Lecture 11

Sivin & Shen

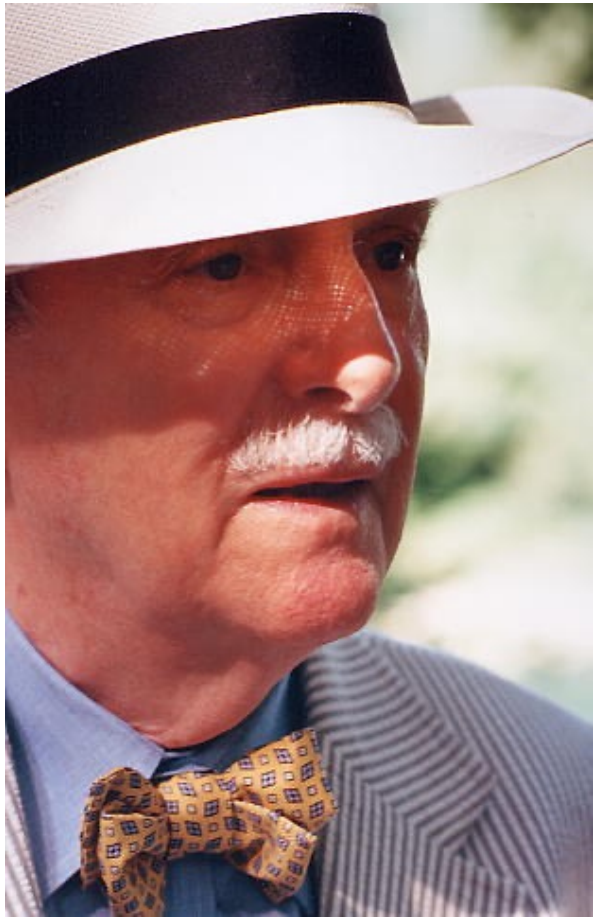
GFN1000 In Dialogue with Nature

Content

- Sivin's Criticisms on The Needham Question
  - False Assumptions
  - Logical Fallacies
  - The Case of Shen Kuo
- Value in Science
  - Internalism vs. Externalism
- Orientalism
  - Colonial Science

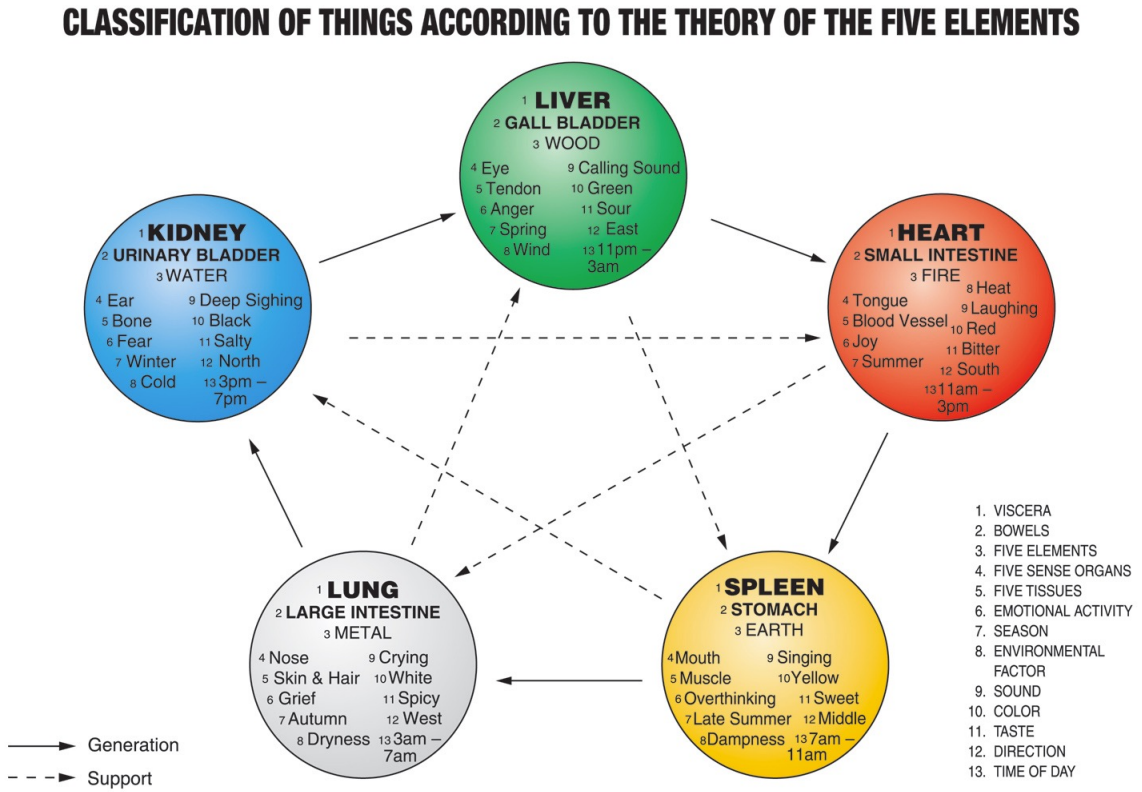
Nathan Sivin (1931-2022)

