

WorldCiv

February 12, 2018

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1 History 1310 - Science and Technology in World Civilization

Date: <2018-01-18 Thu> Lecturer: Driggers

1.1 Questions? :email: edriggers@tnitech.edu Office Hours:

T-Th: 4:30-6 What are office hours for?

- Problems reading and retaining information from lecture or textbook.
- Questions about grades, performance, participation, attendance, Etc

- Go over a test or paper
- Recommendations about improvement

2 Lecture 1 - What is the meaning of Science?

- Where is the use of science?
- Are there ways that science can be improperly?
- Is science value free?
- How do non-epistemic values figure into scientific investigations?
- What are the role of
- contextual values in science?
- Whose values will impact scientific work?

2.1 What do I mean by Values???

- Epistemic-Traditionally means values in the internal processes of science? Like measurement, quantification, ?Testable?
- Non-Epistemic-Means those not in the internal process, often effecting the conceptualization of questions and interpretation of ?data,? things like experiences, psychological worries, political values, ideas about race, gender &c.
- Objectivity is a changing standard throughout history!

2.2 Traditional Conception of Scientific Investigation

- Scientists:
 - Observe phenomena, Measure it, and Understand and make products; control phenomena; offer recommendations
- Who are scientists?
- What is deemed phenomena?
- What counts as proper measurement?

- Why are conclusions drawn, verified, and communicated to professionals and the public(s)?
- Is science objective?
 - What questions are we as society comfortable with asking?
 - What is the role of ethics in scientific investigations?

2.2.1 Nazi Medical Experimentation and the body

- Examples include, but not limited to:
 - High Altitude experiments
 - Drug experiments
 - Freezing water

2.2.2 Drug Testing and Children

- Case of anti-depressants and adolescents
- Re-branding of drugs for profit * Arthritis ##

2.2.3 Conception and understanding of life

- The "Sperm and Egg" Model Traditionally the woman's reproductive system was considered pretty passive, now we know that isn't the case. The woman's body is responsible for "weeding out" the weak of the Man's sperm

2.2.4 Interventions in the environment

+Iron sulfate (Fertilizer) dumping into ocean

3 Lecture 2 - Babylon and beyond

:Lecturer: Driggers :DATE: <2018-01-23 Tue>

3.1 Orientation:

- Survey of history of science, technology, medicine, etc. throughout greater Mesopotamian history
- General Details, geography, Etc.

3.2 TODO Theoretical Point: *Verify quotes...*

- where SHOULD we start this class? Most professors start much later, with the Greeks; look at history through their eyes
- The power of narrative
- Keep Reading!
- Problem with Near Eastern Studies - Far East Studies??? To have a proper *Near east study* you have to be *near east*, most aren't.

3.3 Geographic location:



Figure 1: Fertile Crescent of early agriculture

- Framed in Today's Geopolitical Landscape

3.4 Home to diverse groups of people

- Sumerians



Figure 2: More modern representation of area.

- Akkadians
- Persians
- Babylonians
- **Some of the oldest societies**

3.5 Hammurabi and his Code

- If any one finds runaway male or female slaves in the open country and bring them to their masters, the master of the slaves shall pay him two shekels of silver.
- If any one is committing a robbery and is caught, then he shall be put to death.

- If a tavern-keeper (feminine) does not accept corn according to gross weight in payment of a drink, but takes money, and the price of the drink is less than that of the corn, she shall be convicted and thrown into the water.
- If a son strike his father, his hands be hewn off.
- If a man knock out the teeth if his equal, his teeth shall be knocked out.
- If a barber, without the knowledge of his master, but the sign of a slave on a slave not to be sold, the hands of the barber shall be cut off.
- If a slave says to his master: "You are not my master" - if they convict him his master shall cut off his ear.

3.6 Timeline

- Goes back to 3500 BC
- Civilization arose around present day Iraq
- Communicated throughout a written language: cuneiform

3.7 Literature: *The Epic of Gilgamesh*

- Written around 2100 BC
- About 12 books, or about 5 epic poems
- He saw the Secret, discovered the Hidden, he brought information of (the time) before the Flood. He went on a distance journey, pushing himself to exhaustion, but then was brought peace (1.5-8)

3.8 Technological Achievement

- Metalworking (Bronze, Copper, Gold, and eventually iron)
- Glass making
- Textile Weaving
- Water Storage/control



Figure 3: Cuneiform tablet writing

3.8.1 Walls of Babylon *Part of Seven Wonder*

Provides great security, allows for focus on other aspects of life.

3.8.2 TODO Archimedes Screw: Verify location of possible garden's location with Driggers.

Some scholars believe that this was how the supposed *hanging gardens* were irrigated.

3.8.3 Assyrian Pottery

Allows travel to further distances away from immediate water access.

3.8.4 Astronomy - Wrote down observations

This allows us to *track* backwards in time and *line up* our time line, and understandings with theirs.



