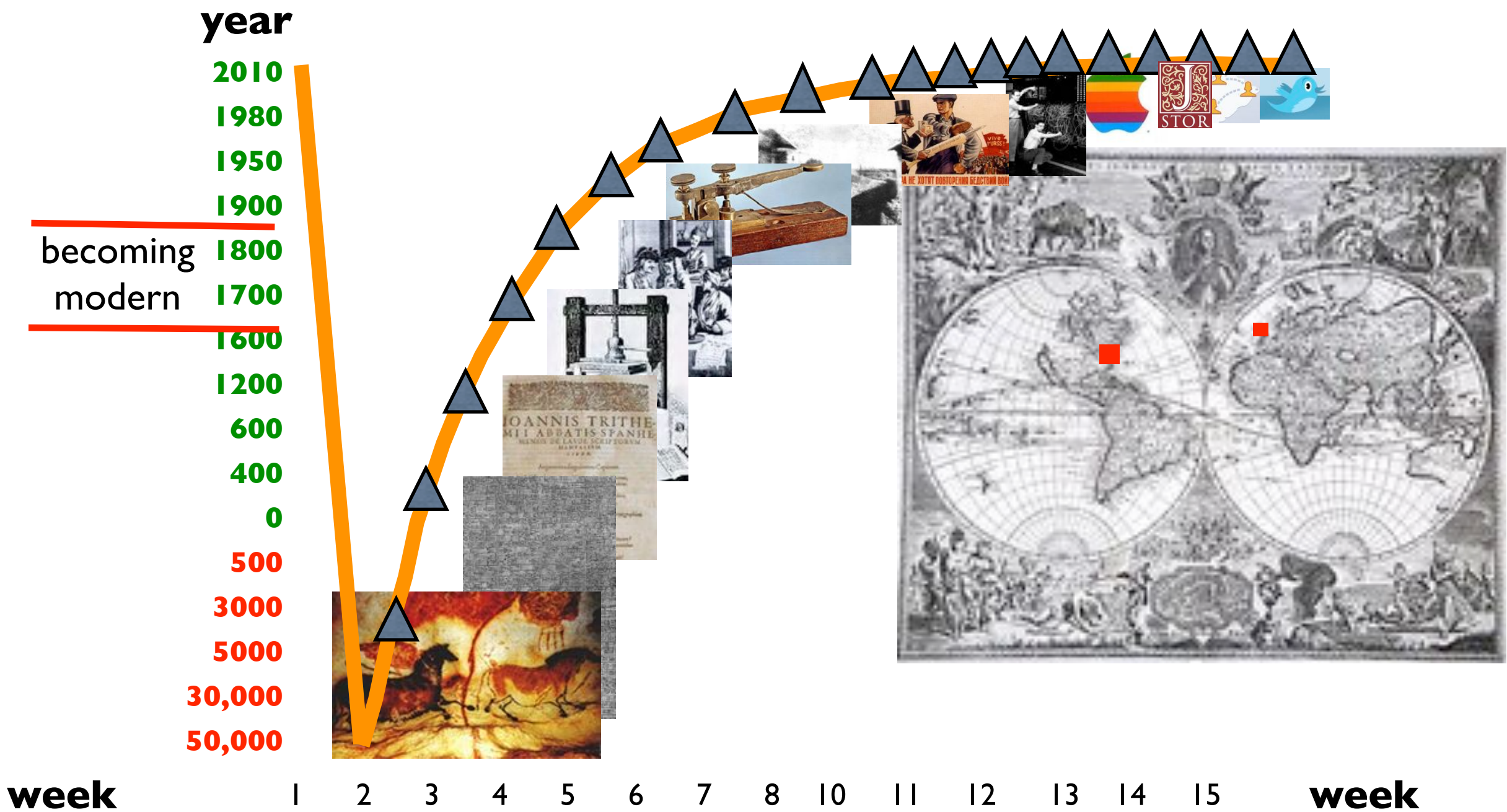


where we are going



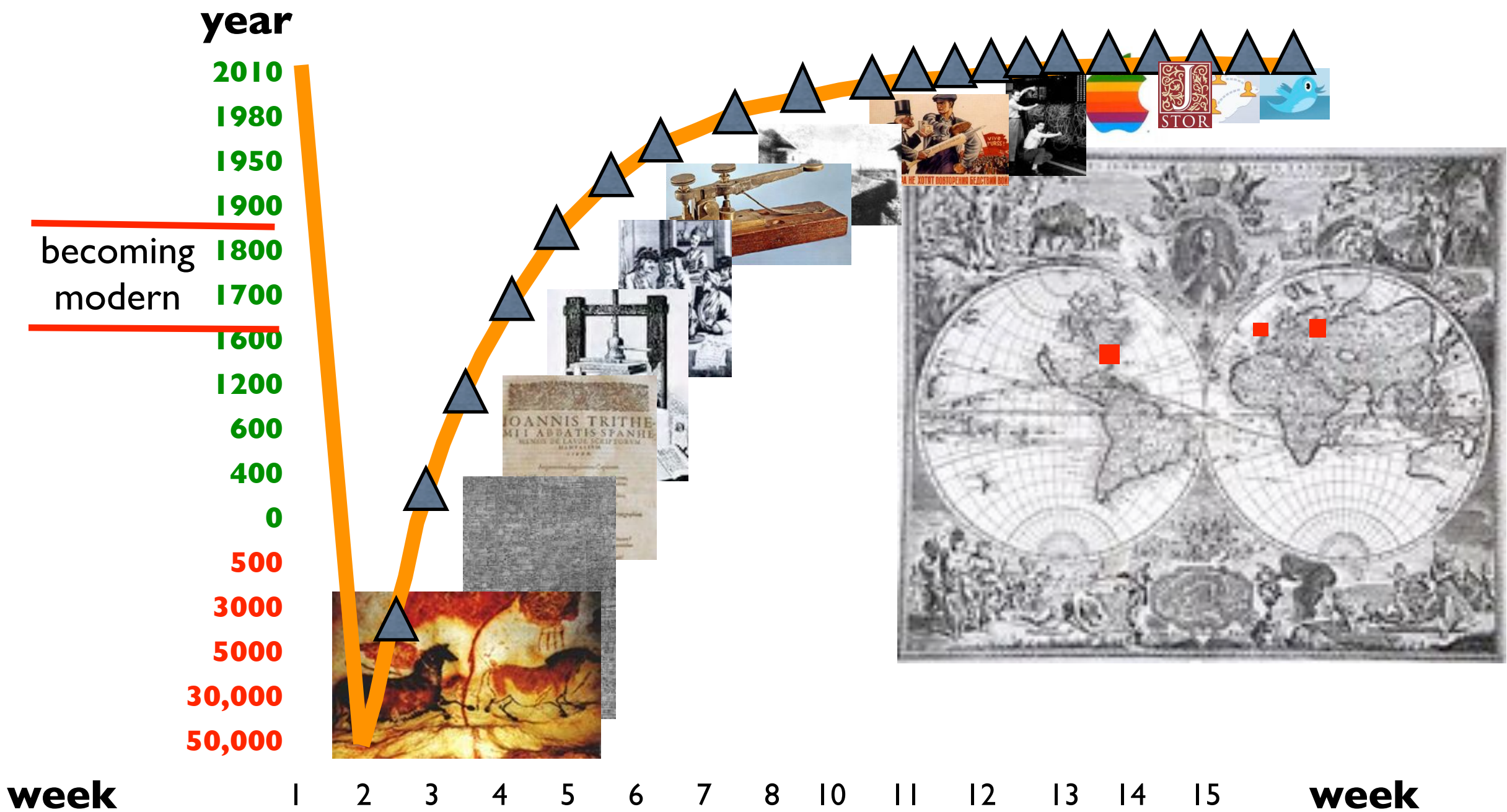


where we are going



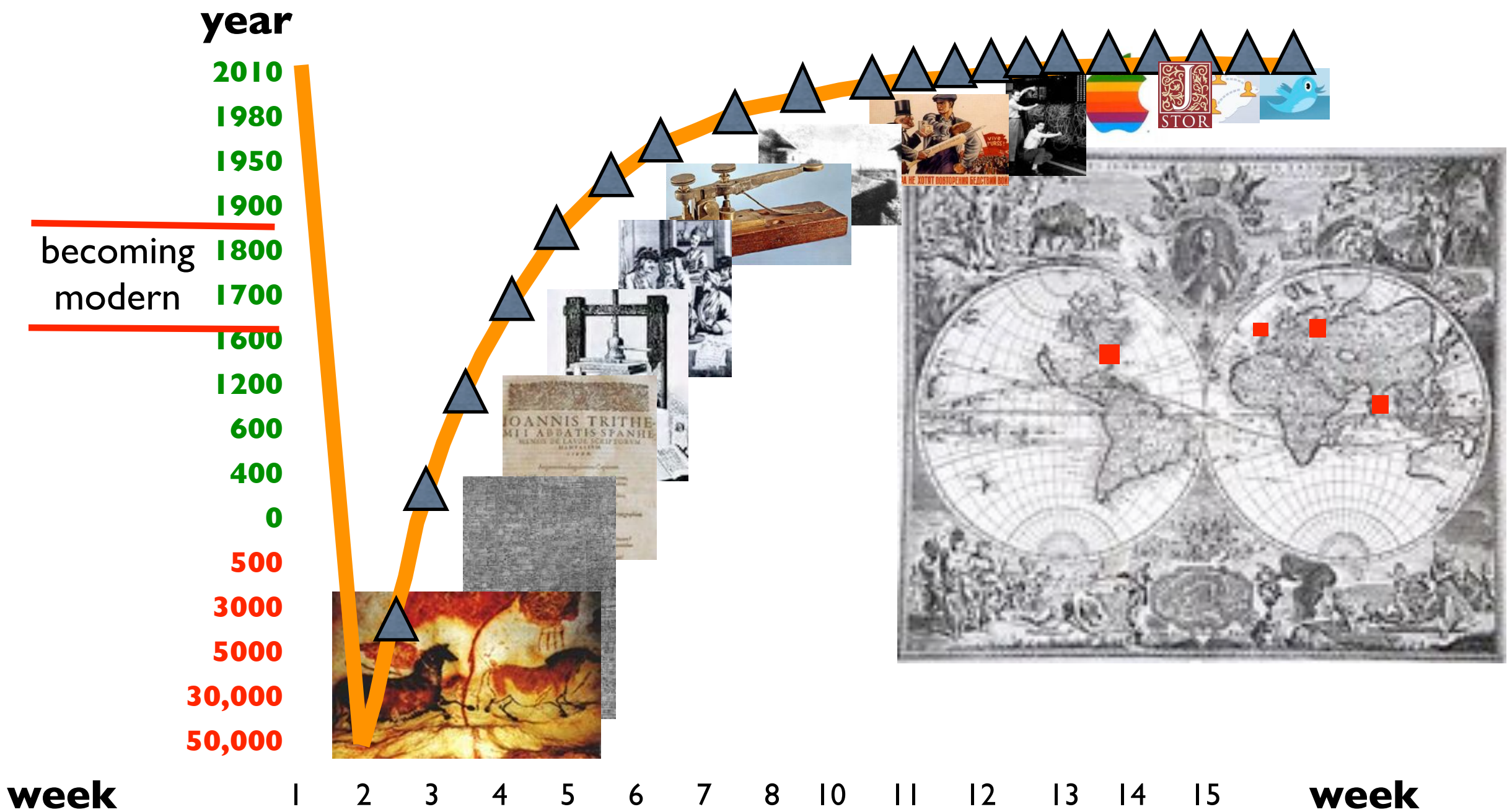


where we are going



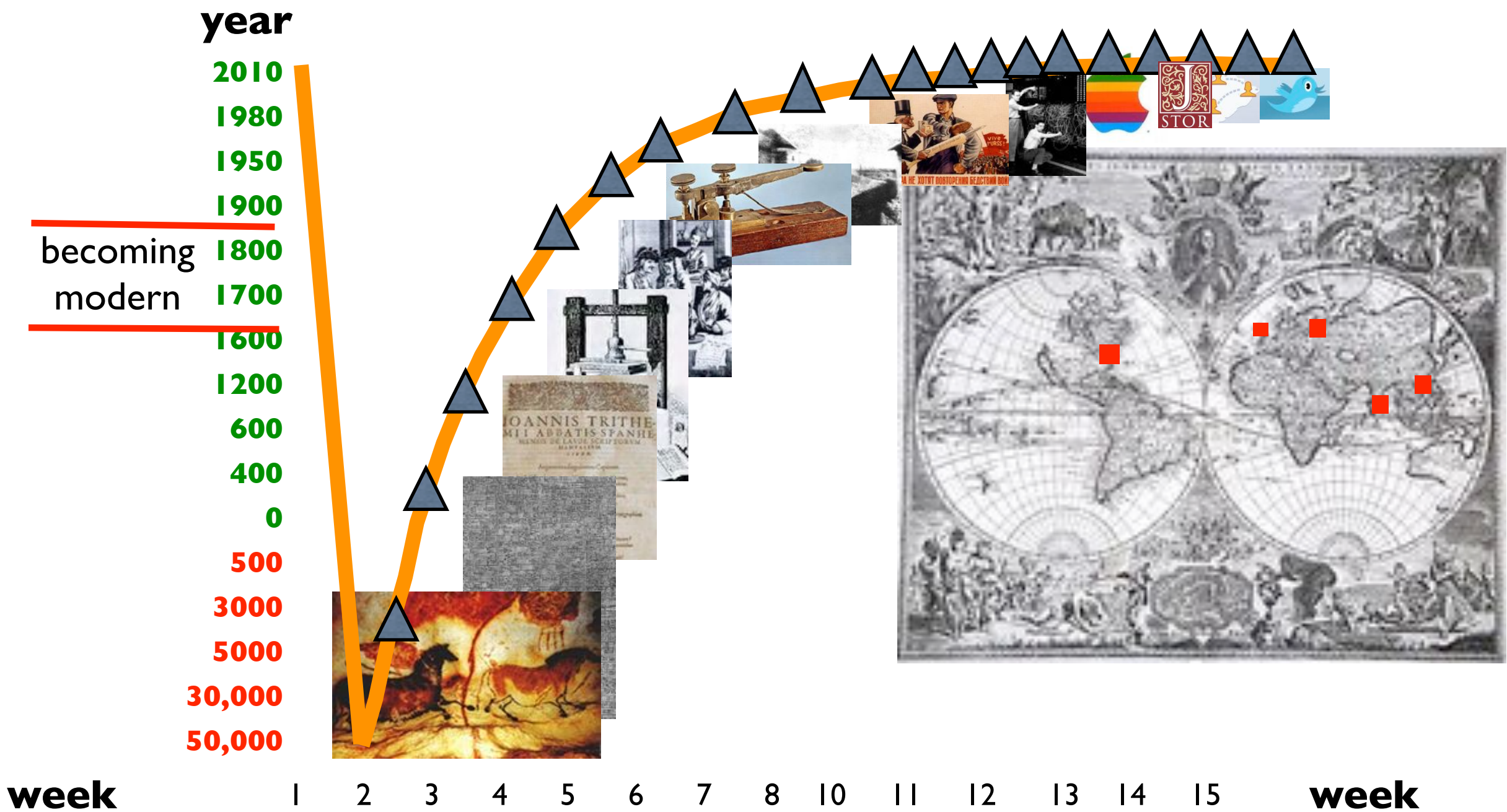


where we are going



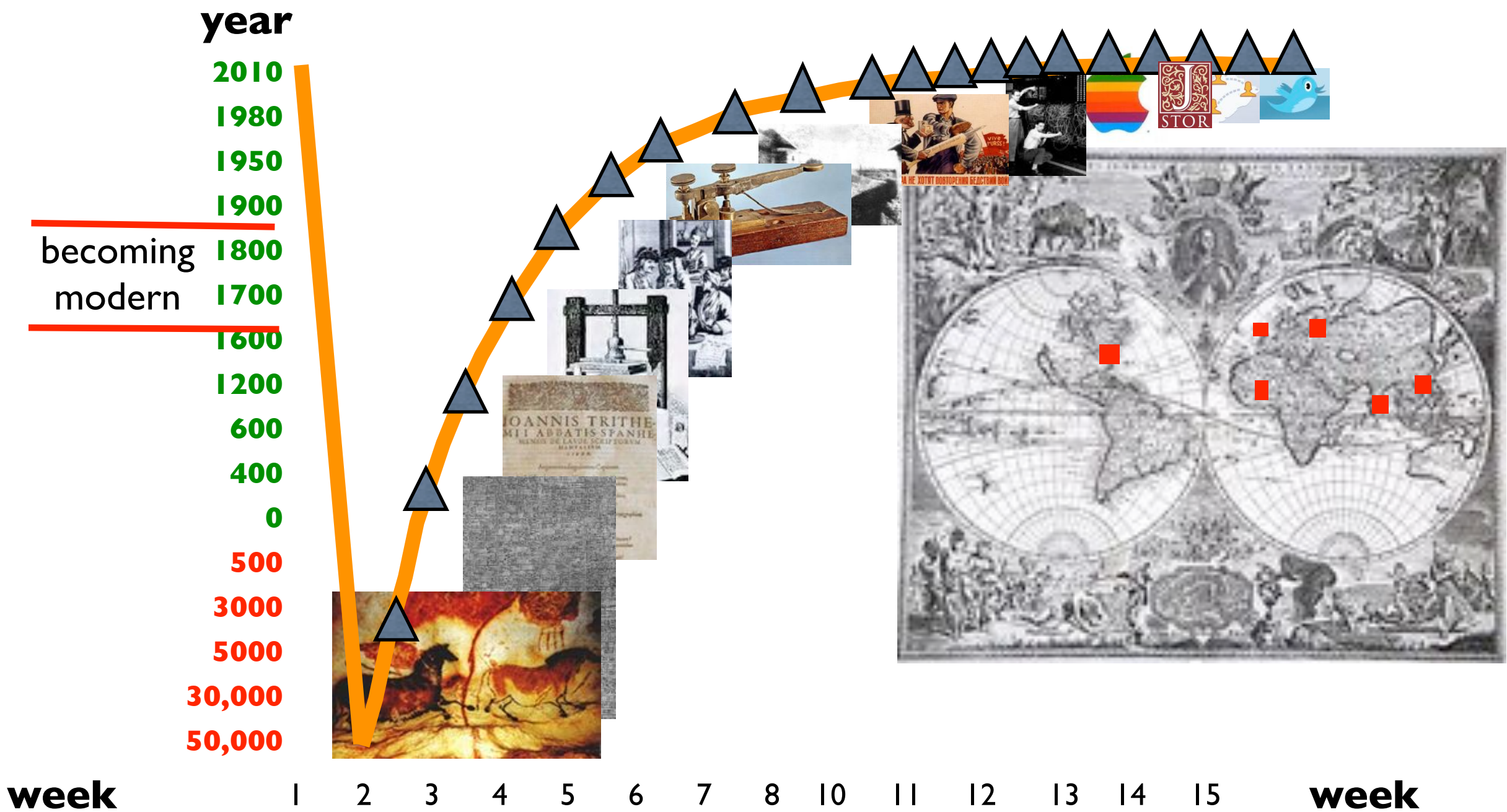


where we are going





where we are going





where we are
going today

scientific information

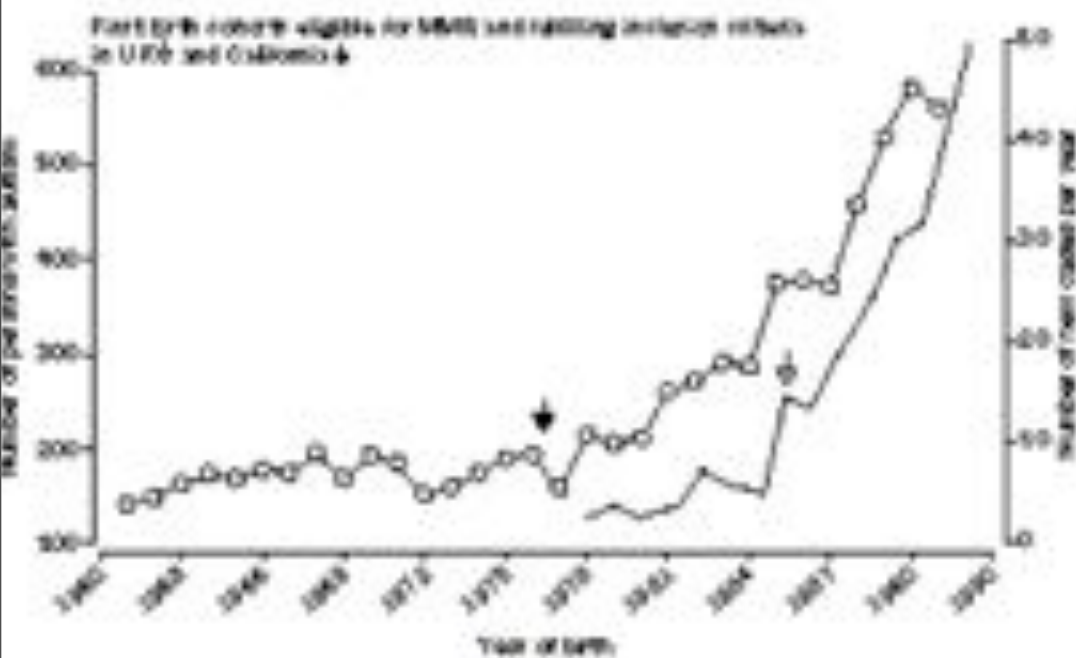
scientific revolution
challenge to old authority

scientific society
establishing new authority

challenges to the society's authority

scientific medicine

challenging scientific authority



Andrew J. Wakefield,
Lancet 1998
correlation of MMR
vaccine & autism

"climategate"

mmr & autism

Assessment of urbanization effects in time series of surface air temperature over land

P. D. JONES[†], P. YA. GROISMAN[‡], M. COUGHLAN[§], N. PLUMMER[§], W.-C. WANG[§] & T. R. KARL^{||}

[†]Climatic Research Unit, School of Environmental Sciences, University of East Angles, Norwich NR4 7TJ, UK

[‡]State Hydrological Institute, Leningrad, USSR

[§]Bureau of Meteorology, Melbourne, Australia

^{||}Atmospheric Sciences Research Center, State University of New York, Albany, New York 12205, USA

^{||}National Climate Data Center, Asheville, North Carolina 28801, USA

nature

RECORDS of hemispheric average temperatures from land regions for the past 100 years provide crucial input to the debate over global warming¹⁻⁴. Despite careful use of the basic station data in some of these compilations of hemispheric temperature^{1,2,4-6}, there have been suggestions^{7,8} that a proportion of the 0.5 °C warming seen on a century timescale may be related to urbanization influences—local warming caused by the effects of urban development. We examine here an extensive set of rural-station temperature data for three