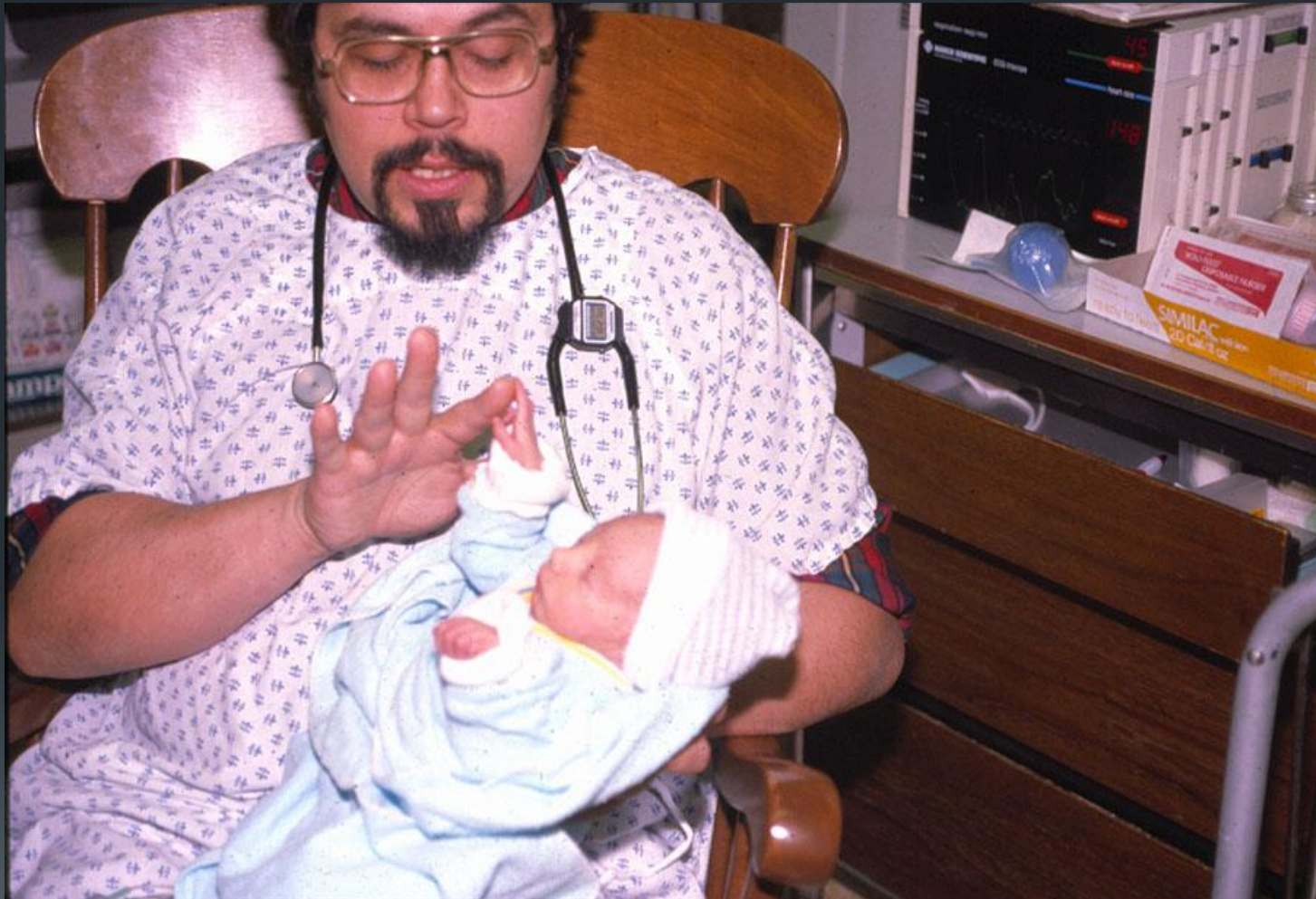