- An American historian and sinologist, Professor of Chinese Culture and the History of Science at the University of Pennsylvania
  - BSc in Chemistry at MIT
  - MA and PhD in history at Harvard University
- Co-author of Science and Civilization in China Vol. 5 & 6 on chemistry and medicine.



The Case of Chinese Medicine

- A holistic understanding of health and disease
- Each of the five elements is associated with specific qualities and organs.
- Chinese medicine seeks to restore balance and harmony within the body by addressing imbalances in the five elements.



Medicalization vs. Socialization

The Needham Question

- “Why did modern science, the mathematization of hypotheses about Nature, with all its implications for advanced technology, take its meteoric rise only in the West … (but) had not developed in Chinese civilization or Indian civilization?”

➢Why did the scientific revolution take place in the West?

- “Why … Chinese civilization was much more efficient than occidental in applying human natural knowledge to practical human needs?”

➢Was ancient China more advanced than the West in terms of its science? Why or Why not?

Assumption 1

- “The natural knowledge that was being applied to human needs was not what we usually call Chinese science.” (Para. 4).
- “Early technology did not succeed or fail according to how well it applied the insights of early science.” (Para. 5)

Assumption

- The “application of Chinese science” in daily life

Refutation

- What was applied to human needs was not Chinese science but technology

Assumption 2

- “Mathematical astronomy in China by its last high point about 1300 never quite reached the general level of predictive accuracy that Ptolemy had mastered eleven hundred years earlier.” (para. 6)
- “Historians have more urgent work to do than trying to prove that every other culture was inferior to the one they specialize in.” (para. 7)

Assumption

- The superiority of Chinese science over western science

Refutation

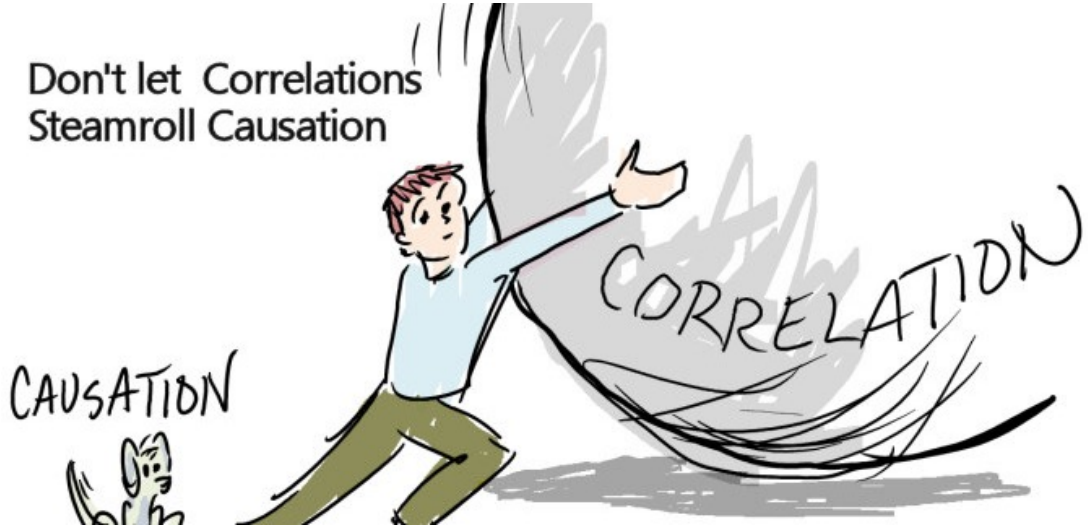
- A meaningful comparison involves many aspects