regions of the world: European parts of the Soviet Union, eastern Australia and eastern China. When combined with similar analyses for the contiguous United States^{9,10}, the results are representative of 20% of the land area of the Northern Hemisphere and 10% of the Southern Hemisphere. The results show that the urbanization influence in two of the most widely used hemispheric data sets^{1,2,4} is, at most, an order of magnitude less than the warming seen on a century timescale.

First birth cohort eligible for MMR and falling vaccine uptake in UK and California

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Our Journals

THE LANCET

Announcements Close

Retraction: the Early Report on 'Ileal-lymphoid-nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children' has been retracted. See the associated [Comment](#) for details.

TIME OF BIRTH

Temporal trends for autism in the USA (California*) and the UK (north-west London)

In 1998 the expected numbers of newly diagnosed autistic children in California should have been 105-263 cases, according to DSM-IV; the actual figure was 1685 new cases. The temporal trend in north-west London is almost identical, although the rise is delayed by about 10 years. The two countries use the same diagnostic criteria. The sequential trends are consistent with the timing of introduction of MMR to both regions.

*Data from Department of Developmental Services, Sacramento, 1987-98 (www.dds.ca.gov).

challenging
scientific
authority

"climategate"

mmr & autism

Andrew J. Wakefield,
Lancet 1998
correlation of MMR
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recap: "mad & dismal age"

"Those dreadful revolutions, which cannot be beheld upon Paper, without horror; unless we remember, that they had this one happy effect, to open mens eyes to look out for the true Remedy."