Figure 4: Wall of Babylon

3.8.5 Mathematics

Mostly derived from needs of scribes, and clerks, doing tax calculations, record keeping was also important.

3.8.6 Medicine

Scholars of early medicine started taking *notes* about what methods worked, and those that didn't

4 TODO Lecture 3 Ancient Egypt: Finish updating this info.

:DATE: <2018-01-25 Thu>

4.1 Objectives

- Survey of science, medicine, and technology in Ancient Egypt
- Begin out exploration of the three subjects, mention above in world cultures

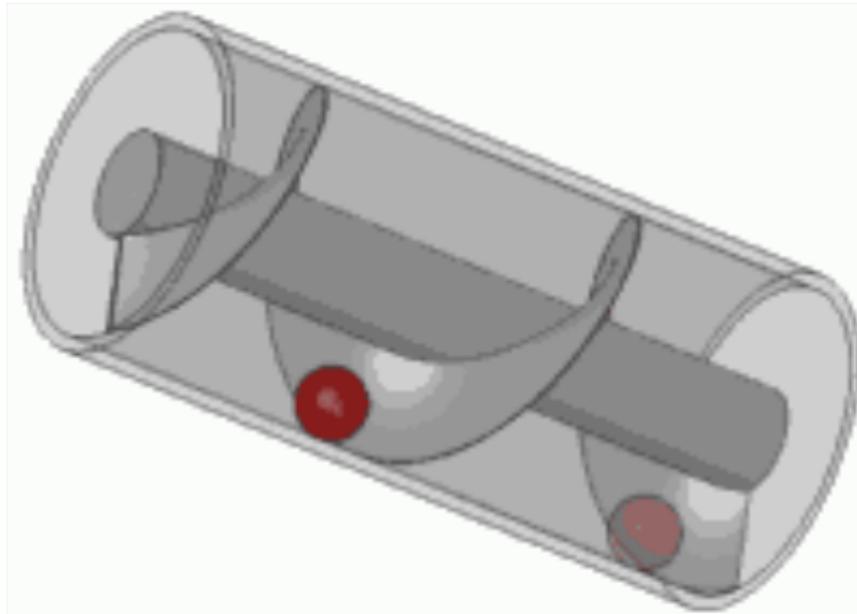


Figure 5: Archimedes Screw

- Briefly discuss *Time*

4.2 Opening Vignette

I have a Mining region of the sovereign
I had gown down to the sea
In a board 120 cubits long
40 cubits broad
in which there were 120 sailors for the choicest of Egypt...
before it came they could fortell a gale
a storm before it existed

From A Tale of the Shipwrecked Sailor (Maybe from 2500 BC)

- Know that person was fairly intelligent.



Figure 6: Hanging Gardens

4.3 Thinking about time

Understanding Timelines

323 BC – Death of Alexander the Great 0 120 AD – Roman Empire at its height

Now we can use the line to locate dates and visualize their place in “history”

{align

- 323 BC Death of Alexander the Great
- 0



Figure 7: Possible location of gardens

- 120 AD Roman Empire at its height

4.3.1 Gregorian Calendar

- Introduced in 1582
- Pope Gregory XIII
- Modification of Julian Calendar
 - Julian Calendar introduced by Julius Caesar as modification of the current Roman Calendar, after Rome conquered Egypt
 - 365 Days, with a leap year every four years in February
 - 10 Days were dropped to make the celebration of Easter (usually at the Vernal Equinox) with the historical time of celebration in the Early Christian Church
 - More accurate calculation for leap year* -Driggers talks about this at length. Mainly about why we removed the 10 days from the location near Easter.

| | | | | | | | | | | | |
|----|----|----|-----|----|------|----|-------|----|-----|----|-----|
| 1 | ↷ | 11 | ◁↷ | 21 | ◁◁↷ | 31 | ◁◁◁↷ | 41 | ↶↷ | 51 | ↶↷ |
| 2 | ↶ | 12 | ◁↶ | 22 | ◁◁↶ | 32 | ◁◁◁↶ | 42 | ↶↶ | 52 | ↶↶ |
| 3 | ↶↶ | 13 | ◁↶↶ | 23 | ◁◁↶↶ | 33 | ◁◁◁↶↶ | 43 | ↶↶↶ | 53 | ↶↶↶ |
| 4 | ↶↶ | 14 | ◁↶↶ | 24 | ◁◁↶↶ | 34 | ◁◁◁↶↶ | 44 | ↶↶↶ | 54 | ↶↶↶ |
| 5 | ↶↶ | 15 | ◁↶↶ | 25 | ◁◁↶↶ | 35 | ◁◁◁↶↶ | 45 | ↶↶↶ | 55 | ↶↶↶ |
| 6 | ↶↶ | 16 | ◁↶↶ | 26 | ◁◁↶↶ | 36 | ◁◁◁↶↶ | 46 | ↶↶↶ | 56 | ↶↶↶ |
| 7 | ↶↶ | 17 | ◁↶↶ | 27 | ◁◁↶↶ | 37 | ◁◁◁↶↶ | 47 | ↶↶↶ | 57 | ↶↶↶ |
| 8 | ↶↶ | 18 | ◁↶↶ | 28 | ◁◁↶↶ | 38 | ◁◁◁↶↶ | 48 | ↶↶↶ | 58 | ↶↶↶ |
| 9 | ↶↶ | 19 | ◁↶↶ | 29 | ◁◁↶↶ | 39 | ◁◁◁↶↶ | 49 | ↶↶↶ | 59 | ↶↶↶ |
| 10 | ↶ | 20 | ◁ | 30 | ◁◁ | 40 | ↶ | 50 | ↶ | | |