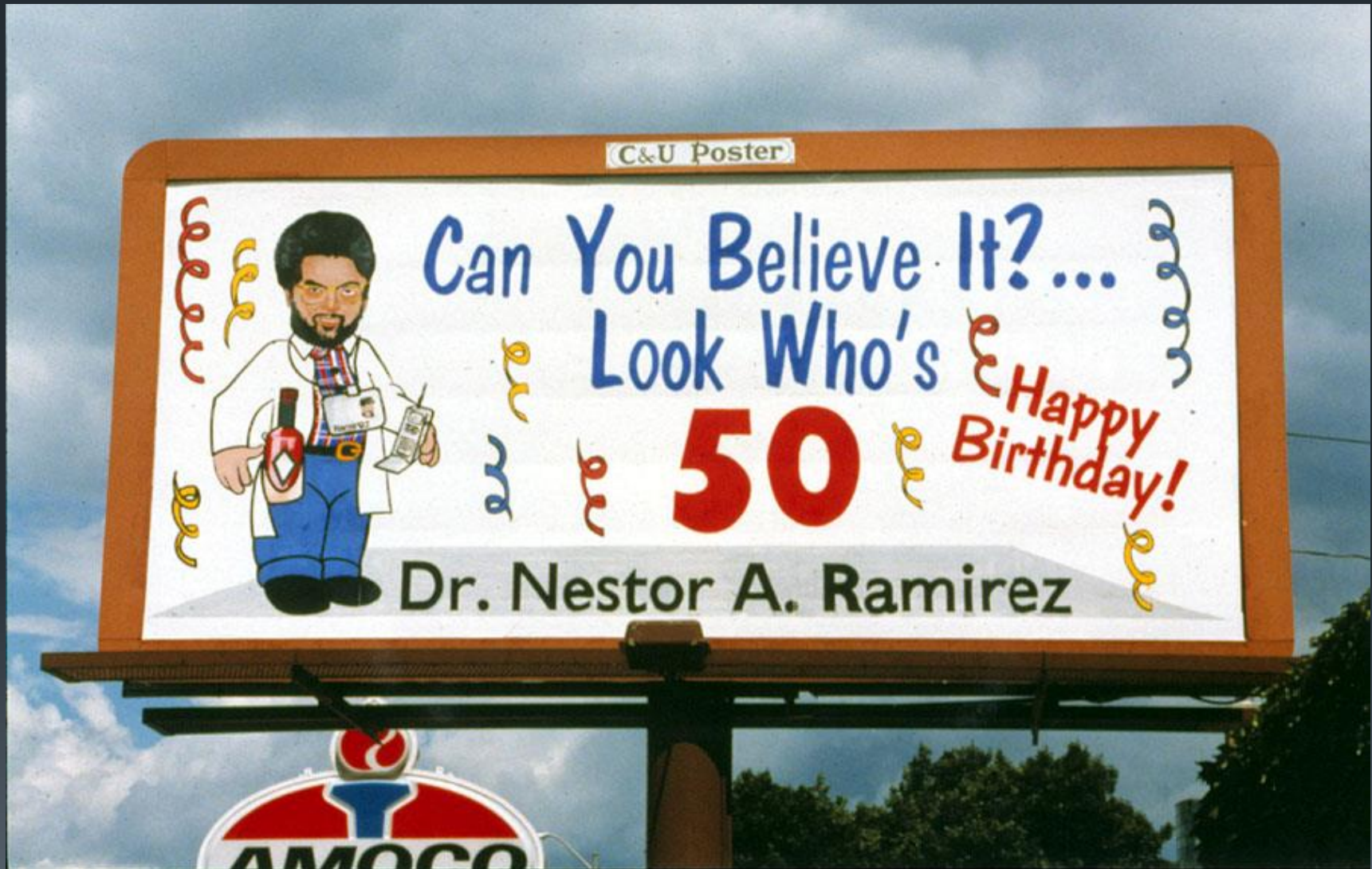