Sprat, History

English Civil War, 1642-1651

death of Charles I

Commonwealth & Protectorate, 1649-1659

Restoration, 1660

return of Charles II

Great Plague, 1665

Fire of London, 1666



recap: social revolution

the public sphere

"Have they not the same security that the whole Nation has for its lives and fortunes? ... that men of all sorts, and qualities, give their voice in every law that is made in Parliament." -- Sprat

significant developments? the English gentleman

"Though the Society entertains very many men of particular Professions; yet the farr greater Number are Gentlemen, free, and unconfin'd." -- Sprat



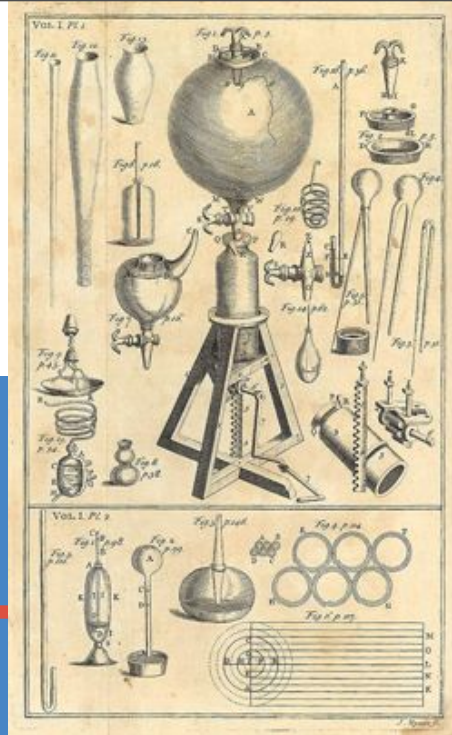


scientific revolution?



"The Scientific Revolution outshines everything since the rise of Christianity and reduces the Renaissance and Reformation to the rank of mere episodes, mere internal displacements within the system of medieval Christianity".

Herbert Butterfield,
The Origins of Modern Science, 1300-1800,
1948



technological revolution?

"Printing ...
the most useful
invention ever
found out ...
make men
Polite ..
encrease the
Knowledge of
Letters ... all
useful Arts and
Sciences ...
Perfection of
Human
Knowledge."

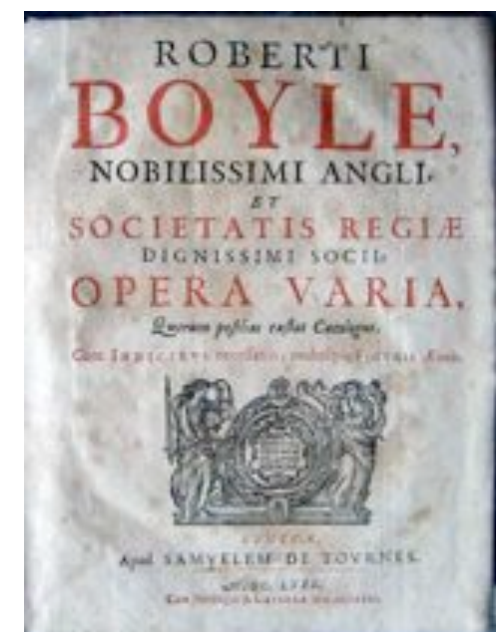
Defoe,
*Regulation of
the Press*, 1704

telescopes, microscopes

air pumps, pendulums

watches, springs

maps, books





scientific revolution?

what happened

what came before

what came afterwards

who was involved



what happened?



Thomas Sprat
1635–1713

"the advancement of *Real Knowledge*"
--Sprat



what happened?



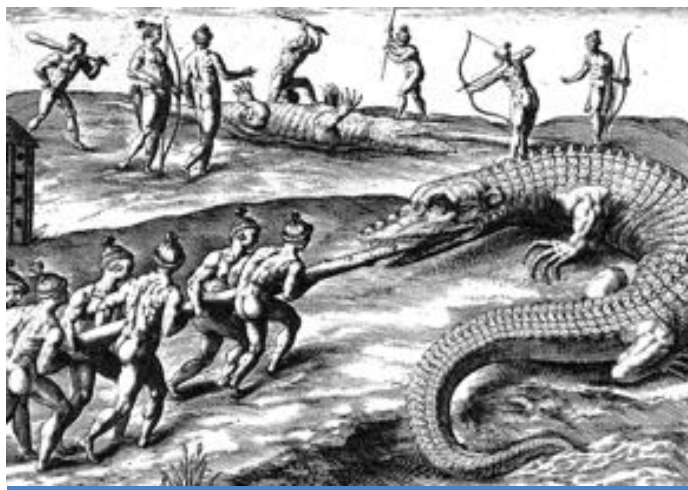
Thomas Sprat
1635–1713

"the advancement of *Real Knowledge*"
--Sprat

"reliable truth-generating
practices were put in place and
institutionalized"

Steven Shapin,
A Social History of Truth, 1994

truth and trust



before

the past and other countries

political prognostications

A lioness hath whelped in the streets;
And graves have yawn'd, and yielded up their dead;
Fierce fiery warriors fought upon the clouds,
In ranks and squadrons and right form of war,
Which drizzled blood upon the Capitol;

tall tales

And of the Cannibals that each other eat,
The Anthropophagi, and men whose heads
Do grow beneath their shoulders.



"La sange du juste à Londres fera faute
Bruslez par foudre de vingt trois le six,
La dame antique cherra de place haute
De meme sute plusieurs seront occis"

recap: almanacks & prophecy



An Almanack
for the year 1666.

Composed by M. Michael
Nostradamus Doctor
in Philosophie of Saloon of
Creux in Provence.

Whil the some sayeth & first then that
the monster be seen in the flames day
then shall interpret it farr otherwise
Doubt hath no respect, none shall pro-
vide for it.



"Sir Thomas Crewe hath heard at the
Committee for examining the burning of the
city,that it was done by plots ... it was
bragged by several Papists that upon such a day
in such a time, we should find the hottest
weather that ever was in England; and words of
plainer sense" --Pepys, November 2, 1666

"We talked much of Nostradamus his prophecy of
these times, and the burning of the City of
London, some of whose verses are put into
Booker's Almanac this year My Lady Carteret
herself did tell us how abundance of pieces of
burnt paper were cast by the wind .. .she took
one up ... wheron there remained no more nor
less than these words: "Time is, it is done"
--Pepys, February 3, 1666/7



"La sange du juste à Londres fera faute
Bruslez par foudre de vingt trois le six,
La dame antique cherra de place haute
De meme sute plusieurs seront occis"

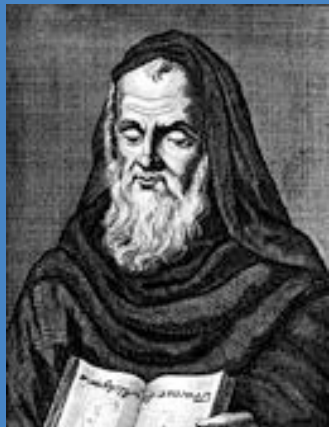
recap: almanacks & prophecy

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--Pepys, February 3, 1666/7



before



Roger Bacon
c 1220–1229



Francis Bacon
1561–1626

scientific rumblings
Roger Bacon

to

Francis Bacon
(and many more)

Wife of Bath's Tale



revolutionary beliefs

old wives tales?

"Experience, though noon auctoritee
Were in this world, were right ynogh to me
To speke of woe that is in mariage"

Geoffrey Chaucer,
"The Wife of Bath's Prologue and Tale," c.
1390

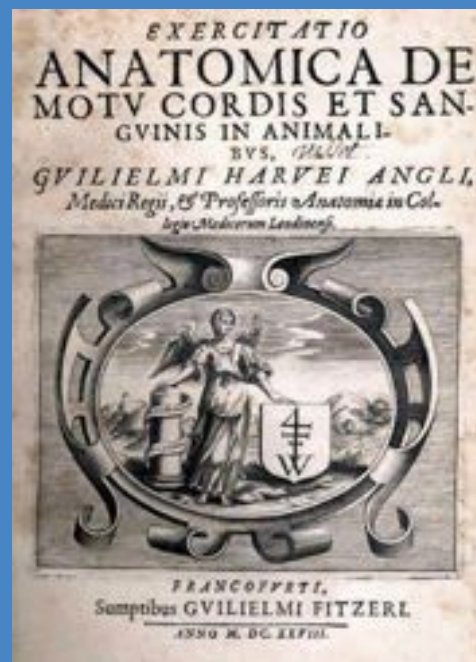
"Men did generally think, that no man was fit to meddle in matters of this consequence, but he that had bred himself up in a long course of Discipline for that purpose; that had the habit, the gesture, the look of a Philosopher. Whereas experience on the contrary tells us, that greater things are produc'd, by the free way, than the formal." -Sprat



anti-authoritarian revolutionaries

"Why do we not,
I say, turn
over the living
book of the
world instead
of dead
papers."

John Comenius
(1592–1670)



from **Ptolemy** (c. 100-170)
to

**Copernicus, Galileo, Tycho,
Kepler, Newton**

from **Hippocrates** (460-375 bce)
Galen (c. 129-216)
to

**Paracelsus (1493-1541)
Harvey (1578-1657)**



"Followers of
nature itself and
truth"
-Henry Oldenburg

social revolutionaries

the royal society, 1660

Boyle (1627-1691)

Wren (1632-1723)

Locke (1632-1704)

Hooke (1635-1703)

Newton (1642-1727)

Halley (1656-1742)

Huygens (1629-1695)

Mercator (1620-1687)

Moxon (1627-1691)

Graunt (1620-1674)

Petty (1623-1687)

Benjamin Franklin (1706-1790)

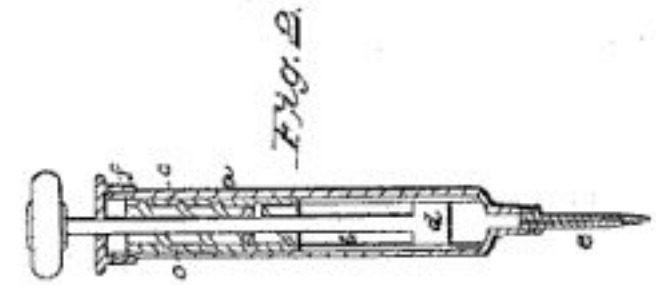


scientific paradox?

authority vs experience who to trust?

"so great a Number of Contemporaries ...
that lov'd truth so zealously; sought it so
constantly; and upon whose labours, mankind
might so freely rely"

"take the measure of the Royal Society, ...
from the honor, and reputation, of many of
those Men, of whom it is compos'd
--Sprat



trust & reputation

Let us consider the matter in this way: If the wise man or any other man wants to distinguish the true physician from the false, how will he proceed?

.... He will consider whether what [the physician] says is true, and whether what he does is right, in relation to health and disease?

... But can any one attain the knowledge of either unless he have a knowledge of medicine?

... No one at all, it would seem, except the physician can have this knowledge; and therefore not the wise man; he would have to be a physician as well as a wise man.

--Plato, *Charmides*



forming a Regular Assembly

I shall divide into three Periods of Time, according to the several Degrees of the preparation, growth, and compleat Constitution of the
Royal Society.

The **First** shall consist of the first occasions of this Model, and the Men, who first devis'd to put it in execution: and shall end, where they began to make it a form'd, and Regular Assembly.

The **Second** shall trace out their first attempts, till they receiv'd the publick assistance of Royal Authority.

The **Third** shall deliver, what they have done, since they were made a Royal Corporation



Sprat's *wonderful model*

Nature alone, which could pleasantly entertain them ... Trials in Chymistry,
or Mechanicks ... their intention was more to communicate to each other
their discoveries ... [as now in Paris], where they have at last turn'd
their thoughts, from Words to experimental Philosophy

Their purpose is, in short, to make faithful **Records**, of all the Works of
Nature, or Art, which can come within their reach: that so the present Age, and
posterity, may be able to put a mark on the **Errors**, which have been
strengthened by long prescription: to restore the **Truths**, that have lain
neglected

to separate the knowledge of Nature, from the colours of **Rhetorick**, the devices
of **Fancy**, or the delightful deceit of **Fables**



Sprat's *model*

They have labor'd to inlarge it, from being confin'd to the **custody of a few**; or from servitude to **private interests**.

They have striven to preserve it from being over-press'd by a confus'd heap of vain, and useless **particulars**; or from being straitned and bounded too much up by **General** Doctrines

They have studi'd, to make it, not onely an Enterprise of one season, or of some lucky opportunity; but a business of time; a steddy, a lasting, a popular, an **uninterrupted Work**.



Sprat's *model*

They have attempted, to **free** it from the Artifice, and Humors, and Passions of Sects; to render it an Instrument, whereby Mankind may obtain a Dominion over Things, and not onely over one anothers Iudgements.

And lastly, they have begun to establish these Reformations in Philosophy, not so much, by any solemnity of Laws, or ostentation of Ceremonies, as by **solid Practice**, and examples: not, by a glorious pomp of Words; but by the silent, effectual, and unanswerable Arguments of real Productions.