Other Shaky Assumptions

- Everybody wants to have the Scientific Revolution
  - i.e., Modern science is a good thing: non-Western cultures want it.
- Everybody ought to have the Scientific Revolution
  - i.e., Every culture: Western or non-Western.
- Science is universal, objective, and value-free
  - i.e., Science is good for everyone, everywhere, every culture
- The Western model of the Scientific Revolution is a standard pattern for all capable civilizations. It will lead to similar socio-institutional changes
  - i.e., Western Europe is the model, and other cultures should have similar consequences.

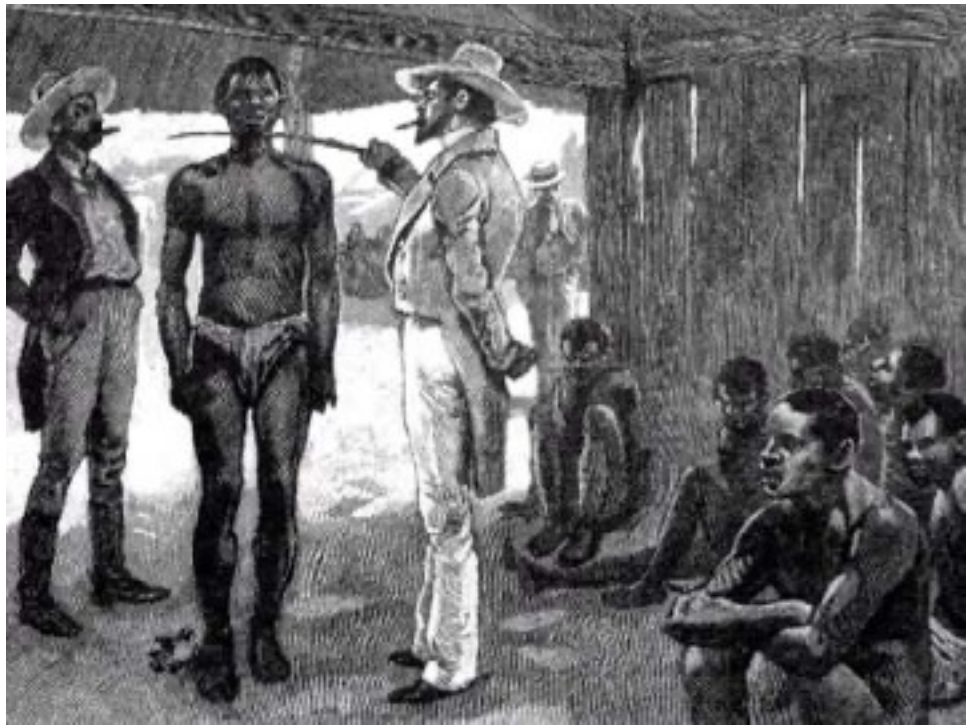
Fallacy 1: Arbitrarily Identifying Necessary Conditions

- An earlier state of culture is conflated with a necessary condition.
- Sivin points out that one fallacy in blaming China for not having had a scientific revolution was to claim that if a certain aspect or factor was absent in another civilization, that civilization could not have had a scientific revolution.



Fallacy 2: The Underlying Agenda

- Sivin speculates that the real motivation behind the question is the urge to imply the West's superiority and legitimize its dominance.
- The use of fallacious arguments aims to suggest that the West's success was not an accident, but inevitable from the beginning.



Preconditions for A Scientific Revolution

The Intellectual Side

- The intellectual side is a transformation of our knowledge. It involves the change in the question, method, and answer.
- Another remarkable feature is that it created a **public, verifiable, morally-neutral** fact for the first time. In Sivin's words, this was a kind of "knowledge that had no value except **truth value**."

The Social Side

- The social side requires a new intellectual community **independent** of the established intellectual elite.
- The building of this new intellectual community is essentially a power struggle to take away authority from the old intellectual establishment.