Giving TLC in 1986



A gift from my Nurses: 1998



The Good

4

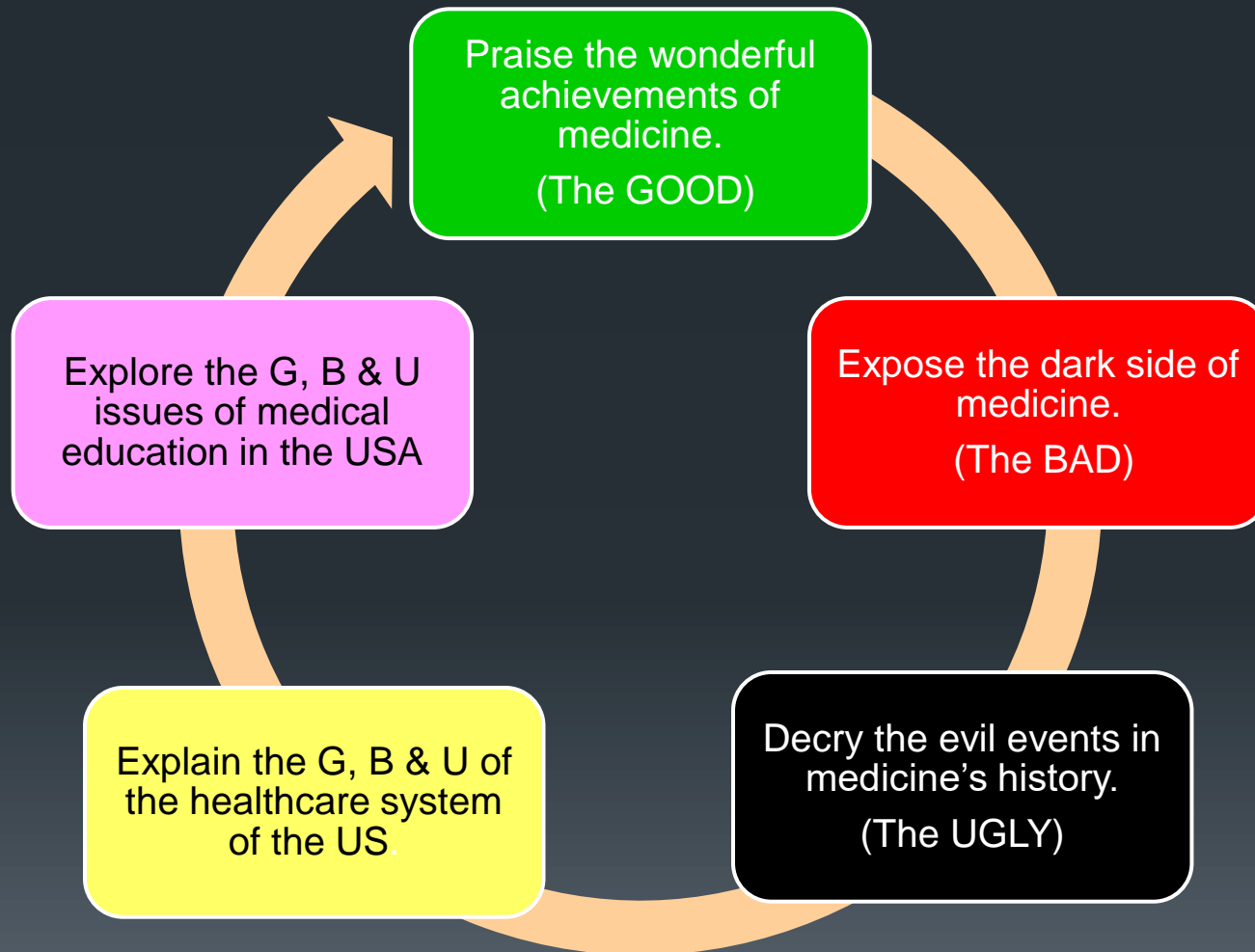
The Bad

The Ugly

Olli Spring 2020 Semester
January 28 to March 17

Néstor A. Ramírez, MD, MPH, FAAP

Course Objectives



Overview of Course

- Session 1: History of Medicine as an Art and Science.
- Session 2: Invention of instruments, tools, diagnostic procedures.
- Session 3 : Rivalries between scientists and/or their countries.
- Session 4 : Role of women and minorities in Medicine.
- Session 5 : Social and medical behavior toward certain diseases.
- Session 6 : Human medical experimentation throughout history.
- Session 7 : US Healthcare system and international comparison.
- Session 8 : US Medical education system: basis, issues, problems

Brief Timeline of Medicine (1)

- 10,000 BC: Witch Doctors
- 6,500 BC: Trephining
- 4,000 BC : Uroscopy
- 3,000 BC : Sutures
- 2,500 BC : Ayurveda
- 2,000 BC : Bloodletting
- 400 BC : Hippocratic Oath
- 190 BC: Galenic Writings
- 1025 : Avicenna's *Cannon*
- 1510 : Leonardo's Drawings
- 1527: Paracelsus
- 1543: Vesalius
- 1753 : Treatment of Scurvy
- 1785 : Digitalis
- 1798 : Smallpox Vaccine
- 1816 : Laennec Stethoscope
- 1846 : General Anesthesia
- 1847 : AMA founded

Brief Timeline of Medicine (2)