Figure 8: Cuneiform Mathematics symbols.

4.3.2 Religious Traditions and Time

- For instance, it's 5776 in teh Jewish Tradition
 - Traditional Lunar-Solar Calendar (follow moon phases + solar year)
 - From their makring of creatio
 - Does not mean taht even Orthodox Jews think that the earth is only about 6,000 years old (**not young each creationist**) ???
- The current Islamic year is 1437 AH. In the year of HIjra
 - Hijra (Mohammed flees from Mecca to MEdina; run out by political power of hte city)
 - Lunar Calendar 354 days
 - Starts teh year 622 CE year of Hijra

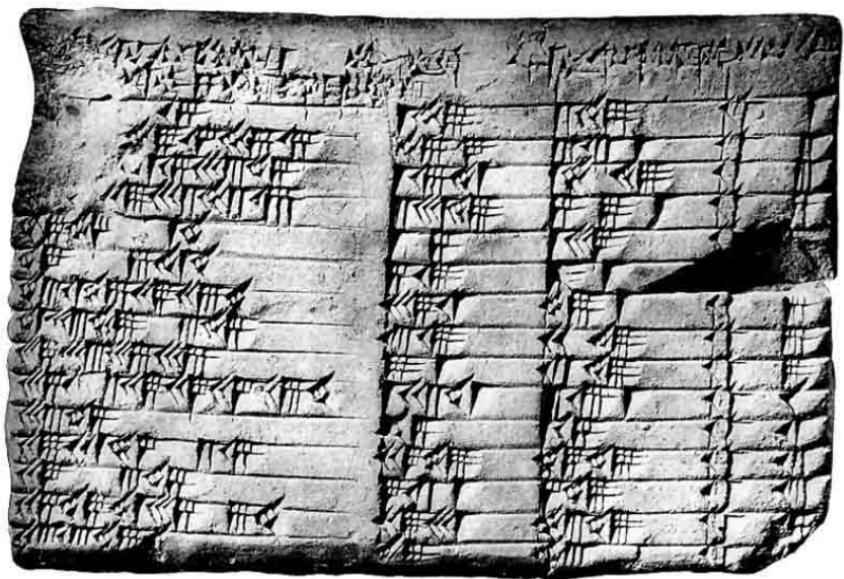


Figure 9: Accounting Records

4.3.3 Egyptian Calendar



Broken down, mainly followed the exceptionally regular flooding of the Nile.

| The Civil Ancient Egyptian Calendar | | | | | |
|-------------------------------------|--------------------------------|---------------------|--------------------------------------|----------|------------------------|
| Nº | Time units | Name in hieroglyphs | (New Kingdom) Transliteration | Time | Correspondence |
| 1 | Year | | (rnp.t) Renpet | 365 days | 3 Seasons 12 months |
| 1 | Month | | (abd) Abed | 30 days | 3 weeks of 10 days |
| 1 | Day | | (hrw) heru | 24 hours | |
| 1 | Hour | | (wnw.t) unut | | 1/24 of the day |
| 1 ^a | Season AKHET | | (ahet) Akhet | 4 months | Flood |
| I | 1 st month of Akhet | | (dhwt) Dyehuty | 30 days | From 19/07 to 17/08 |
| II | 2 nd month of Akhet | | (pa-n-ip.t) Paenipat | 30 days | From 18/08 to 16/09 |
| III | 3 rd month of Akhet | | (hwt-hawr) Hut-hor | 30 days | From 17/09 to 16/10 |
| IV | 4 th month of Akhet | | (ka-hr-ka) Kahorka | 30 days | From 17/10 to 15/11 |
| 2 ^a | Season PERET | | (prt) Peret | 4 months | Sowing |
| V | 1 st month of Peret | | (ta-'b) Ta-Aabet | 30 days | From 16/11 to 15/12 |
| VI | 2 nd month of Peret | | (mhyrt) Pa-en-Mejer | 30 days | from 16/12 to 14/01 |
| VII | 3 rd month of Peret | | (pa-n-amn-htp.w) Pa-en-Amon-Hetep | 30 days | From 15/01 to 13/02 |
| VIII | 4 th month of Peret | | (pa-n-rmn.t) Pa-en-Renunet | 30 days | From 14/02 to 15/03 |
| 3 ^a | Season SHEMU | | (šmw) Shemu | 4 months | Harvest |
| IX | 1 st month of Shemu | | (pa-n-hns.w) Pa-en-Jonsu | 30 days | From 16/03 to 14/04 |
| X | 2 nd month of Shemu | | (pa-n-in.t) Pa-en-Enet | 30 days | From 15/04 to 14/05 |
| XI | 3 rd month of Shemu | | (ipip) Apep | 30 days | From 15/05 to 13/06 |
| XII | 4 th month of Shemu | | (mšw-r') Mesut-Ra | 30 days | From 14/06 to 13/07 |
| | Epagómenos | Mesut-Necheru | (hr(j)w-rnpt) Heru-Renpet | 5 days | From 14/07 to 18/07 |