Shen Kuo (1031-1095)

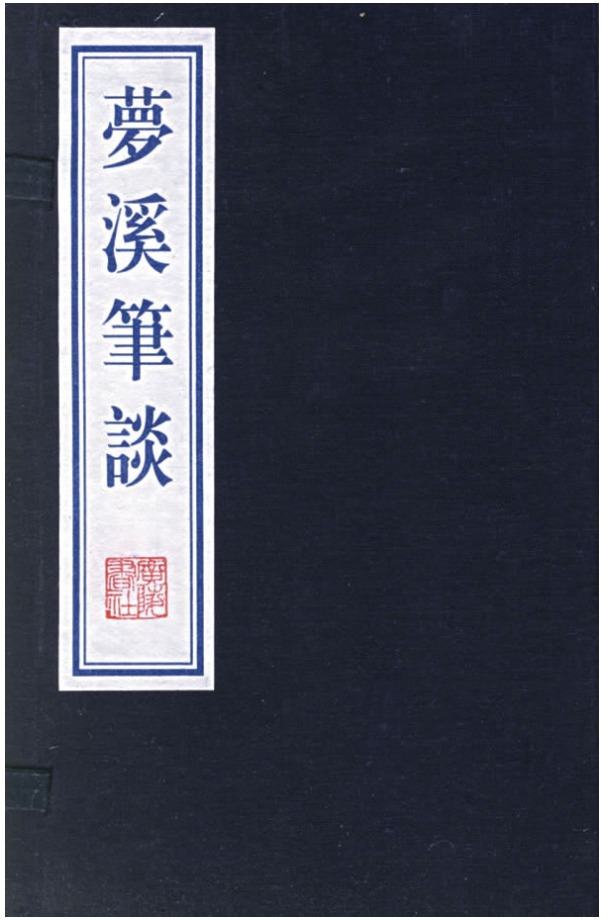
- A Chinese polymath in a variety of fields of science and humanities.
- Participated in Wang Anshi's political reform
- *Brush Talks from Dream Brook (Dream Pool Essays)*

➢"One of the greatest scientific minds in Chinese history." – Needham

➢"One of the most versatile figures in the history of Chinese science and engineering." – Sivin

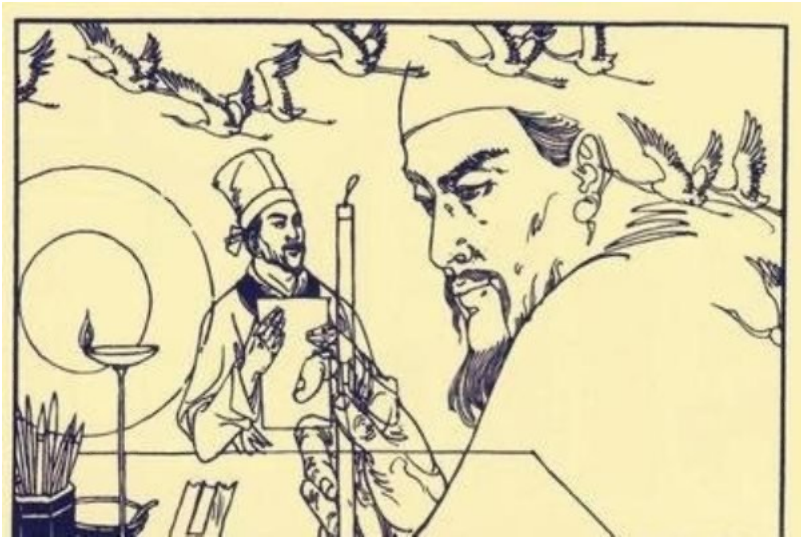
Brush Talks from Dream Brook (1088)

- Each chapter is composed of many jottings, and each is about a subject.
  - 26 chapters; 507 jottings in total.
- Including both the humanities and natural sciences (about a third is about nature).
- Sivin points out that the various sciences Shen Kuo studied were not connected in any systematic way as science.