- 1854 : John Snow & Cholera
- 1862 : Pasteur's Germ Theory
- 1882 : Koch Tuberculosis
- 1894 : Bubonic Plague cause
- 1897 : Malaria cause
- 1899 : Aspirin
- 1922 : Insulin
- 1928 : Penicillin
- 1935 : Sulfa drugs
- 1937 : Yellow Fever cause
- 1944 : Blalock-Taussig shunt
- 1947: Informed Consent
- 1951 : Tobacco & Lung Cancer
- 1962 : Thalidomide
- 1962 : Cryonics
- 1963 : Lung, liver transplants
- 1967 : Heart transplant
- 1978 : First IVF baby
- 1990 : Gene therapy
- 2003 : Human Genome



Session 1: January 28, 2020

History of Medicine as an Art and Science

Medicine: Art or Science?

- The art of medicine exists since the time of primitive medicine.
- The science of medicine changes with progress and changing concepts from time to time.
- So, the art of medicine: compassion, care, sympathy etc., are the building blocks of the practice of the science of medicine.
- Medicine is both an art and a science.
- Both are interdependent and inseparable, just like two sides of a coin.

On the Evolution of Science

Half of what is true today will be proven to be incorrect in the next five years. Unfortunately we don't know which half that is going to be. ¹

1. Lakshmipati, 2003

What is Disease?



An imbalance within the body or of the body and its environment.

Health, Well-Being and Happiness

A threat to the life and well-being of the individual regardless of the cause.



Primitive and Prehistoric Medicine (1)

- Dread of disease, potential and actual.
- Pain of acute complaints and long-term ailments.
- **Fear of mortality.**

Universality of mankind's concerns:



- Shamans, healers, wisdom of the elders.
- Remedies from natural plants.
- Use of available resources: stones, metals, animals.

All societies have fought disease and tried to manage it



- Why me?
- Religion and philosophy help cope with illness in mind and heart.
- Moral meaning of disease (judgement, punishment).

Personification and rationalization occur:



Why Me?

Ramírez 2019 after Porter, 2002

Primitive and Prehistoric Medicine (3)



Healer was both medicine man and priest:

- Provided emotional support.
- **Used rituals to summon spirit's' help**
- **Requested absolution for patient.**
- **Herbals/nostrums as adjuncts.**
- Treated fractures, injuries & trauma.
- Was a keen observer of nature.

Duffy, 1993

Primitive and Prehistoric Medicine (2)

Disease is an undesirable condition:

- Comes from powers beyond the individual.
- Sent as *punishment* for some unacceptable deed.
- Meant as a test for sufferers.
- ***Illness has social, moral or spiritual functions.***

Healer does not concentrate on symptoms, but instead:

- Searches for signs to determine why deity sent the affliction.
- Treats to maintain or restore integrity.
- Wants to right the wrongs committed.
- Attempts to keep the faith and console the ill.

Duffin, 2007



Primitive and Prehistoric Medicine (4)

- Fractures set with mud / wood splints.
- Evidence of cranial trepanation (trephining) in Peru and Australia:
 - Evacuate evil spirits.
 - Treat seizures or severe headaches.
 - Healed bone suggests some survival.



Trepanation in Modern Age

Baron Guillaume Dupuytren (1777-1835), famous surgeon of the early 1800's was one of the first surgeons to successfully drain a brain abscess using trepanation of the skull, and he also used the method to treat seizures and evacuate hematomas.