Members ... different Religions, Countries, and Professions ... not to lay the Foundation of an English, Scotch, Irish, Popish, or Protestant Philosophy; but a **Philosophy of Mankind**. ... the Church of England ought not to be apprehensive to settle a constant Intelligence ... the general Banck, and Free-Port of the world ... receive strangers from all countries, into its number



establishing trust

by

observation & experimentation

systematization

correspondence

publication

exclusivity

corroding trust

inconclusive results, projects

undermining trust

scepticism, mockery



Robert Hooke
1663–1703



Robert Boyle
1627–1691

observation & experimentation

Hooke & Boyle

*Trials in Chymistry, or Mechanicks .
the right Art of Experimenting*--Sprat

dealing with doubts

"the testimony of two witnesses," -- Boyle

"I judged that whatever men's eyes were in the
younger age of the World, our eyes in this old
age of it needed spectacles"

--Hooke, in defense of scientific devices



systematization

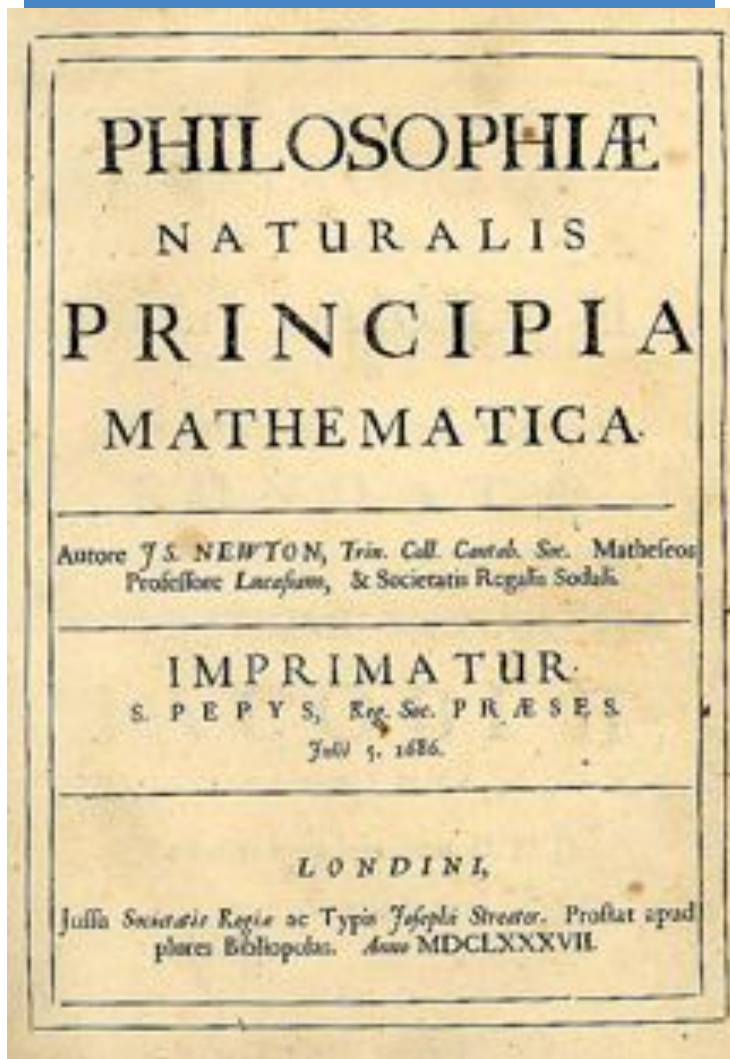
classification

up next: *organizing knowledge*

quantification and enumeration

"calculation brings everything to a certainty which before floated in the mind indefinitely"

--Samuel Johnson





publication

advertisements, articles, abstracts

"to print a Paper of advertisements... wherein will be contained heads or substance of the inquiries they are most solicitous about, together with the progress they have made and the information they have received from other hands ... a short account of such other philosophicall matters as accidentally occur."

--Robert Hooke

Boyle, random publication v **Hooke**, ordered



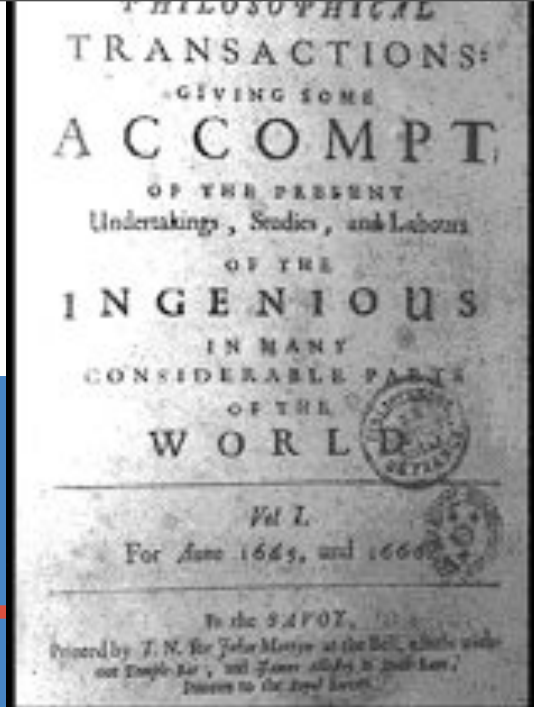
"publish'd to the world"

cures for sickness

"[Publication] is a most heroick Invention:
For by such concealments, there may come very
much hurt to mankind. If any certain remedy
should be found out against an Epidemical
disease; if it were suffer'd to be ingross'd
by one man, there would be great swarms swept
away, which otherwise might be easily sav'd."

-- Sprat

'ingross'd' ideas?
coming up: medicine, IP



society of letters

corresponding secretary

Journal des Scavans, 1665

Philosophical Transactions, 1665

"their intention was more to communicate to each other their discoveries ... some resemblance, to the Academy lately begun at Paris ... "to all the learned world they called for aid"

--Sprat



Henry Oldenburg
1619-1677



L'IMPRIMEUR AU LECTEUR.



Le dessein de ce Journal estant de faire sçavoir ce qui se passe de nouveau dans la République des Lettres, il sera composé,

Premièrement d'un Catalogue exact des principaux Livres qui s'imprimeront dans l'Europe. Et on ne se contentera pas de donner les simples titres, comme ont fait jusques à présent la plupart des Bibliographes ; mais de plus on dira de quoy

ils traitent, & à quoy ils peuvent estre utiles.

Secondement, quand il viendra à mourir quelque personne célèbre par sa doctrine & par ses ouvrages, on en fera l'Eloge, & on donnera un Catalogue de ce qu'il aura mis en loür, avec les principales circonstances de sa vie.

En troisieme lieu on fera sçavoir les expériences de Physique & de Chymie, qui peuvent servir à expliquer les effets de la Nature ; les nouvelles découvertes qui se font dans les Arts & dans les Sciences, comme les machines & les inventions utiles ou curieuses que peuvent fournir les Mathématiques ; les observations du Ciel, celles des Météores, & ce que l'Anatomie pourra trouver de nouveau dans les animaux.

En quatrieme lieu, les principales décisions des Tribunaux Ecclesiastiques & Politiques, les censures de Sorbonne & des autres Universitez, tant de ce Royaume que des Pays estrangers.

Enfin, on tâchera de faire en sorte qu'il ne se passe rien dans l'Europe digne de la curiosité des Gens de Lettres, qu'on ne puisse apprendre par ce Journal.

Le seul dénombrement des choses qui le composeroient pourroit suffire pour en faire connoître l'utilité. Mais l'édiculeray qu'il sera très-avantageux à ceux qui entreprendront quelque ouvrage considérable, puis qu'ils pourrout s'en servir pour publier leur dessein, & informer tout le monde à leur communication des manuscrits, & les places fugitives qui pourront contribuer à la perfection des choses qu'ils auront entrepris.



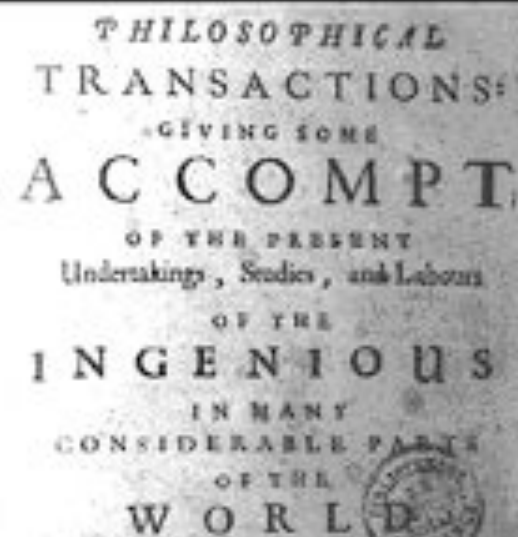
PHILOSOPHICAL
TRANSACTIONS:
GIVING SOME
ACCOMPT
OF THE PRESENT
Undertakings, Studies, and Labours
OF THE
INGENIOUS
IN MANY
CONSIDERABLE PARTS
OF THE
WORLD.

PAUL L.

For June 1645, and 1660

To the SAFOY.

Printed by J. N. the Father Mission at the Bell, which will
not double the, and James Miller in their hands.
Passes to the first level.



Vol. I.
For June 1645, and 1660.

To the S. A. F. O. Y.
Printed by T. N. for John Mayne at the Bell, which is
not Double Bar, and James Allister in South Lane,
Prosser to the Book Depot.

Name: _____

PHILOSOPHICAL
TRANSACTIONS.

Monday, March 6, 1866.

The Context

An Introduction to this Treatise. An Attempt of the Improvement of Optick Glasses at Rome. Of the Observation made in England, of a Spot in one of the Belts of the Planet Jupiter. Of the motion of the late Comet predicted. The Heads of many New Observations and Experiments, in order to an Experimental History of Cold; together with some Thermometrical Differences and Experiments. A Relation of a very odd Menstruum Cold. Of a peculiar Lead-Ore in Germany, very useful for Essays. Of an Hungarian Boleus, of the same effect with the Boleus Armetus. Of the New American Whale-fishing about the Bermudas. A Narrative concerning the success of the Pendulum-watches at Sea for the Longitudes; and the Grant of a Patent thereupon. A Catalogue of the Philosophical Books published by Monsieur de Fermat, Counsellor at Toulouse, lately dead.

The Introduction.



Herein there is nothing more necessary for promoting the improvement of Philosophical Matters, than the communicating to such, as apply their Studies and Endeavours that way, such things as are discovered or put in practice by others: it is therefore thought fit to employ the *Press*, as the most proper way to



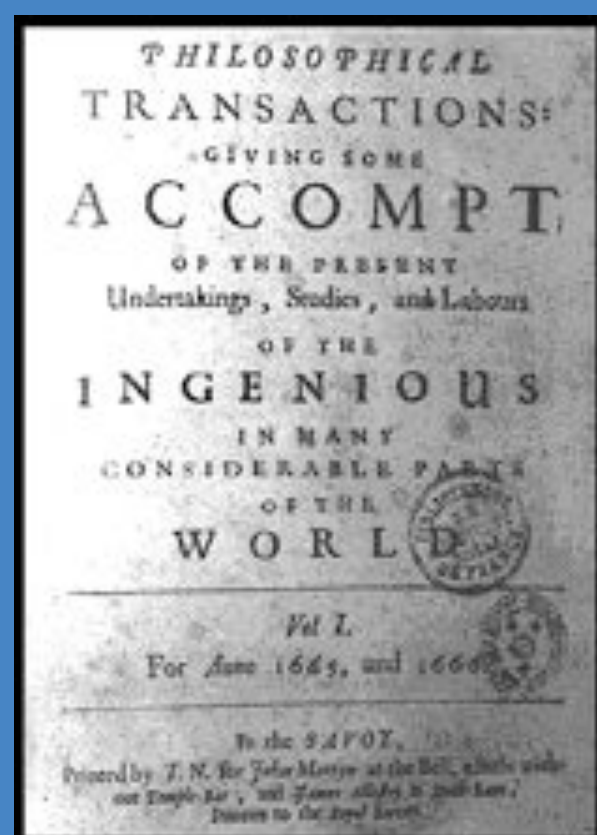
(1)

Numb. 1.

PHILOSOPHICAL

(10)

An Account of a very odd Monstrous Calf.