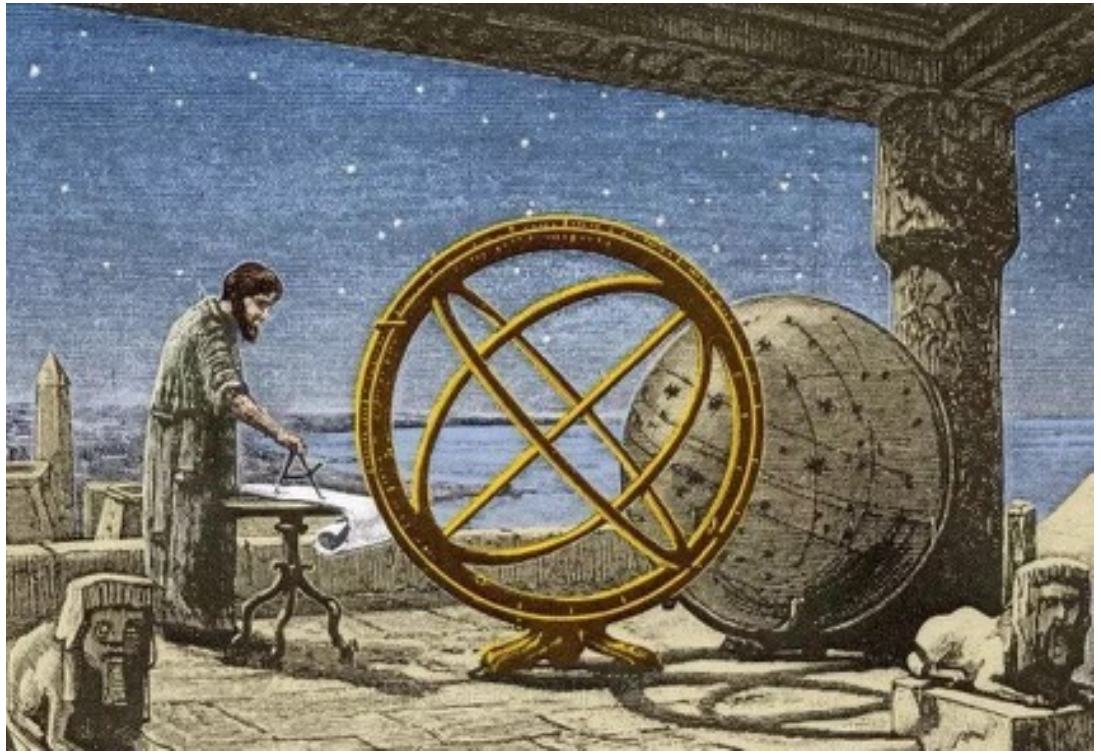


Encyclopedia of Its Time

- Mathematics
  - Geometry formulas
- Physics
  - Geometrical properties of the camera obscura
  - Optic and acoustic experiments (e.g., resonance)
- Astronomy
  - Calendar reform; improved astronomical instruments; explained solar and lunar eclipses
- Geology
  - Geographic North vs. Magnetic North
  - Land formation; climate change