Divine Healing BCE

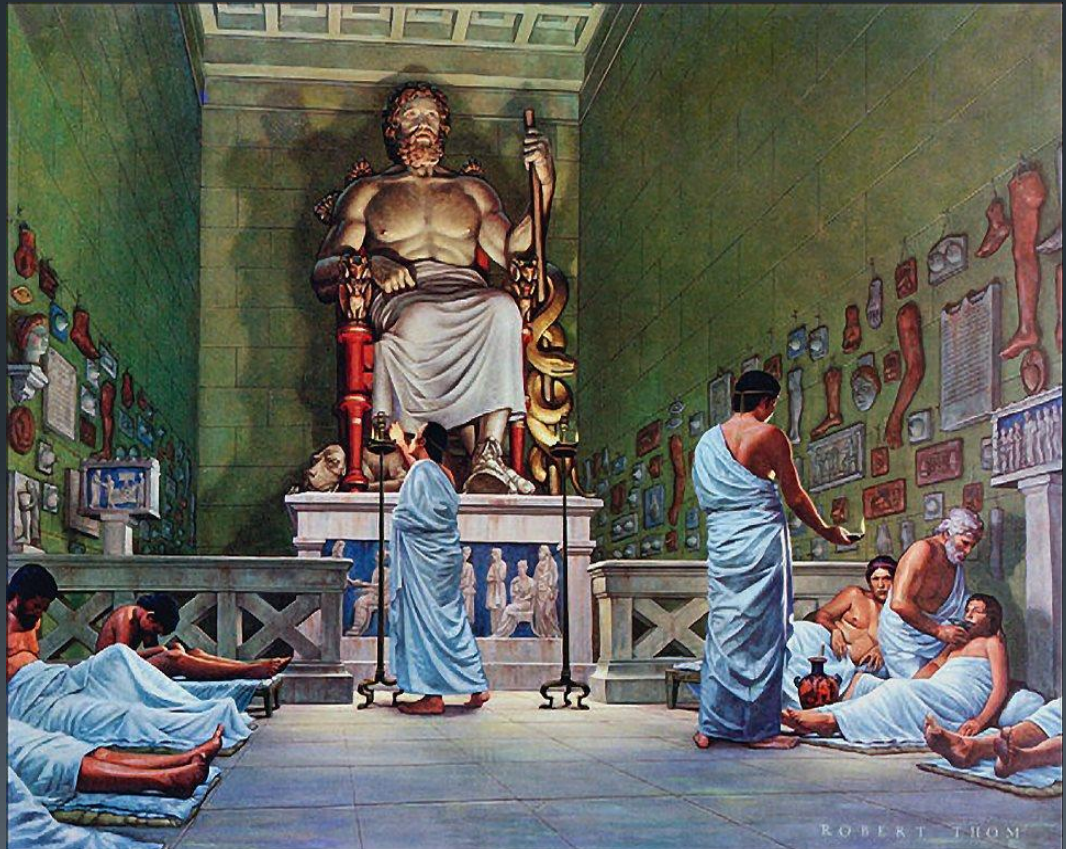
Asclepius, the god

Legend maybe originated in real human being, Aesculapius, 1200 BC?

- Son of Apollo, *Paeon*, the healer.
- A serpent taught him healing secrets.
- In his Asklepions (temples), *therapeutae* healed and treated.
- Reputedly raised people from dead.

The Cult of Asclepius

- More than 200 Temples in ancient Greece.
- The god holds *asklepian*.
- Ritual called “incubation”.
- The god visited during a drug-induced (opiate?) dream.
- Asclepius prescribed medicines or diet.
- If healed, *votives* were hung.



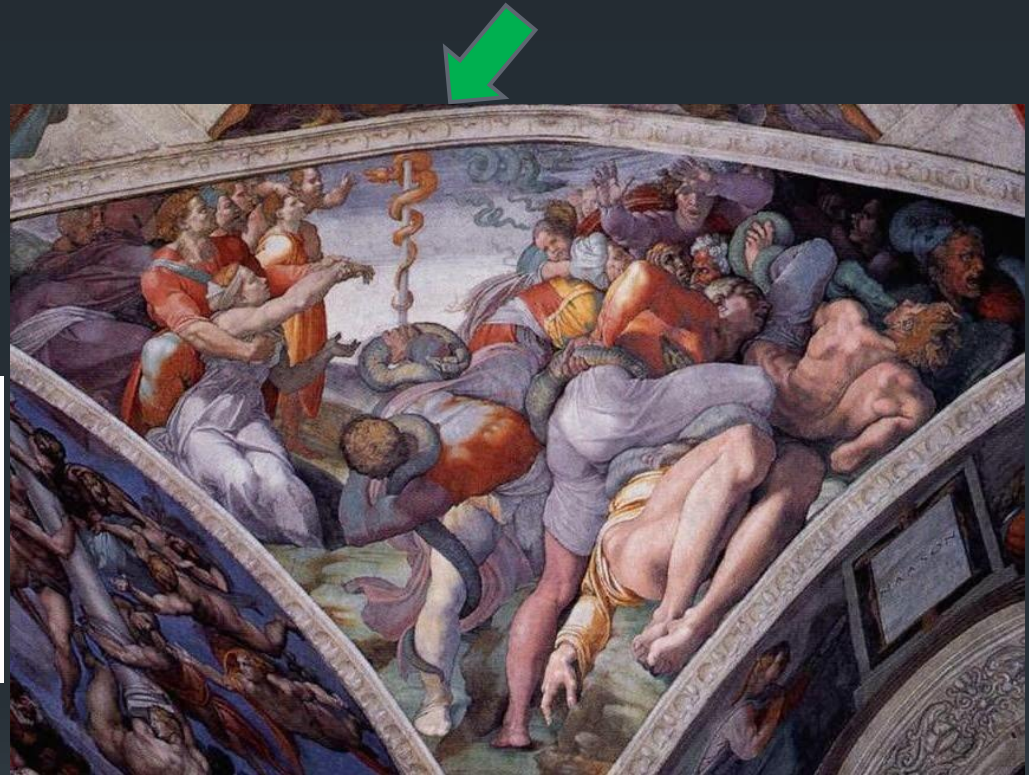
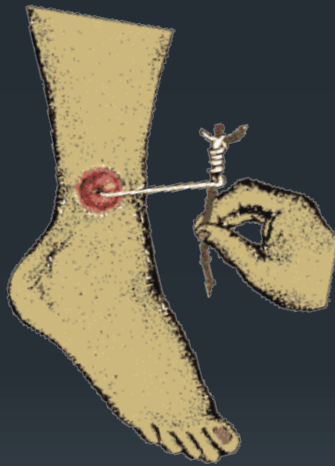
The Daughters of Asclepius