By the same Noble person was lately communicated to the *Royal Society* an Account of a very Odd Monstrous Birth, produced at *Limington* in *Hampshire*, where a Butcher, having caused a Cow (which cast her Calf the year before) to be covered, that she might the sooner be fatted, killed her when fat, and opening the Womb, which he found heavy to admiration, saw in it a Calf, which had begun to have hair, whose hinder Leggs had no Joynts, and whose Tongue was, *Cerberus*-like, triple, to each side of his Mouth one, and one in the midst: Between the Fore-leggs and the Hinder-leggs was a great Stone, on which the Calf rid: The *Sternum*, or that part of the Breast, where the Ribs lye, was also perfect Stone; and the Stone, on which it rid, weighed twenty pounds and a half; the outside of the Stone was of Grenish colour, but some small parts being broken off, it appeared a perfect Free-stone. The Stone, according to the Letter of Mr. *David Thomas*, who sent this Account to Mr. *Boyle*, is with Doctor *Haughteyn* of *Salisbury*, to whom he also referreth for further Information.

A Discourse of the Rule of the Decrease of the Height of the Mercury in the Barometer, according as Places are elevated above the Surface of the Earth, with an Attempt to discover the true Reason of the Rising and Falling of the Mercury, upon change of Weather.

By EDM. HALLEY.

THE Elastick Property of the Air has been long since made out, by Experiments before the R. Society and elsewhere; and the Resistance of its Spring is found to be nearly equal to the Weight or Force that compresses it; as also, that the Spaces the same Air occupies, under dif-

proceeding

"A Discourse on the Rule of the Decrease of the Height of Mercury in the Barometer, According as Places are Elevated Above the Surface of the Earth, with an Attempt to Discover the True Reason of the Rising and Falling of the Mercury, upon Change of Weather"

Edmond Halley

Philosophical Transactions, 1686

A Table shewing the Altitude to given Heights of the Mercury.

Inch.	Feet.
30 ————	0
29 ————	915
28 ————	1862
27 ————	2844
26 ————	3863
25 ————	4922
20 ————	10947
15 ————	18715
10 ————	29662
5 ————	48378
1 ————	91831
0,5 ————	110547
0,25 ————	129262
0,1 29 mil.	154000
0,01 41 mil.	216169
0,001 53 mil.	278338

A Table shewing the Heights of the Mercury at given Altitudes.

Feet.	Inch.
0 ————	30,00
1000 ————	28,91
2000 ————	27,86
3000 ————	26,85
4000 ————	25,87
5000 feet ————	24,93
1 mile ————	24,67
2 ————	20,29
3 ————	16,68
4 ————	13,72
5 ————	11,28
10 ————	4,24
15 ————	1,60
20 ————	0,95
25 ————	0,23
30 ————	0,08
40 ————	0,012



MECHANICK
EXERCISES,
OR,
The Doctrine of
Handy-works.

Began Jan. 1. 1677. And intended to be
Monthly continued.

By Joseph Moxon Hydrographer to the
Kings most Excellent Majesty.

1677
1677

LONDON

Printed for Joseph Moxon at the Sign of the Ship in
Ludgate-Street, 1677.

not so philosophical

**philosophers, physicians, and
mechanics**

"this freedom ... which they use
in embracing all assistance ... is
most advantageous to them"
--Sprat

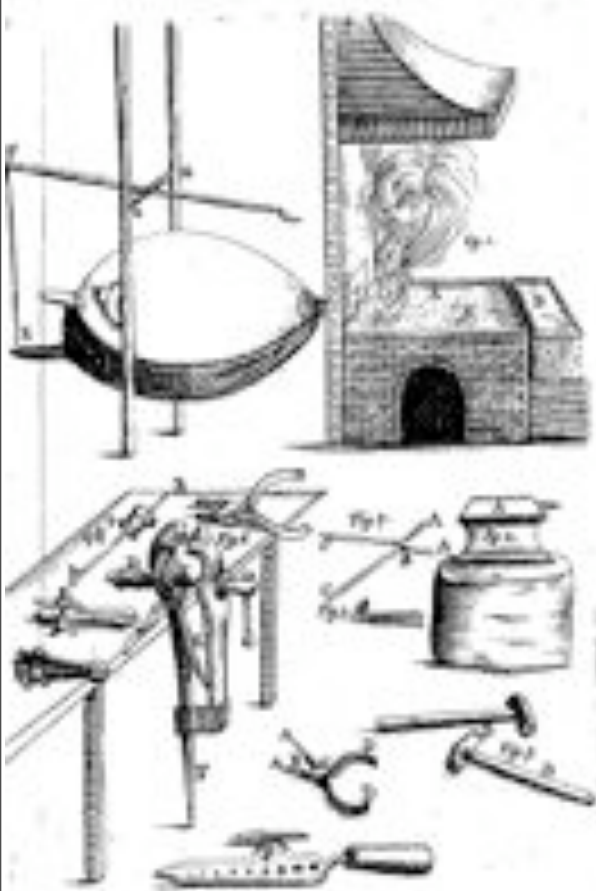
Joseph Moxon,
astronomy
mathematics
navigation
self-help, ..

1677-86?

Mechanick Exercises



Joseph Moxon
1627-1691



MECHANICK
EXERCISES
OR,
The Doctrine of
Handy-works

Began Jan. 1. 1677. And is
Manuscript continued

By Joseph Moxon Hydrographer
to the Kings most Excellent Majesty

1677

LONDON

Printed for Joseph Moxon at the Sign
of the Gun, in St. Dunstons Church-yard, 1677.

Numb. 1.

1

MECHANICK EXERCISES:

Or, the Doctrine of

Handy-works.

Applied to the Art of

Printing.

PREFACE.

BEfore I begin with Typographie, I shall say
some-what of its Original Invention; I mean
here in Europe, not of theirs in China and
other Eastern Countries, who (by general
assent) have had it for many hundreds of years,
though their Invention is very different from ours; they
Cutting their Letters upon Blocks in whole Pages or
Forms, as among us our Wooden Pictures are Cut; But
Printing with single Letters Cast in Metall, as with us
here in Europe, is an Invention scarce above Two hundred
and fifteen years old: and yet an undecidable Controversie



Joseph Moxon
1627-1691



challenges: attribution



Isaac Newton
1642–1727

Hooke v Newton

"It now remains to know the propriety of a curve Line (not circular nor concentrical) made by a centrall attractive power which makes the velocitys of Descent ... in a Duplicate proportion to the Distances Reciprocally taken. I doubt not but that by your excellent method you will easily find out what the curve must be."

--Hooke to Newton, Jan 4, 1681



"Hooke concealed his invention about Watches too long; pray tell him not to do so with what other things hee hath of that kind."

--Moray to Oldenburg

challenges: priority



Hooke v Huygens

"I my self had an other way of continuing and equalling the vibrations of a pendulum by clock work long before I heard of Monsieur Zulichems way, nay though equated with a Cycloeid **yet I have not either cryd eureka or publisht it** and yet I think I can produce a sufficient number of Credible witnesses that can testify for it about these 12 years. Soe that the argument that he soe much Relys upon to secure to him the Invention is not of soe great force as to perswaid all the World that he was the first & Sole inventor of that first particular of applying a pendulum to a clock." --Hooke



Christiaan Huygens
1629-1695



establishing authority: exclusivity

parting of the ways **Royal Society**

"as may conduce to the illustration and
improvement of Philosophy, and of all
Laudable and Useful Arts and Practices. ...
Neither have we discouraged or refused the
Essays of some famous Philosophers, learned
Philologists and Antiquaries"
Oldenburg, *Philosophical Transactions*, 1667



establishing authority: exclusivity

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Oldenburg, *Philosophical Transactions*, 1667

Society of Antiquaries, 1717
coming up: Kunstschränk, Kunstkammer,
Curiosities ...



establishing authority: credentials

"The Genius of Experimenting is so much *dispers'd*, that even in this Nation, if there were one, or two more such *Assemblies* settled; there could not be wanting able men enough, to carry them on. All places and corners are now busie, and warm about this Work: and we find many Noble Rarities to be every day given in, not onely by the hands of Learned and profess'd Philosophers; but from the Shops of *Mechanicks*; from the Voyages of *Merchants*; from the Ploughs of Husbandmen; from the Sports, the Fishponds, the Parks, the Gardens of Gentlemen"

--Sprat

(1) Numb. 1.
PHILOSOPHICAL
TRANSACTIONS.

Munday, March 6. 1667.

The Contents.

An Introduction to this Tract. An Account of the Improvement of Optick Glasses at Rome. Of the Observation made in England, of a Spot in one of the Belts of the Planet Jupiter. Of the motion of the late Comet predicted. The Heads of many New Observations and Experiments, in order to an Experimental History of Cold; together with some Thermometrical Discourses and Experiments. A Relation of a very odd Monstrous Calf. Of a peculiar Lead-Ore in Germany, very useful for Essays. Of an Hungarian Bolus, of the same effect with the Bolus Armenus. Of the New American Whale-fishing about the Bermudas. A Narrative concerning the success of the Pendulum-watches at Sea for the Longitudes; and the Grant of a Patent thereupon. A Catalogue of the Philosophical Books publisht by Monsieur de Fermat, Counsellour at Tholouse, lately dead.

Numb. 364.

Beginning the Thirty First Volume.

PHILOSOPHICAL TRANSACTIONS.

For the Months of January, Feb. March and April. 1722.

The CONTENTS.

- I. *Some Remarks on a late Essay of Mr. Cassini, wherein he proposes to find, by Observation, the Parallax and Magnitude of Sirius.* By Edmund Halley, L. L. D. Astron. Reg. Geom. Prof. Savil. & R. S. S.
- II. *An Account of the External Mamillæ, and other Solitary Glands: Also of the Injections of all the Lymphaticks (as well above as below the Subclavian) into the Veins; which Glands and Injections have not hitherto been mentioned, or not truly described by any Authors.* By Richard Hale, M. D. Reg. Soc. & Col. Med. Lond. Soc.
- III. *De Peste Constantinopoli grassante. Auctor supra V. Cl. Emmanuele Timone. M. D. Hæc scriptum ab Auctore Clarissimo, qui Constantinopoli per multos annos Medicinam fecerat, Excellentissimo Ablegato Britannico, Roberto Sutton, Eq. Aurato, traditum, ejusdem Equitis permissu, cum Societate Regia communicat idem R. Hale, M. D.*
- IV. *An Account of a Luminous Appearance in the Air, seen at Dublin on January the 12th, 1722. By Philip Percival, Esq; Brother to the Right Honourable the Lord Percival, F. R. S. and communicated by his Lordship to the Royal Society.*

exclusivity

- V. *Of the Infinity of the Spheres of Fix'd Stars.* By Edmund Halley, L. L. D. R. S. S.
- VI. *Of the Number, Order, and Light of the Fix'd Stars.* By the same.
- VII. *An Account of the Method of making Sugar from the Juice of the Maple Tree, in New England.* By the Honourable Paul Dudley, Esq; F. R. S. Communicated by John Chamberlayne, Esq.
- VIII. *A Copy of an Affidavit made in Scotland, concerning a Boy's living a considerable time without Food.* Communicated by Patrick Blair, M. D. F. R. S.
- IX. *A Discourse concerning a Method of discovering the Virtues of Plants by their External Structure.* By the Same.
- X. *An Account of a Book, Entituled, Geometria Organica, sive Descriptio Linearum Curvarum Universalis. Auctore Colino MacLaurin, Matheseos in Collegio Novo Abredonensi Professor, & R. S. S.*



challenges: scepticism

"we are now arriv'd at that excessive
censuring humor, that he who takes upon
him to commend any thing ... will raise
to himself farr more Enemies than
Friends .. this sowness of Criticism"

--Sprat





scepticism & faith

"A perfect comprehensive Knowledge of Nature belongs only to the Maker of all things; for it is not only to know what things are, but how to make them; which would be a vain Curiosity, and useless Knowledge to those, who have not a Making and Creating Power. This is to know things à priori, with an Intuitive Ideal Knowledge, which is infinitely more superior to Reason, than Reason is to Sense: And it is the affection of this Intuitive making Knowledge, which makes some men Atheists, and others Hereticks."

--William Sherlock,

"Danger of Corrupting the Faith by Philosophy," 1697



failed demos



Samuel Pepys
1663–1703

"And thither anon come all the Gresham College, and a great deal of noble company: and the new instrument was brought called the Arched Viall, where, being tuned with lute-strings, and played on with keys like an organ, a piece of parchment is always kept moving; and the strings, which by he keys are pressed down upon it, are grated in imitation of a bow, by the parchment; and so it is intended to resemble several vialls played on with one bow, but so basely and harshley, that it will never do. But, after three hours' stay, it could not be fixed in tune."

--Pepys, October 5, 1664



personality and credibility

"The Royall Societie (generally) had the like for [Hobbes]; and he would long since have been ascribed a member there but for the sake of one or two person whom he took to be his enemies. Dr. Wallis ... Mr Boyle. I might adde Sr Paul Neile, who disobliges every body."