La Vía Asociación Bíblica internacional

Common Era and AFter Common Era

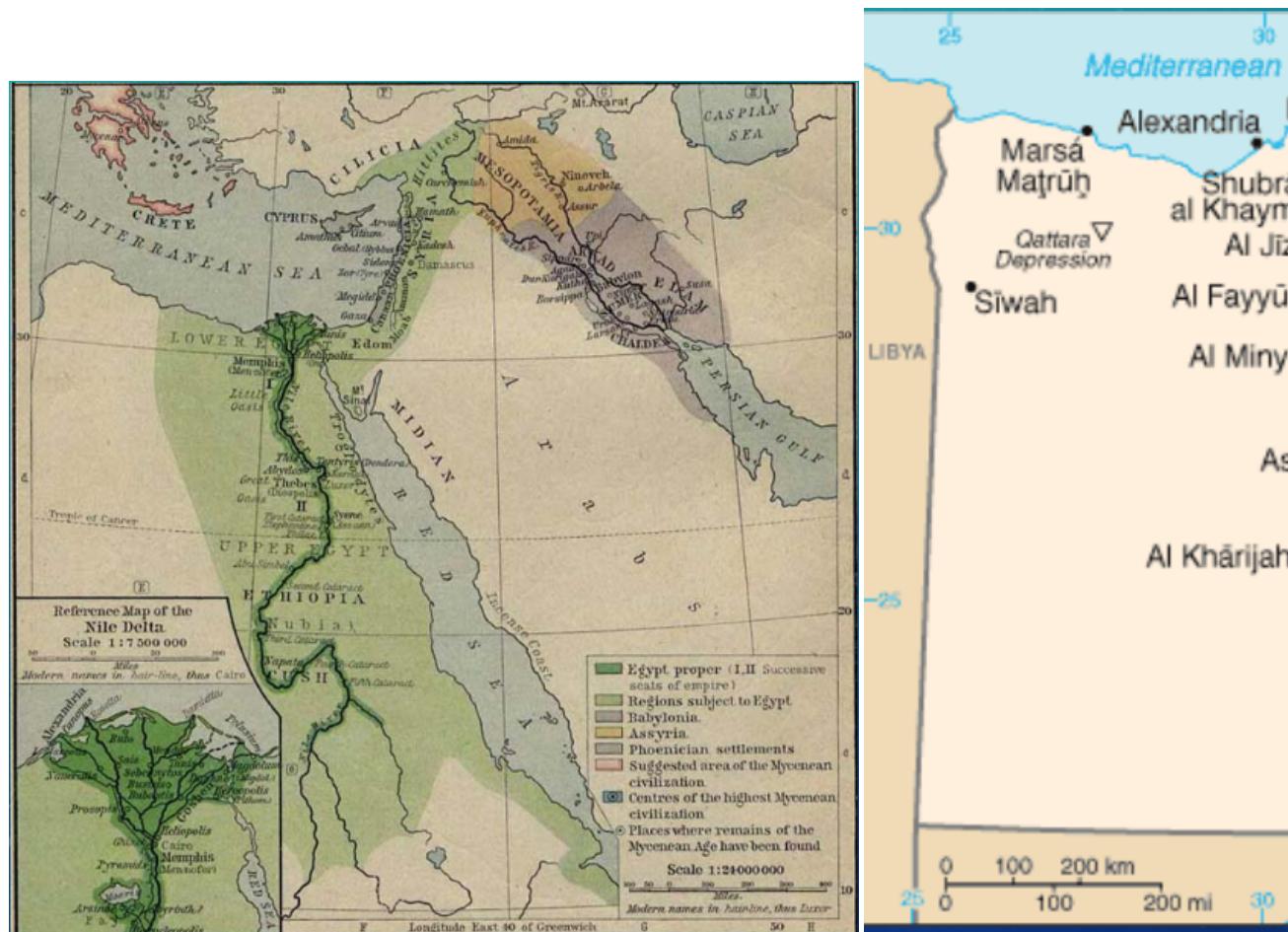
- BCE "Before the common era" used interchangably with B.C or "Before Christ"
- CE / ACE "Common Era" used interchangably with A.D. Anno domini, in the year of our Lord