Goddess or
personification
of:

- Health and sanitation: ***Hygieia****
- Recuperation from illness: ***Iaso***
- Healing Process: ***Aceso***
- Glow of good health: ***Aglea***
- Universal remedy: ***Panacea****

The Rod of Asclepius (Asklepian)

Image possibly associated with the Guinea worm (GWD) *Dracunculus Medinensis*



Greeks believed snakes represented wisdom and eternal life (shedding skin meant eternal life).



NUMBERS 21:8

Moses' serpent on a rod

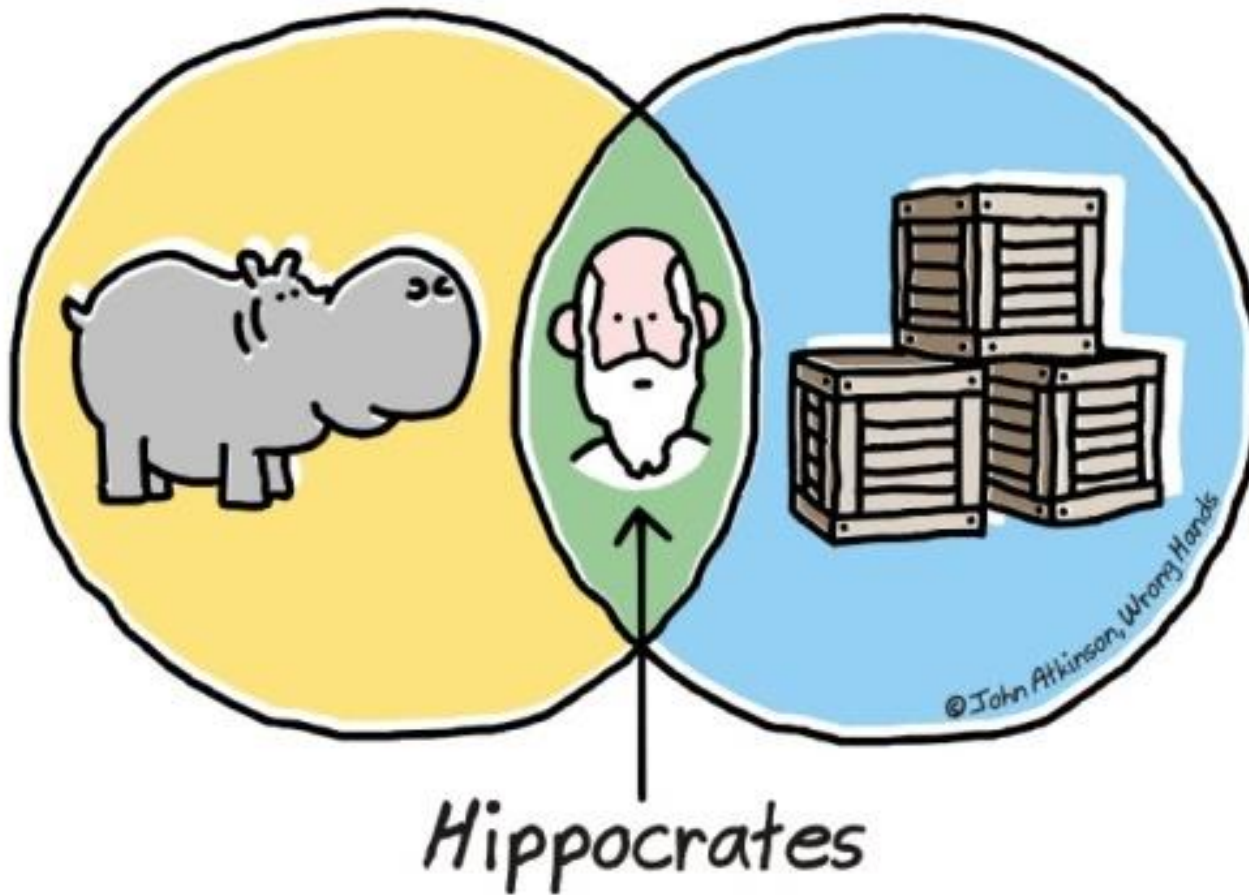
Fallacy of the Caduceus

US Army Medical Corps started using this symbol in the early 20th century due to mistakes, misunderstandings and confusion, and their use made it popular.



Particularly inappropriate as a symbol of medicine because of its association with **Hermes (Mercury)**, patron of commerce, traders, thieves, tricksters, liars, gamblers, and the guide of souls to the underworld.

The Greek Era of Medicine



wronghands1.wordpress.com

©John Atkinson, Wrong Hands

©J. Atkinson wronghands1.wordpress.com

Hippocrates (460-377 BC)



- “Father of Medicine”.
- Practitioner and teacher.
- Established:
 - Value of Medicine.
 - Dignity of the Art.
 - Ethical behavior.
 - Examination.
 - Recording of findings.
- Eliminated:
 - Supernatural causes.
 - Appeal to deities.
 - Uncertain prognosis.

Hippocratic Medicine