--John Evelyn, *Brief Lives*

"there is less credit to be placed in the Narrations of some of our *Virtuosi*, who have been so mistaken in their Accounts ... with what *negligence* and *imperfectness* will they register things? how *unphilosophical* will their memories be?"

--Henry Stubbe, *Legends No Histories*, 1670



false claims

Mistakes about the SWEATING-SICKNES, and its Cure.

TO shew the great Utility of the Royal Society, he sayes

They will be able by degrees to purchase such Extraordinary Inventions, which are now close lock'd up in Cabinets; and then to bring them unto one Common Stock, which shall be upon all occasions exposed to all mens use. This is a most Heroick Invention; For by such concealments, there may come very much hurt to mankind. If any certain remedy should be found out against an Epidemicall disease, if it were suffer'd to be engross'd by one man, there would be great Swarms swept away, which otherwise might be easily sav'd. I shall instance in the Sweating-Sickness. The Medicine for it was almost Infallible. But, before that could be generally published, it had almost dispeopled whole Towns. If the same disease should have returned, it might again have been as destructive, had not the Lord Bacon ta-ken care to set down the particular course of Physick for it in his History of Henry the Seventh, and so put it beyond the possibility of any private man's invading it. This out to be imitated in all other Sovereign Cures of the like nature to avoid such dreadful casualties.

One would think by the words of our Historian, That the Cure of the Sweating-Sickness, were recorded by no Body but the Lord Bacon that it was almost Infallible; that the Sweating-Sickness did not return again; And that the Cure was rather concealed (and needed to be generally published) at first, then to be discovered by Observation and Experiments of those that first fell sick. But there is no such thing: for the same cure is related by Polydore Virgil, and Holinshed in their Histories of Henry the Seventh. And the same sickness did rage in the twenty second year of the said King his Reign, as well as the first. And the Cure related was so far from being almost Infallible, that my Lord Bacon only saies it commonly recovered the sick: and after it was so generally known, yet the twenty second year of that Kings Reign, many dyed of it (as Holinshed saith) howbeit not in the same number, by reason of the remedy found out at the beginning of it. To convince the Reader of the truth of what I say, and to shew how unacquainted



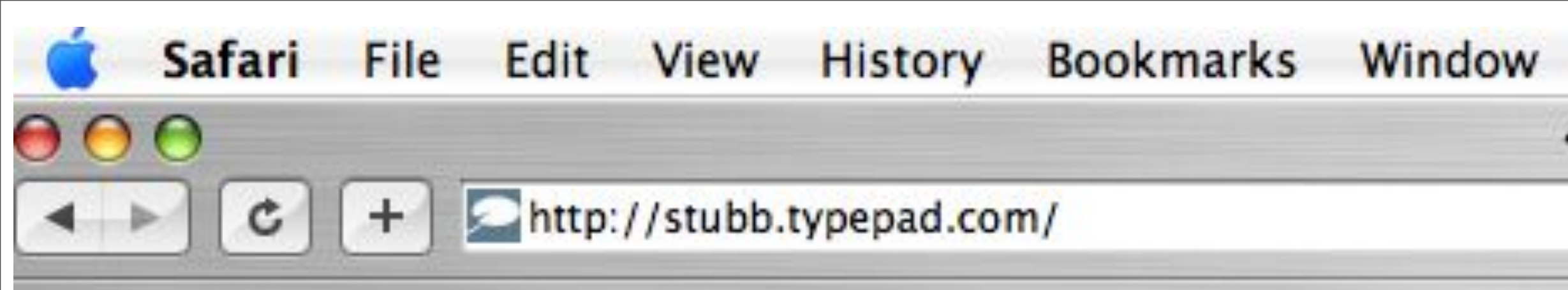
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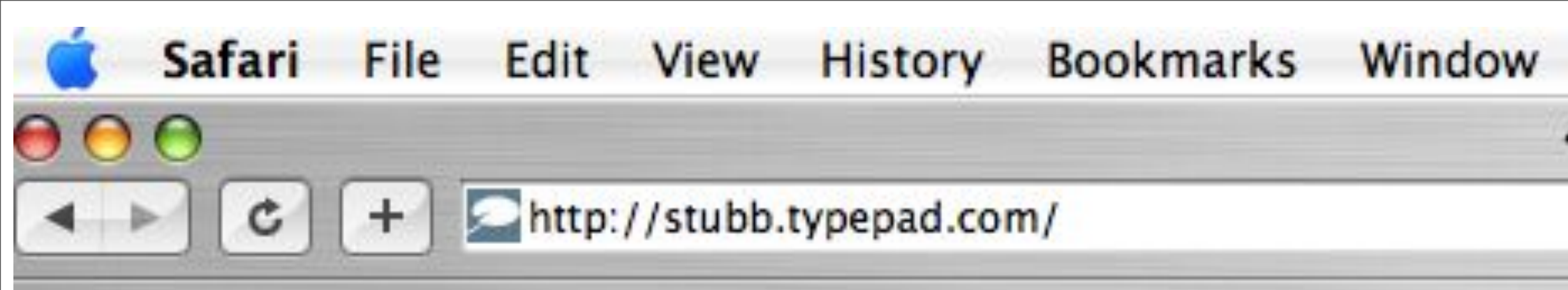
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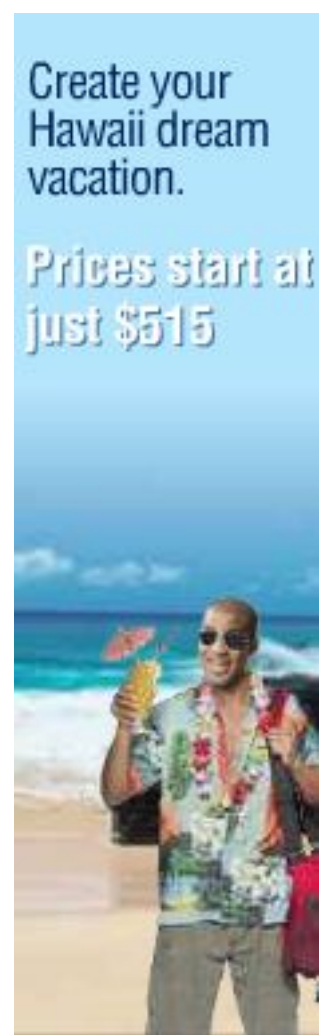
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BOOK NOW





"I have sent one to weigh Air at the Picque of Teneriff that's the lightest Air. I shall have a considerable Cargo of that Air. Sheerness and the Isle of Dogs Air is the heaviest. Now if I have a mind to take Countrey Air, I send for, may be, forty Gallons of Bury Air, shut all my windows and doors close and let it fly in my Chamber.."

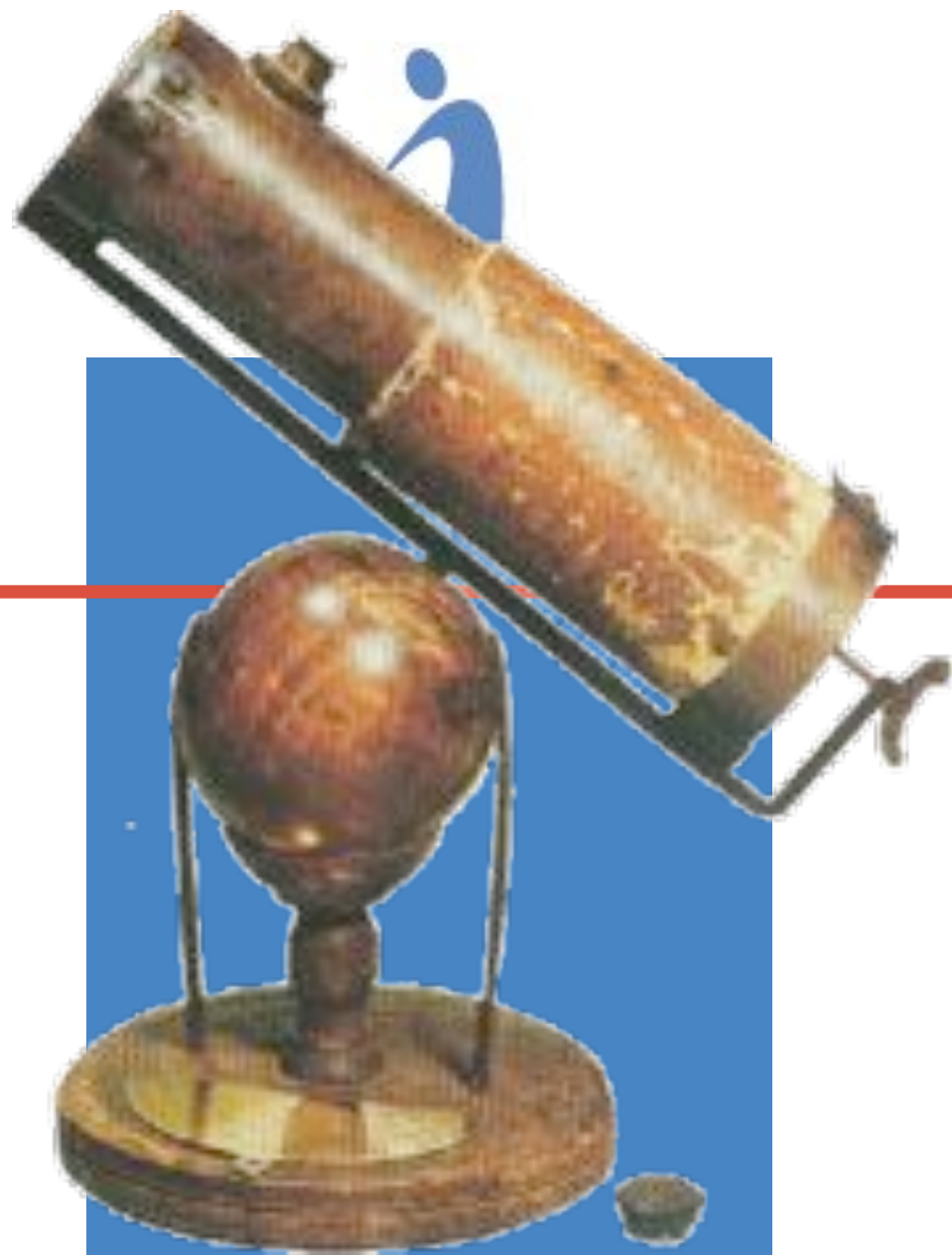
Shadwell, *Virtuoso*

mockery, a more serious problem?

Charles II, 1664

"the King came and stayed an hour or two laughing at Sir W. Petty, who was there about his boat; and at Gresham College in general; at which poor Petty was, I perceive, at some loss; but did argue discreetly, and bear the unreasonable follies of the King's objections and other bystanders with great discretion; .. but the King ... cried him down with words only. Gresham College he mightily laughed at, for spending time only in weighing of ayre, and doing nothing else since they sat."

--Pepys, February 1, 1663/4



more mockery

Samuel Butler, c1670 **"The elephant in the moon"**

Quoth he,---A stranger Sight appears
Than e're was seen in all the Spheres,
A Wonder more unparallel'd,
Than ever mortal Tube beheld.
An Elephant from one of those
Two mighty Armies is broke loose,
And with the Horrour of the Fight
Appears amaz'd, and in a Fright;
Look quickly, lest the Sight of us
Should cause the startled Beast t' imboss.



still going

Spectator, 1711

"innumerable Retainers of Physick, who, for want of other Patients, amuse themselves with the Stifling of cats in an Air Pump, cutting up Dogs alive, or impaling of Insects upon the Point of a Needle for Microscopical Observations."



still going



Jonathan Swift
1667–1745

Jonathan Swift, 1725
"Voyage to Laputa"
the flapper

the "Academy of Projectors"
objects for words

sunbeams out of cucumbers

food out of excrement

houses built from the top down

pillows out of marble ...



looking for results: "what have ye done?"

"When the philosophers of the last age were first congregated into the Royal Society, great expectations were raised of the sudden progress of useful arts; the time was supposed to be near, when engines should turn by a perpetual motion, and health be secured by the universal medicine; when learning should be facilitated by a real character, and commerce extended by ships which could reach their ports in defiance of the tempest. But improvement is naturally slow.

"The society met and parted without any visible diminution of the miseries of life. The gout and stone were still painful, the ground that was not ploughed brought no harvest, and neither oranges nor grapes would grow upon the hawthorn. At last, those who were disappointed began to be angry; those likewise who hated innovation were glad to gain an opportunity of ridiculing men who had depreciated, perhaps with too much arrogance, the knowledge of antiquity. And it appears, from some of their earliest apologies, that the philosophers felt with great sensibility the unwelcome importunities of those who were daily asking, "What have ye done?"