4.4 Continuation of discussion from earlier 4.2

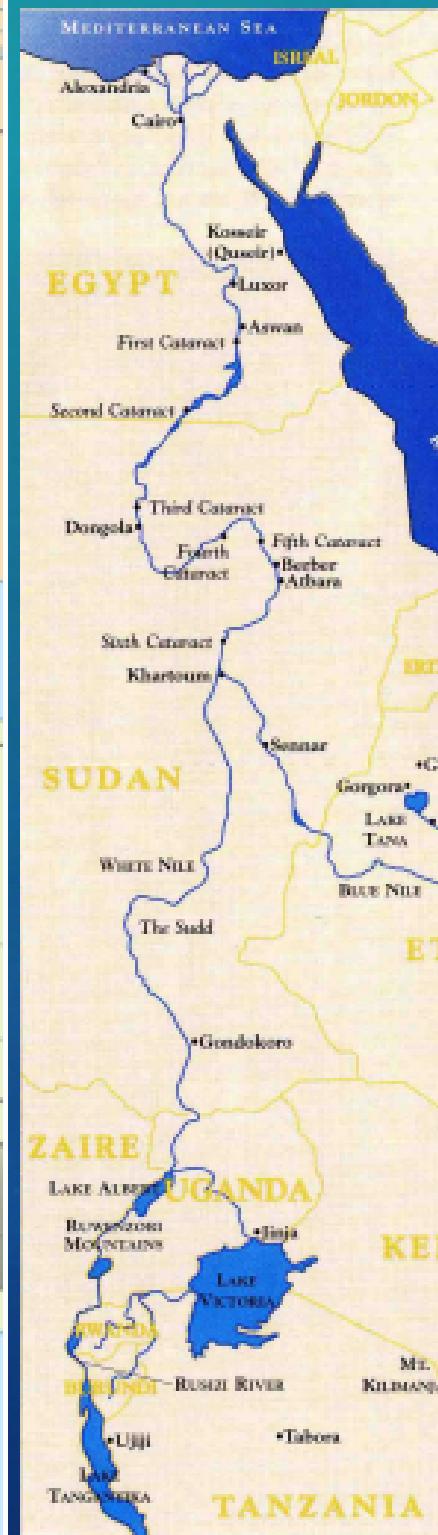
What does this "Primary Source" tell us about Egyptian Society?

- What's a cubit?
 - Length of measurement, the average man's forarm
- Ships?
 - Not sure what he wanted here...
- Knowledge that this primary source conveys?
- How does this have a bearing on science and technological development? Not a clue.....

4.5 Background of Ancient Egypt



4.5.1 The Nile river (The Life line of Egypt)



- Discussion of the Nile
 - General Information/History about the nile
 - Egypt's and its close relationship with the Nile
 - Religion and the Nile

4.5.2 Advanced Plant knowledge



Example Cyperus Papyrus - Essentially paper.

4.5.3 Agricultieral Success

- What did egypions grow to eat
- And Drink
- Examples of Food
 - Beer (Barley and Emmer) Driggers says this was used mainly to preserve the landowner's grain; however, this misses a crucial aspect of water preservation. This might not have been a problem for folks in the Nile, but beer was crucial in sailing endeavors.
 - Wine (Grapes) grains preservation.

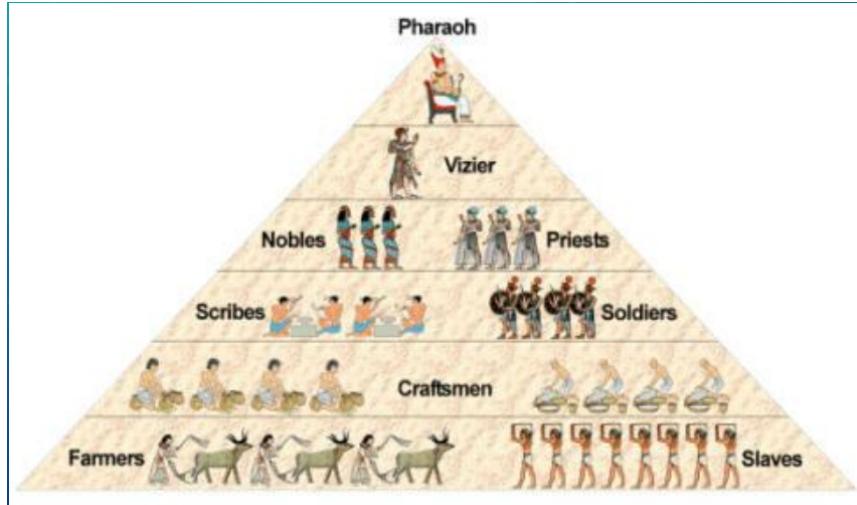
- Spices
 - * Garlic, aniseed **the seed of the anise, used in cooking and herbal medicine.**, cinnamon, corriander, cumin, dill, fennel, marjoram, rosemary, and thyme (BUT NO PEP-PER_?)
- Meats
 - * Cattle, Quail, –hens raised for eggs MUCH later; dicks, geese)
- Fish
 - * Caught with net, spears, traps, and hooks *Seems like modern day fishing no????*
- Veggies
 - * beans, cabbage, celery –worst food in world!; chickpeas, peas, onions, lentils
- Fruits
 - * apples, dates, figs, jujubes, olives, pomegranates, melons
- Sweets/Sweetening Agents
 - * Dates, fig, honey

