KNOWING THE WORLD

Globalizing the History of Science

History of Science Department – Harvard University

HS102v / HS100 Fall 2016
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Class Hours: Tues & Thurs 11-12 Emerson 305
Office Hours, Science Center 451 Tues 2-3 & Thurs 2-3

Course Description

This course provides undergraduate students with an introduction to the history of science by a taking a global approach to the subject. Such introductory courses have for decades remained focused on a Western Europe to North America narrative of the making of the modern world, utilizing some form of Scientific Revolution → Rise of Big Science story to organize them. But what happens when we open up the history of the natural sciences (plural) to a range of other peoples’ histories without subordinating them to the traditional narrative? How we might recast histories of the sciences from multiple perspectives is now one of the most exciting questions in the field, with no clear answer yet to emerge. And what might that nebulous and contested term “globalization” actually mean for the history of science and its relation to questions of technology, medicine and environment? Our class will raise new questions about knowing the world in the most expansive sense of that phrase although, as we shall see, the history of science was from its very origins ‘universally’ conceived, so the question of the global is not new but merely forgotten.
We will take a long-range view, focusing principally on early modern world history, while also examining key connections to the medieval and postcolonial phases of science and technology. Major themes include networks in the making of knowledge; processes of cultural mixture and translation; and the production of polemical claims to cultural and racial superiority based on science and technology – claims about who is modern and who is not, about who possesses merely local knowledge versus who can truly know the world. In so doing, we will aim to probe the deep narrative structures of the history of science – often left implicit – and examine core methodological issues working from both primary and secondary sources. In addition to exploring multiple scientific traditions, one further aim of the course is therefore auto-ethnographical: to begin to understand how “western science” itself has been defined in relation to “nonwestern” societies.

All Readings Available via Canvas

We will work from a large selection of essays and extracts listed on Canvas under Files: https://canvas.harvard.edu/courses/16948. There are no set books to purchase and no books on library reserve for this course. Lecture outlines will be posted to Canvas after relevant lectures for the purposes of review.

Electronics

In order to foster the best possible conditions for learning, thought and engagement the class policy is that no laptops, tablets, phones or other electronic devices are permitted in class. All students are asked to abide by this policy and help create a distraction-free environment – for which your cooperation is appreciated. Please bring paper (or a journal) and pen to take notes by hand. Writing notes by hand remains a highly effective method for translating class discussions into one’s own thoughts on any given subject – immediately beginning the process of writing and reflection that will generate questions for discussion, written assignments and exam answers.

Readings, Lectures, Weekly Discussions

Lectures combine discussions of the readings with attention to the larger themes of the course beyond any single reading. Students should complete readings before coming to class and are encouraged to review them afterwards. These are in general short to allow for more time for reflection. It is crucial to take some form of notes as you read, even brief ones, preferably annotations in which you begin to formulate your own thinking. Bear in mind the prompt under each unit heading as you read. Attendance of both lectures and discussions is expected.

In addition to lectures, there will be weekly discussion sections in smaller groups led by Teaching Fellows (days & times TBC). These sessions will serve to review and discuss the week’s work. Several will serve this aim by focusing on primary source material; there will be two visits to examine and discuss objects from the collection of historic scientific instruments in the Science Center, hosted by expert curators. Active participation is expected in these discussions, for which you should bring your notes on relevant readings or, especially in the case of primary source material, a hard copy of the assigned readings.

Office hours visits are warmly welcomed.
**Assignments**

10%  Attendance and contributions to discussions

10%  Short paper: Arabic/Islamic/Ottoman: 22 Sept

10%  Short paper: Americas: 6 Oct

20%  Take-home Midterm: East Asia and Course to Date: 20 Oct

10%  Short paper: Humboldtian Science: 17 Nov

40%  Final Exam: South Asia and Cumulative: schedule to be confirmed

**Note:** Short paper questions, based around primary source material, to be distributed in sequence and will be approximately 3 pages long @ 1.5 spacing (roughly 1000 words)

**Academic Integrity, University Policies and Regulations**

You should ensure that any written work you submit for evaluation is the result of your own thought and writing and that it reflects your own approach to the topic. You must also adhere to standard citation practices in this discipline and properly cite any books, articles, lectures, etc. that have helped you with your work. Note: you will not need to consult materials not on the syllabus to complete the assignments.

We uphold University policies and regulations on the observance of religious holidays; against sexual harassment, racial or ethnic discrimination; and the offer of assistance for students with disability issues. Students needing academic adjustments or accommodations because of a documented disability must present their Faculty Letter from the Accessible Education Office (AEO) and speak with the professor by the end of the second week of the term. All discussions will remain confidential, although Faculty are invited to contact AEO to discuss appropriate implementation. We also uphold University policy with respect to cases of plagiarism.