Samuel Johnson, *Idler* 1759



health sciences

"Cramp be thou
faintless
As our Lady was
sinless
When she bare
Jesus"

--Pepys

sickness:
a test for trustworthiness

"[T]he time was supposed to be near, when
engines should turn by a perpetual motion, and
health be secured by the universal medicine;

"The society met and parted without any visible
diminution of the miseries of life. The gout
and stone were still painful."

Samuel Johnson, *Idler* 1759



nasty, brutish, and short

the European experience

black death: 1347

plague again: 1665

in London, of about 1/2 million, 100,00 died



slow progress

The plague is much in Amsterdam, and we in fears of it
here. Pepys, **Dec.** 31, 1663

The talk upon the 'Change is, that De Ruyter is dead, with
fifty men of his own ship, of the plague, at Cales,
June 30, 1664

We were told to-day of a Dutch ship of 3 or 400 tons, where
all the men were dead of the plague, and the ship cast
ashore at Gottenburgh, **Sept.** 24, 1664

Thence to the Coffee-house ... where all the newest is of
the Dutch being gone out, and of the plague growing upon us
in this towne, **May** 24, 1665



slow progress

In the evening home to supper; and there, to my great trouble, hear that the plague is come into the City (though it hath these three or four weeks since its beginning been wholly out of the City); but where should it begin but in my good friend and neighbour's, Dr. Burnett, in Fanchurch Street: which in both points troubles me mightily. **June 10,**
1665

The towne grows very sickly, and people to be afeard of it; there dying this last week of the plague 112, from 43 the week before,.The Mortality Bill is come to 267; June 29th, 1665
Above 700 died of the plague this week. **July 13,** 1665

The sickness is... almost every where, there dying 1089 of the plague this week.

July 19, 1665
Hofl Science 10 - 52



spreading plague/ spreading news



Daniel Defoe
1659?-1731

"We had no such thing as printed newspapers, in those days, to spread rumours and reports of things; and to improve them by the invention of men, as I have lived to see practised since. But such things as those were gathered from letters of merchants, and others, who corresponded abroad, and from them was handed about by word of mouth only; so that things did not spread instantly over the whole nation as they do now. But it seems that the Government had a true account of it, and several councils were held, about ways to prevent its coming over; but all was kept very private."

--Daniel Defoe,
Journal of the Plague Years, 1722



advice of the physician

PROCLAMATION

" 'That no hogs dogs, or cats, ... be kept within any part of the city' ...

"Wherefore were we ordered to kill all the dogs and cats, but because as they were domestic animals, and are apt to run from house to house ...so they are capable of carrying ... infections streams ... even in their furs and hair ... by the advice of the physician, that all dogs and cats should be immediately killed."

--Defoe, *Plague Years*



scientific advances?

"Kinyoun was an accomplished bacteriologist, but he was not aware of Paul-Louis Simond's discovery in 1894 of the role of rat fleas in the spread of *Yersinia pestis*, because it was not confirmed until 1906 by a British scientific commission in India. Thus, unaware that crudely enforced quarantines will not contain a plague epidemic, Kinyoun [in 1900] fueled more fury by trying to extend these measures with compulsory health passes for train and sea travel out of the city."

Dorothy Porter, review of
Marilyn Chase, *The Barbary Plague: The Black Death in
Victorian San Francisco*, 2003



nasty, brutish, and short



smallpox

Queen Anne (1665-1714)

17 pregnancies

3 still births

10 miscarriages

3 died in infancy of **smallpox**

William Duke of Gloucester (1689-1700)



foreign born disease foreign born cure

inoculation

India, 8th century

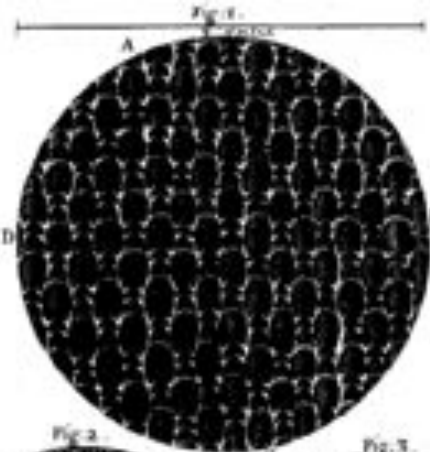
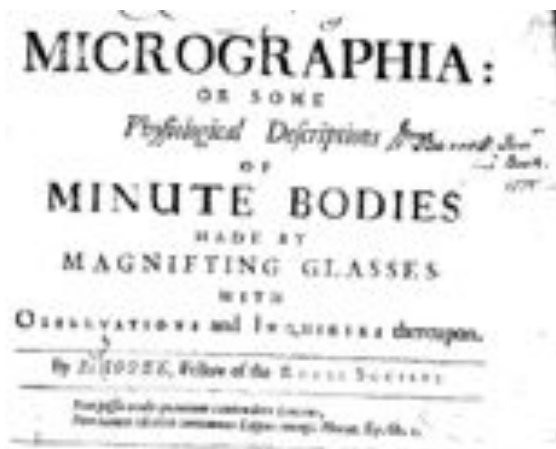
China, 10th century

Tibet, 11th century

Africa?

Turkey, ? 16th century

England, France, US 18th century



attacking smallpox

"the ingenious Invention of that Excellent person, Doctor Wren, of injecting liquors into the veins of an Animal, seems to be reducible to this head: I cannot stay, nor is this a fit place, to mention the several Experiments made of this kind by the most incomparable Mr. Boyle, the multitudes made by the lately mention'd Physician Doctor Clark, the History whereof, as he has been pleas'd to communicate to the Royal Society, so he may perhaps be prevail'd with to make publique himself: But I shall rather hint, that certainly, if this Principle were well consider'd, there might, besides the further improving of Bathing and Syringing into the veins, be thought on several ways, whereby several obstinate distempers of a humane body, such as the Gout, Dropsie, Stone, &c. might be master'd, and expell'd; and good men might make as good a use of it, as evil men have made a perverse and Diabolical. And that the filling of the pores of the skin with some fluid vehicle, is of no small efficacy towards the preparing a passage for several kinds of penetrant juices, and other dissoluble bodies, to insinuate themselves within the skin."

--Hooke, 1665



variolation



Lady Mary Wortley
Montague
1689–1762

England, France, US 18th century

England
Lady Mary Wortley Montague

France
Montpelier, but not Paris

US
Onesimus



mad men



Voltaire

[François-Marie Arouet]

1694–1778

"It is whispered in Christian Europe that the English are mad and maniacs: mad because they give their children smallpox to prevent their getting it, and maniacs because they cheerfully communicate to their children a certain and terrible illness with the object of preventing an uncertain one. The English on their side say: 'The other Europeans are cowardly and unnatural: cowardly in that they are afraid of giving a little pain to their children, and unnatural because they expose them to death from smallpox some time in the future.' To judge who is right in this dispute, here is the history of this famous inoculation which is spoken of with such horror outside England."

Voltaire, *Letters on England*



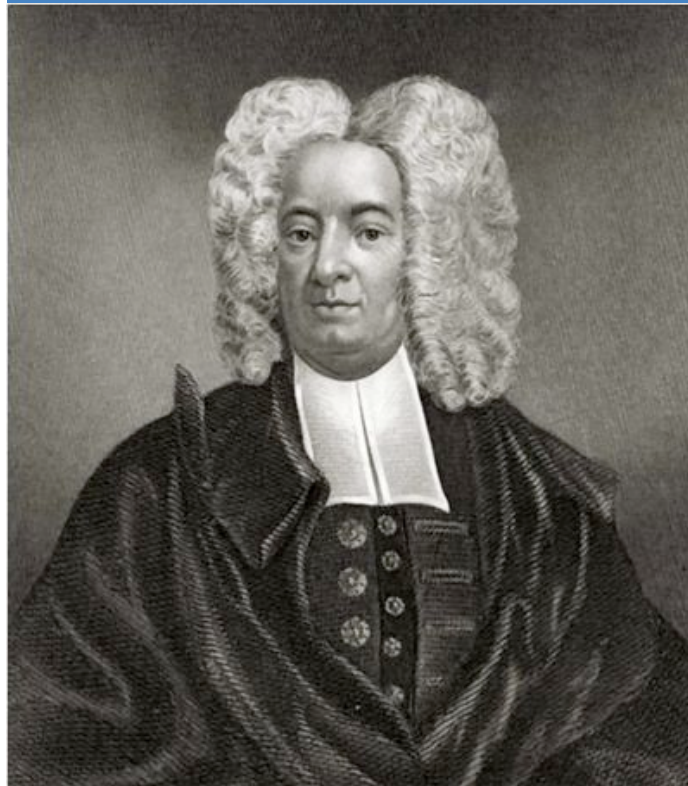
US

Boston outbreak 1721

HMS Seahorse

"Inquiring of my Negro-man, Onesimus, who is a pretty intelligent fellow, whether he had ever had the smallpox, he answered both yes and no. He told me that he had undergone the operation which had given something of the smallpox and would forever preserve him from it, adding that was often used in West Africa."

Cotton Mather



Cotton Mather
1663–1728



US

Boston outbreak 1721

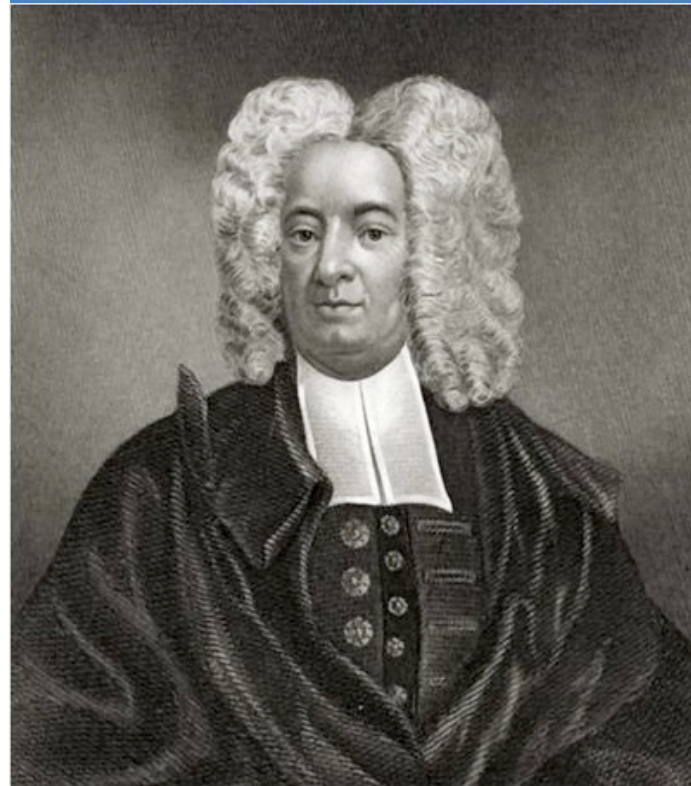
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Cotton Mather

"Cotton Mather, you dog, dam you! I'll inoculate you with this; with a pox to you"

[note attached to missile]



Cotton Mather
1663–1728



Benjamin Franklin
1706–1790

To the Author of the New-England Courant,
S I R,
Reading in your last a Story concerning Inoculation, with the News of the intended Expedition against the Eastern Indians; they casually lodged together in the same Apartment of my Brain, and by next Morning formed themselves into the following Project.

A Project, for reducing the Eastern Indians by Inoculation.

That there be forthwith enlisted a sufficient number of Inoculators, to be commanded by a Major General Inoculator, who in Quality of a Field Officer, may be Duty on Horseback.

That they be completely armed with Incision-Lanceet, Pandora's-Box, Nut-Shell and Fillet; their Exercise and Discipline to be according the Practice of that able and experienced Officer, amongst the Indians (our Inoculator General's good Friend and intimate Acquaintance) Capt. General Timonius.

That their Ammunition be of the best Proof, that is, a Constitution of Negro Yaws, and constant Small Pox.

That the Inoculators be all Volunteers, who besides their usual Food, and travelling Charges, may be allowed a Gratuity of 10 L. per Head, of each Indian who survives, conveys and spreads the Infection amongst his Tribe; and of 5 L. per Head for those who blow up 100 (or die) before they reach the Places where Execution is intended.

That in Consideration of the difference of Climate, and other more pressing Occasions, the Timonius direct such Expeditions to be made only in Winter and Spring, but shall be in Summer, as in all Probability like to do most Execution in that Season.