4.6 Egyptians at Sea

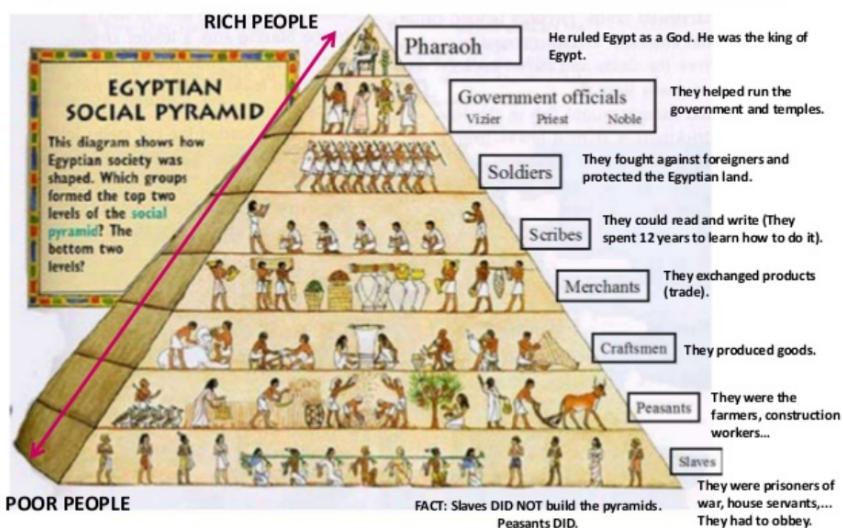
No modern peoples are sure if this lighthouse ever really existed.

4.7 Egyptain Civilization and Society (Organization)

This "layout" is much like fudelism in the mideival period in Europe.



ANCIENT EGYPTIAN SOCIETY



4.8 Pharaoh

- Description of Pharaoh
- Short discussion of the Expansion of Egyptian Power
- Divine Rule

4.8.1 Religion (Ra)

Some scholars would argue that Egyptians were monotheists. The argument would be along the lines of Ra was so important all the other gods just faded away. Pharaoh was the embodiment of Ra. when PH died Ra would *reincarnate* as the next PH in line.



4.8.2 Religious tradition "the book of the dead"

Didn't discuss the book, as I remember.

Mainly discussed how when you die your heart is placed on a scale alongside a feather.

5 TODO Lecture 4

:DATE: <2018-01-25 Thu>

6 TODO Lecture 5

:DATE: <2018-02-01 Thu>

7 TODO Lecture 6 - Europe in the Middle Ages; Natural Philosophy: Remind driggers about quadrium

:Date: <2018-02-06 Tue>

7.1 middle ages

Two contributions medieval west gives us is Universities, and cathedrals

:EXAM: <2018-02-15 Tue>

Driggers Dressed in grad robes.

- Hat like what was worn
 - used to collect money after each lecture approximately \$20
- Robe like Geneva robe, similar to priests
- Colors represent

Masters means to teach, or read

Mace of university symbolic of power, president wears medallion to illustrate his power.

Oxford and Cambridge don't give out paper, they give out a metaphysical degree, they place hands on the graduate.

Doctorate comes from medieval period.

Coat of arms comes from this era also.

- Back rows similar to today's lectures.

7.2 Introduction

5th - 15th century

- philosophy
- medicine
- society
- education in europe

7.3 Timeline

[[]] Organized this way because we look back, and organize history.// Historians place order due to trends, sometimes they get it wrong.

During this time in Europe when bad things: wars, plagues - Golden age of Islam...

- Collapse of W. Rome (372-410 CE)
- Early middle ages (5th to 10th Century? CE)
- High Middle ages (1001-1300 CE)

Renaissance

- Late middle ages (1301-1500? CE)

As Islamic civilization continued golden age, they have more emirates, one in Spain.