**SCHEDULE**

**PART 1: GLOBAL HISTORIES OF SCIENCE**

**Thurs 1 Sept  Introduction and Welcome**

In-class question: What should the aims of the history of science be? What periods and places should its narrative cover and how? In what ways should the history of science be understood as part of global history?

Tues 6 Sept  Canon: Scientific Revolution & Modern Western Science

What is the classic story of the history of science & who invented it? Is it a global story & why does it matter?


Arun Bala, The Dialogue of Civilizations in the Birth of Modern Science (Palgrave, 2006), pp. 7-20

Joseph Needham, Science and Civilization in China (Cambridge University Press, 1954), vol. 1: pp. 3-9 only (“preface”)

Thurs 8 Sept  Net-Work: From Genius to Labor

How does Latour define actor-network theory (ANT) to analyze science as a form of labor across distance via the notion of translation? How does ANT challenge classic notions about ‘modern science’ & what are its key advantages & shortcomings?


DISCUSSION  Elshakry, Bala, Latour

PART 2: ARABIC/ ISLAMIC/ OTTOMAN SCIENCES

Tues 13 Sept  Translations: Medieval Arabic/Islamic Sciences

How did knowledge of the natural world flourish in the Islamic Caliphates? How do McClellan-Dorn (the only authors to date of a “world history of history & technology”) and Al-Khalili (a British-Iraqi scientist and popular historian) translate medieval knowledges into modern terms? How do their narrative strategies differ?

James McClellan and Harold Dorn, Science and Technology in World History (Johns Hopkins University Press, 1999), pp. 103-115


Thurs 15 Sept  Polemics & Practitioners: Sciences in Caliphate Culture
What was the relationship between religion and science under the Caliphates? What are the key polemics in the Huff-Saliba exchange? What kind of ‘scientist’ was Jābir ibn Hayyān – what is the best way to describe what kind of practitioner he was – and who was ‘Geber’?


**DISCUSSION**

Jābir ibn Hayyān in context

**Tues 20 Sept**

**Knowing the World? Ottoman Geography (16th Century)**

To what extent were Ottoman geographers curious about the world beyond their own empire and what rides on this question? Compare the respective merits of Burns’ and Casale’s approach to Ottoman sciences.


Giancarlo Casale, *The Ottoman Age of Exploration* (Oxford UP, 2010), pp. 180-203

* SHORT PAPER on Caliphates/Ottomans DUE TH 22 SEPT *

**PART 3: AMERICA**

**Thurs 22 Sept**

**American Civilization before Columbus**

What were indigenous ways of knowing like in pre-contact Central and South America? What are the strengths and weaknesses of Montellano’s assessment of “empirical Aztec medicine”? What is the significance of “America’s first herbal”?

McClellan and Dorn, *Science and Technology in World History*, pp. 155-167


*An Aztec Herbal: The Classic Codex of 1552* [Codex Badianus], trans. and ed. William Gates (1939; Dover, 2000): xxxvii-lxiv & end-papers
DISCUSSION VISIT to Collection of Historical Scientific Instruments
[from part two] Middle Eastern Qibla-indicators, astrolabes, etc.

Tues 27 Sept Drinking Chocolate: Columbian Exchanges

How did Spanish colonization transform the natural environments of the Atlantic world? How does chocolate provide an example of exchange between Americans and Iberians – or is exchange the wrong narrative in the context of the ‘Conquest’? Compare the approach of Norton versus Montellano.

Alan Taylor, American Colonies (Penguin, 2001), pp. 39-49


Thurs 29 Sept Local Only? Creole-American Sciences

How did Spanish-Americans use indigenous sources to produce Creolized and Baroque forms of knowledge and what do these terms signify? What does Cañizares mean by “patriotic epistemology” and what are both the stakes and costs of vindicating Spanish and Creole sciences?


DISCUSSION Francisco Hernández, The Mexican Treasury: The Writings of Dr. Hernández, ed. Simon Varey (Stanford University Press, selections

* SHORT PAPER on Americas DUE TH OCT 6 *

PART 4: EAST ASIA

Tues 4 Oct Celestial Invention & Barbarian Outsiders: China

What was early modern China’s stance regarding the wider world and how did it organize its pursuit of natural knowledge? What is the significance of discussions of Chinese “inventiveness”? What does Xhang’s account of Xin suggest about Chinese attitudes to translating outsiders’ knowledge?