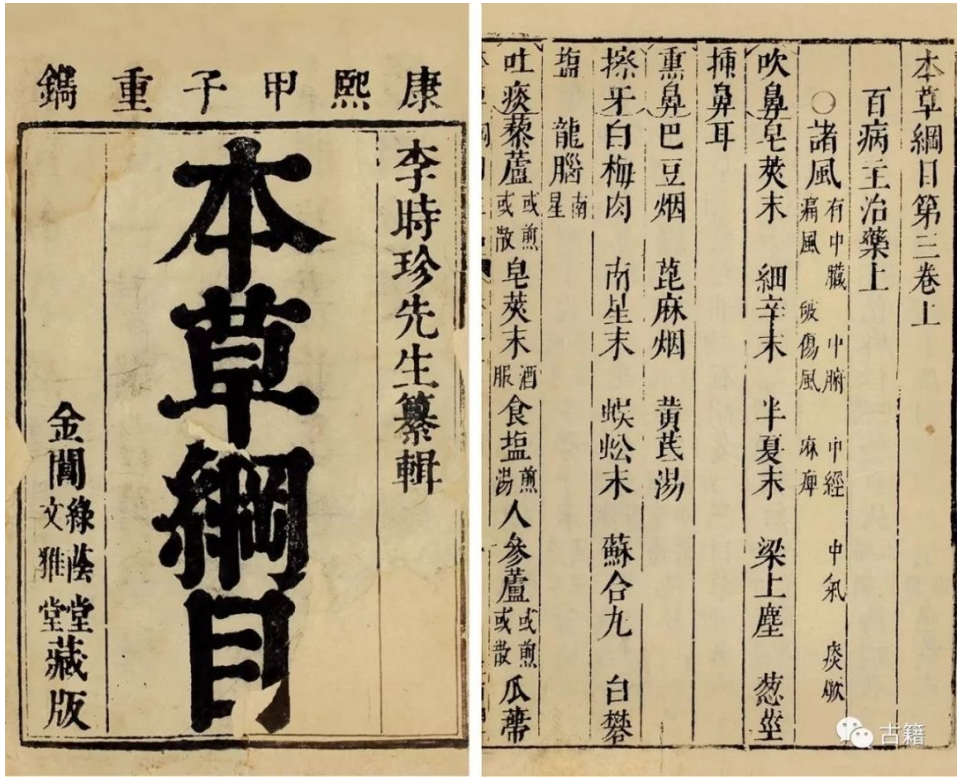


Shen Kuo as a Case Study

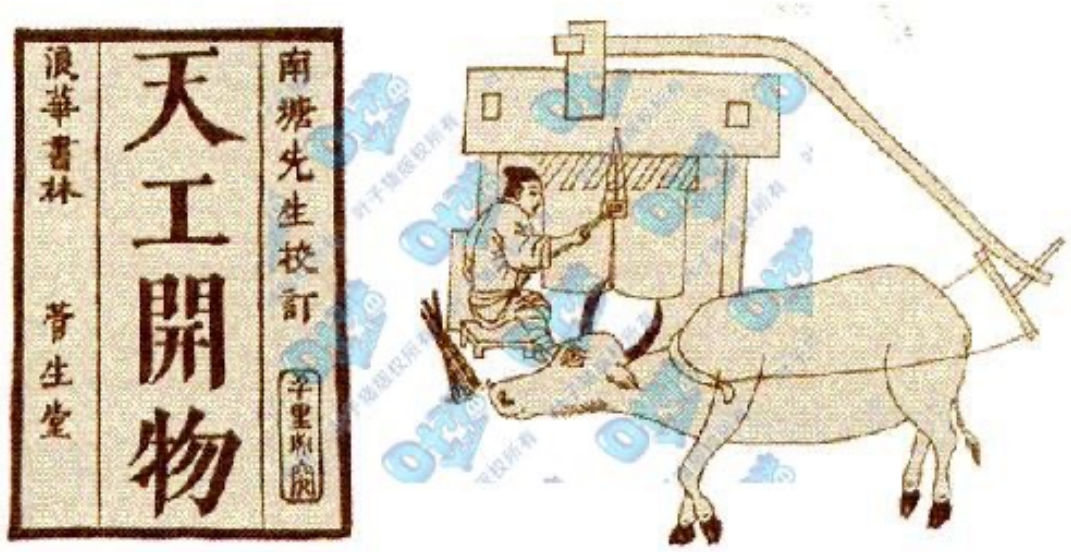


Other Examples

Compendium of Materia Medica

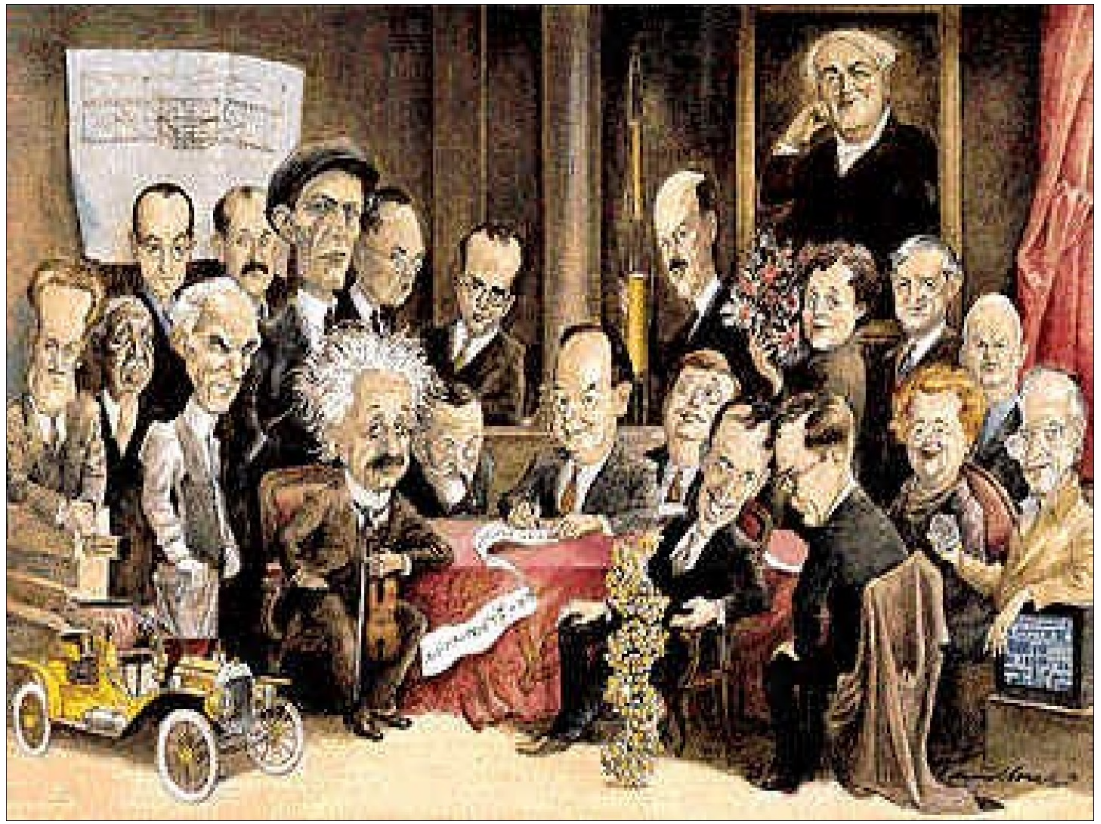


Exploitation of the Works of Nature



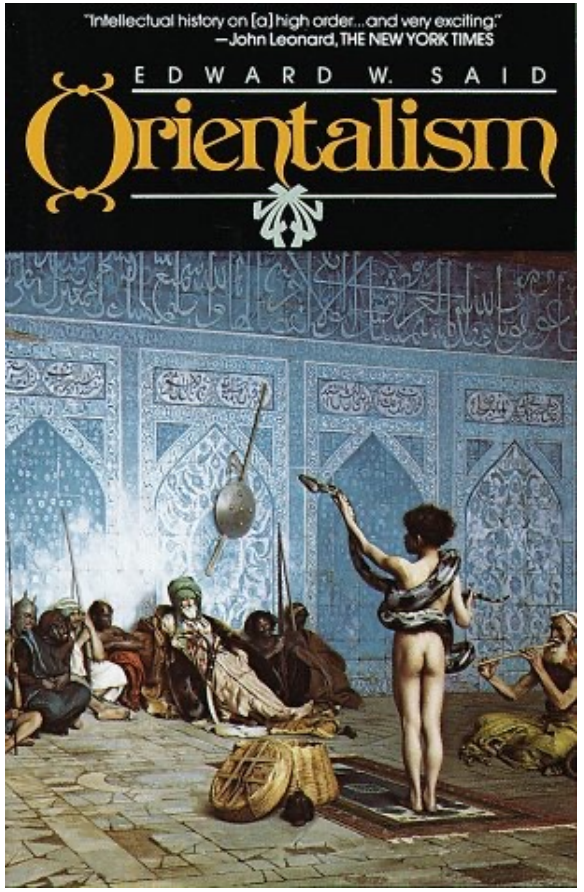
Internalism vs. Externalism

- The internal history of science (i.e. rational reconstruction) sees outside factors as having no determining effect on scientific theory
- The external history of science deals with features of the history of science that cannot be explained by science alone.



Orientalism

- The main agenda for the European colonizers was a European **representation** of the Orient.
- Orientalism is an idea, produced both in and about the West, that holds that the ‘East’ is the **other** that is inferior, backward, and uncivilized.
- The relationship between the Occident (West) and Orient (East) is a relationship of **power**, domination, and varying degrees of complex hegemony.



Jean-Léon Gérôme - The Snake Charmer

Science and Colonialism

Western science has long relied on the knowledge and exploitation of colonized peoples.

- Nature history
  - Botany
- Anthropology
- Geology
- Medicine
- Etc.