Charlemagne main grandchild of person who stops advance of *moors*
byzantine empire expands

Western Europe has de urbanization problems, city governments abandoned.
... Russians start to get organized

7.4 Medieval Times

- social order
- towns/urban spaces like
- religious life and science?
- Scientific production of med uro.

During this time in Europe when bad things: wars, plagues - Golden age of Islam... due to trends, sometimes they get it wrong.

7.4.1 Zombie Apocalypse

What would happen if we had to abandon the city, where would we go?
Go to manors and agree to work in exchange for essentially food

7.4.2 Feudalism

We don't really know where feudalism started. Most think England, maybe w. France.

- **Nobles** - highest is king - Obligated to defend other two groups can become knight groups
- **Priests** - Praying for everyone all the time. ?Pray for people who might be in purgatory?
- **Serfs** - People doing the work.

7.5 Scholarly life

1050 and the return of "classical learning"
The importance of Aristotle v. Plato in Medieval Europe

- Aristotle most important, however, Plato was taught...?

- What is neo-platonism?

Plato was very abstract and hard to translate. \would say Jesus was a neo-platonist

If western translators had done more of Plato's works the chances are good that we would see more of his works in this time period

- Medieval Universities

- Curriculum and instruction

Materials/ideas: 7 labors

* trivium help make an argument rhetoric type instruction.

You know enough to go on.

* quadrivium

- Scholasticism

* knowledge is publishing papers. disputation, debate around an issue - the nature of something.

* More of a method than anything.

7.5.1 Roger bacon

Medieval professor - forms basis of scientific method. Makes artificial rainbow and freaks out students.

7.5.2 William of Ockham - Ockham's razor.

7.5.3 Albert Magnus *Albert the great*

Falconry regarded as scholar priest and professor

7.5.4 Hildegard of Bingen Nun

Outlier example of intellectual thought done by women

- Creates a lot of music *like a Renascence women*
- Has a medical garden
- publishes medical material

7.5.5 Cristine Depuzon?

Wrote book about all women city state

7.5.6 Thomas Aquinas

- Explains how different substances come together to form new material.
- Aquinas Cosmos
 - Dante's inferno arises from this.

7.6 Medieval engineering

- Heavy plows
- Trebuchets
- crossbow
- could think of castles
- Artificial power - wind mills

7.7 Music

hurdi gurdi???

7.8 Medieval medicine

- Black Death
 - Some people think this was an oldschool ebola Sutonic virus

7.8.1 Old theory

Rats on ships is how the diseases spread.

- Physicians and the plague
- Thought maybe astrological upsets caused the plagues.
- serfs were able to negotiate for higher pay since so many people died, there weren't many people around to work.

+Chronicles of the plague

8 TODO Lecture 7 - test bank, Golden age of Islamic philosophy: email driggers about magic early Tuesday morning.

:DATE: <2018-02-08 Thu>

8.1 What to expect on test.

$$40^*2 = 80\%$$

- m.c.
- T/F, if a little false, all the way false...
- Fill in the blank

1 essay @ 20 pt

- Args
- 3 P min
- be detailed
- Don't care about grammar for test essay.

8.2 Outline

- historical case study
- transition to byzantine empires
- ...

8.3 Contextualizing Historical Terms

- Ancient Greek (500 - 336 BC)
- Golden Age of Islamic philosophy (~ 700CE-1300 BCE)
- The renaissance of eastern and western Europe()

8.4 Islamic era maps 1

Islamic era began after mohammed.

High era really ended after conqueror moved in (1497)???

Battle of toors charles montel stops military campain of moors...

Mongols are busy during this time, Baghdad sacked during this time.

8.5 Islamic era map 2

arrested dev of middle Europe?

8.6 Scientific terms

8.7 Cities of golden age

- Irrigation and Prosperity//
- Relative city pops: really high

8.8 Hydraulic Tech - The qanat

- Gently sloping tunnels, moves water from natural aquifers.
- These had dams

8.9 Transmission of tech

- Literate society

This was due to the expectation of each individual reading the quaran every day.

- Many uses of scientific instruments
 - Case of astrolabe

Astrolabe can do over 300 types of calculations.

- Used to calculate direction of Mecca
- Used to determine time of prayer.

Greeks/someone used to forecast horoscopes.

8.10 Houses of wisdom

Literal translation factories in city of Baghdad

- Receive patronage from rulers of city
- Functioned as library for personal consumption, although typically he would allow other scholars access.

Also has intellectual effect

- While working on Greek translators, these translators come up with idea of science and other Greek aspects make up base for good knowledge.

Able to translate Greek texts to their religious texts.

8.11 Hunaynn ibn Ishaq (Latin Iohannities) you/yoo knight us

contributing member of Islamic society.
fluent in Greek Syriac ???

Translated Greek into Syriac and his family translated into Arabic.