The three greatest Evils incident to Mankind, are War, Famine and Pestilence. The first, or War, hath been allowed and practised by all Nations in all Ages. The second is also made use of to annoy an Enemy, as in the Instance of Blockading, or Starving strong Towns: But the doing of Execution by Infection or Pestilence, seems reserved for the Honour of the Inoculator, and his Associates. That it is a heinous and Lawful we have had it lately sufficient.

humour?



afterthoughts



"it does not seem to make that progress among the common people in America, ... *Scruples of conscience* ... The expence of having the operation performed by a surgeon ... **A small Pamphlet .. by some skilful Physician** ... directing what preparations .. should be used .. what precautions to avoid .. and how the operation is to be performed, the incisions dressed the patient treated .. might encourage parents to inoculate their own children .. and thereby save thousands of lives"

--Franklin, letter, 1759



declining scepticism



"In 1736 I lost one of my sons, a fine boy of four years old, by the smallpox taken in the common way. I long regretted bitterly and still regret that I had not given it to him by inoculation. This I mention for the sake of the parents who omit that operation, on the supposition that they should never forgive themselves if a child died under it; **my example showing that the regret may be the same either way, and that, therefore, the safer should be chosen.**"

--Franklin, *Autobiography* 1793



"the safer way"

a shortage of numbers

tracking population

Graunt, Petty

accounting for death

how many sick? how many died? how
many recovered? how many?



1611: incorporation of parish clerks counting by "searchers"

I728: age of deceased

1837: last bills

Hofl Science 10 - 66



political arithmetic

politics and population

William Petty, RS (1623-1687)

surveyor

Political Arithmetic of Ireland

velocity of circulation
natural vs market price
economic surplus
population change



William Petty
1623-1787



headcounters

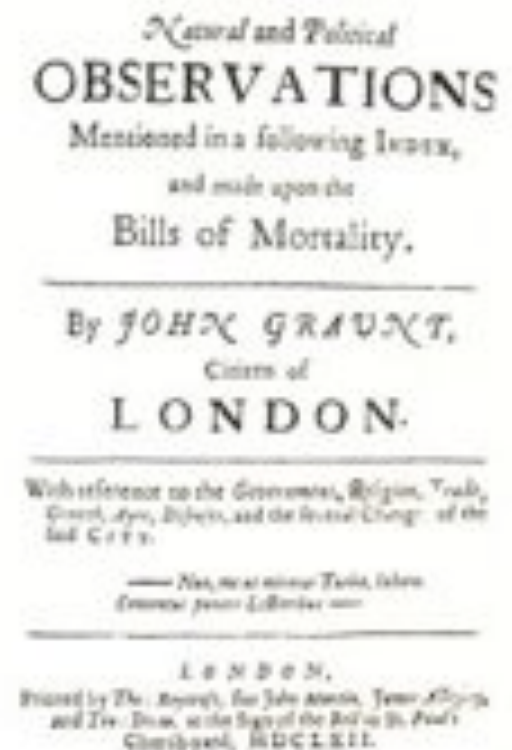


John Graunt
1620–1674

"His Majesty gave this particular charge to His Society, that if they found any more such Tradesmen, they should be sure to admit them all, without any more ado."

--Pratt

John Graunt, RS
*Natural and Political
Observations ...
upon the Bills of Mortality*
1662



An Extract of two Essays in Political Arithmetick concerning the comparative Magnitudes, &c. of London and Paris by Sr. William Petty Knight. R. S. S.

The excellent Author of these two Essays, has in several former of the same Nature made it appear that Mathematical Reasoning, is not only applicable to Lines and Numbers, but affords the best means of Judging in all the concerns of humane Life. In the present he endeavours to prove *London*, as it now is, the most considerable City now in being, by shewing it much to exceed *Paris*, (which not only the *French* but foreigners have asserted to be the chief City of *Europe*.) both in People, Housing, and Wealth: The first by comparing the Bills of Mortality, whereby he finds that the People of *London* are as many as those of *Paris* and *Rouen* put together. The second by comparing the number of Houses, which by the Chimney-Books are found above 80000 in *London*, whereas a great Author among the *French*, (who seldom fail to magnifie their own things,) reckons but 50000 Houses in *Paris*. As to the third, to wit the Wealth, he conceives that there is yet a much greater disproportion, there being no comparison between them for Trade, and besides a good argument drawn from the Law-Suites of both places, he concludes from the *Paris* bills of Mortality, that two 5ths of the People of *Paris* are so poor

competitive counts

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1. I T could not be expected that an Assertion of *Londons* being bigger than *Paris* and *Rouen*, or than *Paris* and *Rome* put together, and bigger than any City of the World, should scape uncontradicted, and 'tis expected that I (if continuing in that Perswasion) should make some Reply to these contradictions.

2. I begin with the Ingenious Author of the *Novelles de la Republique des Lettres*, who saith that *Rey in Persia* is far bigger than *London*; for that in the 6th. Century of Christianity (I suppose *An. 550*) It had 15000, or rather 44 thousand *Moschees* or *Mabometan Temples*. To which I reply, that I hope this Objector is but in jest, for that *Mabomet* was not borne till about the Year 570, and had no *Moschees* till about 60 Years after

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battle with 'declinists'



births, marriages, & deaths

(184)

The Number of the Weddings, Christenings, and Burials, that were in the Parish of Cratbrook, from March 1780 to March 1840, (as appears by the Register only in the years 1784 and 1785 the Christenings are actually entered, because the Register is very imperfect for the greater part of those years.)

Year	Weddings	Christenings	Burials
	M.	F.	Total
1780	20	25	45
1781	22	28	50
1782	25	30	55
1783	28	32	60
1784	30	35	65
1785	32	38	70
1786	35	40	75
1787	38	42	80
1788	40	45	85
1789	42	48	90
1790	45	50	95
1791	48	52	100
1792	50	55	105
1793	52	58	110
1794	55	60	115
1795	58	62	120
1796	60	65	125
1797	62	68	130
1798	65	70	135
1799	68	72	140
1800	70	75	145
1801	72	78	150
1802	75	80	155
1803	78	82	160
1804	80	85	165
1805	82	88	170
1806	85	90	175
1807	88	92	180
1808	90	95	185
1809	92	98	190
1810	95	100	195
1811	98	102	200
1812	100	105	205
1813	102	108	210
1814	105	110	215
1815	108	112	220
1816	110	115	225
1817	112	118	230
1818	115	120	235
1819	118	122	240
1820	120	125	245
1821	122	128	250
1822	125	130	255
1823	128	132	260
1824	130	135	265
1825	132	138	270
1826	135	140	275
1827	138	142	280
1828	140	145	285
1829	142	148	290
1830	145	150	295
1831	148	152	300
1832	150	155	305
1833	152	158	310
1834	155	160	315
1835	158	162	320
1836	160	165	325
1837	162	168	330
1838	165	170	335
1839	168	172	340
1840	170	175	345

(185)

The Table of the Parish of Cratbrook.

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1787	38	42	80
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1789	42	48	90
1790	45	50	95
1791	48	52	100
1792	50	55	105
1793	52	58	110
1794	55	60	115
1795	58	62	120
1796	60	65	125
1797	62	68	130
1798	65	70	135
1799	68	72	140
1800	70	75	145
1801	72	78	150
1802	75	80	155
1803	78	82	160
1804	80	85	165
1805	82	88	170
1806	85	90	175
1807	88	92	180
1808	90	95	185
1809	92	98	190
1810	95	100	195
1811	98	102	200
1812	100	105	205
1813	102	108	210
1814	105	110	215
1815	108	112	220
1816	110	115	225
1817	112	118	230
1818	115	120	235
1819	118	122	240
1820	120	125	245
1821	122	128	250
1822	125	130	255
1823	128	132	260
1824	130	135	265
1825	132	138	270
1826	135	140	275
1827	138	142	280
1828	140	145	285
1829	142	148	290
1830	145	150	295
1831	148	152	300
1832	150	155	305
1833	152	158	310
1834	155	160	315
1835	158	162	320
1836	160	165	325
1837	162	168	330
1838	165	170	335
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counting difficulties

An INDEX of the Positions, Observations, and Questions contained in this Discourse.

1. **T**he Duration of keeping the Account of Burials made first from the Plague, Anno 1592, page 3
2. Seven Alterations, and Augmentations of the published Bills, between the years 1592, and 1662, pag. 4, 5, 6, 7, 8, 9, 10
3. Reasons, why the Account of Burials, and Christenings should be kept universally, and how called for, and pursued by the Magistrate. p. 11
4. A true Account of the Plague cannot be kept, without the Account of other Diseases. p. 12
5. The ignorance of the Searchers no impediment to the keeping of sufficient, and useful Accounts. p. 13
6. That about one third of all that were ever quind, the under five years old, and about thirty six per Centum under five. p. 14
7. That two parts of nine die of Acute, and forty of one hundred twenty nine of Chronical Diseases, and four of one hundred twenty nine of outward Graths. 14, 15
8. A Table of the Proportions dying of the most serious, and formidable Diseases, or Calamities. p. 16
9. That seven per Centum die of Age. bid.
10. That some Diseases, and Calamities keep a constant proportion, whereas some others are very irregular. p. 17, 18
11. That not above one in four thousand are Starved. p. 17

shame

"The Old-Women Searchers, after the mist of a Cup of Ale, and the bribe of a two-grout fee ... cannot tell whether this emaciation or leanness were from a phthisis, or from an Hectick Fever, Atrophy, &c. or from an Infection of the Spermatick parts ... onely hated persons, and such, whose very Noses were eaten off were reported by the searchers to have died of this too frequent Malady."

principle

fear



authority again

"to commit the work
to the care of such
men, who, by the
freedom of their
education the plenty
of their estates,
and the usual
generosity of Noble
Blood, may be well
suppos'd to be most
averse from sordid
considerations"

--Sprat

"the distribution of
credibility followed
the contours of
English society"

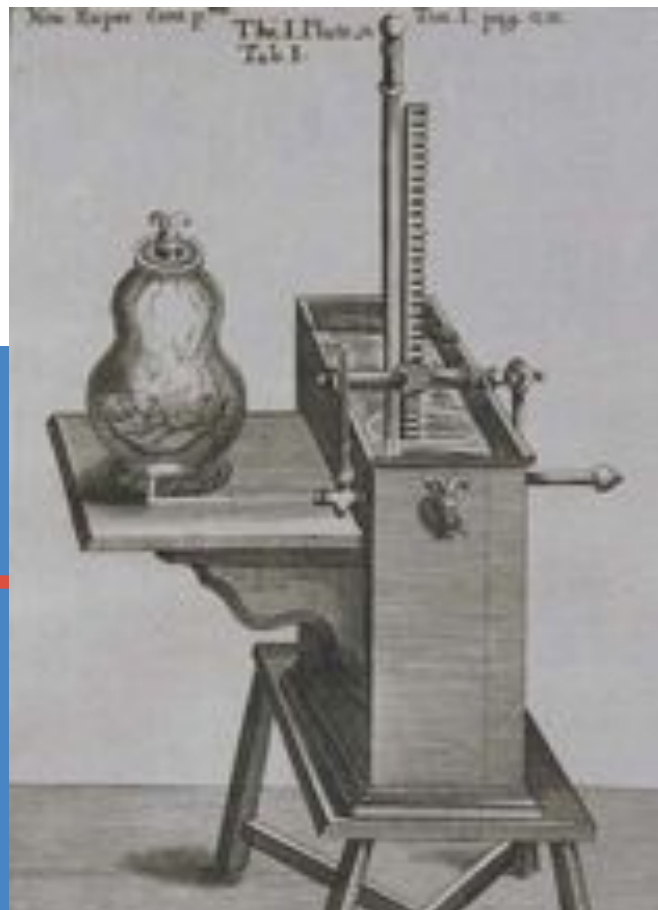
--Steven Shapin

Hooke's
subordination

Graunt's
"shop arithmetic"

**Petty &
Anne Greene**





Robert Boyle
1627–1691

scientific knowledge

matters of trust

in *machines*

in *books*

in *calculation*

in *people*

aristocrats, gentlemen, women, servants



authority & not experience

membership

peer review

back to the university



summary

beginnings of science

*from facts and curiosities to evidence and
calculation*

from certainty to trust

*from "diligent and laborious individuals"
to credentials and institutions*



ahead

18 Feb: Reference books and the organization of knowledge

Required reading:

- McArthur, Tom. 1986. Ch 12-15, pp. 91-133 in *Worlds of Reference*. Cambridge: Cambridge University Press.