Qianlong Emperor’s Letter to King George III (1793)

McClellan and Dorn, Science and Technology in World History, pp. 117-140

**Thurs 6 Oct**

**Missionaries & Imperialists: Qing—Jesuit Relations**

*How did religion and science converge in Qing interactions with Jesuit missionaries, and how did the Qing aim to survey and govern their peoples in the context of their imperial territorial ambitions?*


**DISCUSSION**

Xhang, Hostetler

**Tues 11 Oct**

**Traffic and Go-Betweens: Tokugawa Japan**

*How does the ‘go-between’ help frame knowledge exchanges (compare with Latour on translation) and the theme of mediation in the history of science generally? What does the relationship between Kaempfer & Eisei in Japan suggest about how such mediations work – what seems local but also generalizable about their story?*


**Thurs 13 Oct**

**Rangaku: Dutch Machines Under Japanese Eyes**

*What does the reception of Dutch apparatus suggest about how to re-conceive cultural histories of ‘technology transfer’? How were Japanese-Dutch exchanges mediated both by specific apparatuses and also concepts of vision?*

DISCUSSION        Schaffer *et al.*, Kaempfer & Brown

* TAKE-HOME MIDTERM [E Asia + class-to-date] DUE TH 20 OCT *

PART 5: WESTERN EUROPE AND ITS COLONIES

Tues 18 Oct        Slave and Trade Networks: Colonial Botany

*How did trade make possible long-range sciences of botanical collecting and prospecting? What did trafficking in healing mean to enslaved Africans and to what extent can such meanings be recovered? How do the histories of Atlantic slavery and early modern science converge?*


Thurs 20 Oct        Zombie Classic: Europe’s “New Science”

*How did European understandings of world and cosmos change during the 17th century? In what ways is the classic scientific revolution undead – is this really true? What is the role of this narrative today?*

Burns, *Scientific Revolution in Global Perspective*, pp. 57-74


DISCUSSION        Parrish & Sweet on slavery;
                  Maria Sibylla Merian, Letter to Johann Volkammer, 1702

Tues 25 Oct        Global Newton
Why did Newton’s dependence on colonial networks come to be written up in terms of solitary genius? How does Schaffer define notions of “assay” & “information order”? How did the composition of the Principia resemble the workings of natural history – and what is the significance of this resemblance?


**Thurs 27 Oct**  
**Atlantic Franklin**

*How were Franklin’s electrical experiments linked to Newtonian natural philosophy in mid-20th century scholarship and with what implications for global histories of science? How did Atlantic networks enable Franklin’s experiments and the circulation of electrical knowledge more generally?*


**DISCUSSION**  
**Visit to Putnam Gallery @ Collection of Historical Scientific Instruments**  
Eighteenth-Century American scientific apparatus

**PART 6: FROM ORIENTALISM TO POSTCOLONIALISM**

**Tues 1 Nov**  
**Traditions of Fusion: India**

*What scientific and medical traditions flourished in India prior to and after European contact? How does Raj frame the interaction of different peoples and traditions in the story of L’empereur’s Jardin and what narrative of science & empire does it suggest?*

McClellan and Dorn, *Science and Technology in World History*, pp. 141-149


Thurs 3 Nov  Futures and Pasts: Orientalism

How did Orientalism cast European knowledge as the future and Indian knowledge as the past and why did this formulation take such aggressive form in the late 18th century? How does the case of Tafazzul exemplify the value of historical anthropologies of scientific translation? How, in other words, can we reconstruct the cultural meaning of translation from the perspective of multiple actors?


DISCUSSION  Raj, Schaffer
Tues 8 Nov  Orientalism, Continued

Schaffer, “Asiatic Enlightenments”

Thurs 10 Nov  1800: From Human Brokers to Scientific Instruments?

*Did the years around 1800, sometimes glossed as “the second scientific revolution,” witness the replacement of human brokers and mediators by new technologies? What was Humboldtian science and what did it imply about the role of both instruments and bodies for European knowledge of colonial territories?*

Review introduction to Schaffer, et al. (eds.), *The Brokered World*


Alexander von Humboldt, *Personal Narrative of a Journey to the Equinoctial Regions of the New Continent* (1814-1825): chap. 14 on electric eels

**DISCUSSION**  Go-betweens, Dettelbach, Humboldt

*SHORT PAPER on Humboldt & Science c. 1800 DUE TH 17 NOV*

Tues 15 Nov  Modern without Western? Postcolonialism

*What are the strengths and weaknesses of Anderson’s concept of postcolonial technoscience and the broader notion of alternative modernities? How did Gandhi and Nehru articulate visions of modernity and postcolonial nationhood for India based on science, medicine and technology? How was it desirable or possible to become modern without becoming western in their view?*


Thurs 17 Nov  Early Modern Paths Forward

**DISCUSSION**  Anderson, Prakash

Tues 22 & Thurs 24 Nov  No Classes – Thanksgiving Week

Tues 29 Nov  Review Class: TBC

Thurs 1 Dec  Course Conclusion and Final Exam Preview
* FINAL EXAM: Date TBC – SOUTH ASIA AND COURSE AS WHOLE *