8.12 Avicenna - Ibin Sinda

- natural philosopher and a physician
- wrote book of healing and canon of medicine

comes from present day Iran, understood Aristotle very well.

Saves life of one of royals, allowed to access their library, spends rest of days reflecting on these Greek texts.

8.12.1 Book of healing

11th century

- more of encyclopedia: why things are the way they are.//

Criticized and interpreted Aristotle and made writings on this. Also became his own authority.

8.12.2 Canon of medicine

Synthesis of Greek medicine ideas, and folk Arabic medicine, also poems and thoughts on medicine.

has ideas about incorporating feelings into humors.

Rose water had healing power, or so thought.

Most middle westerners liked him, he sands down Aristotle

8.13 Medicine/Biology and Images 2

How do you convey images of body, when you have prohibitions on that type of study of body, not allowed to capture essence of a person's body//

Stuff was written to appear as words and shapes.

8.14

No structure... Developed trig algebra, our numerals

8.15 Mosque

Facilitated learning

8.16 observatories

8.17 Midrasas? - law centers

8.18 TODO Hospitals: The medieval Islamic hospital in lib

Christian physicians were astonished to see female healers.

8.19 Toledo, Spain

Man religions worked together on translations

Archbishop was able to get scholars of different backgrounds to work together.

reconquist redefines boundaries of Islamic society.

- After this a lot of the texts are left behind, and invading peoples re-discover the ancient Greek texts.

Erasure of middle eastern contribution to science from Islamic society

8.20 Byzantine empire - Byzantium 2

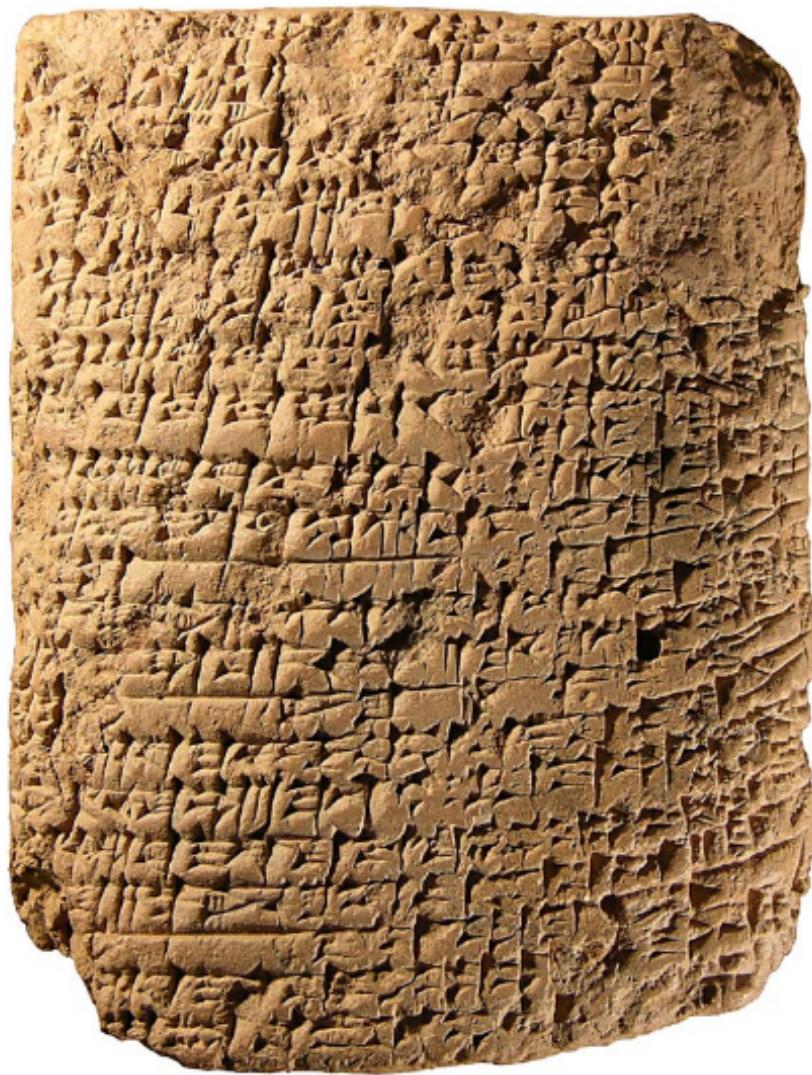
Mostly spoke Greek here.// new streams of Latin development

Roman Catholic Church uses Latin

Orthodox church use Greek

Byz's loved horse races, like today's football.

8.21 Crusades have huge affects, we don't really get into it.....yet.



MS 2670

Diagnoses of medical conditions with prognoses of the outcome.
Babylonia, ca. 1900-1700 BC

Figure 10: Medical Records



Figure 11: Lighthouse of Alexandria: Potentially one of the seven wonders