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Four Basic Body Humors:

Blood

Yellow bile

Black bile

Phlegm

Hippocratic Beliefs

- Disease has natural (not supernatural or divine) causes.
- Health = balance of the 4 humors.
- Illness = imbalance: dyscrasia (bad mixture of humors).
- Cure is accomplished by evacuating undesired humors:
 - Emetics.
 - Purgation.
 - Bloodletting.
 - Treatment with diet and behavioral measures.

Hippocrates' Treatments

Fever is a disease in itself.

It's nature's effort to the corrupted humors.

“**Cold**” illness treated by **Heat**.

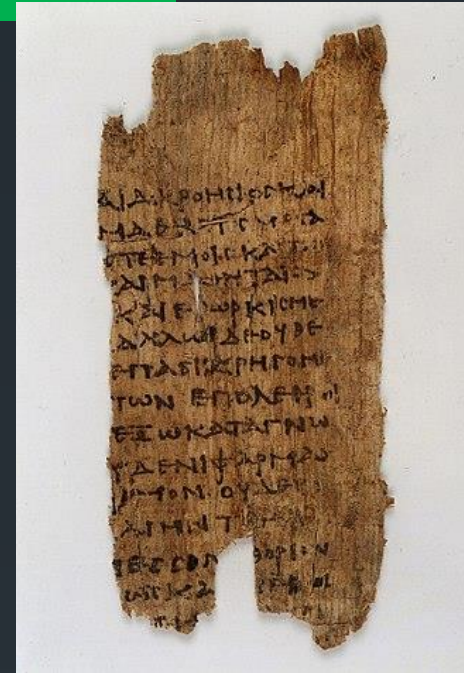
“**Hot**” illness treated by **Cold**.

“**DRY**” illness treated with foods & baths.

Severe “black bile” illness treated by bloodletting!!!

Hippocratic Oath

- I swear by Apollo Physician, by Asclepius, by Hygieia, by Panacea and by all the gods and goddesses.....
- I will not use the knife...on sufferers from stone, but I will give place to such as are craftsmen therein.
- I will not give to a woman a pessary to cause abortion.
- Whatsoever I shall see or hear in the course of my profession... I will never divulge, holding such things to be holy secrets.
- I will abstain from all intentional wrong-doing and harm.



Misinterpretations of and Misattributions to Hippocrates

- **Let thy food be thy medicine and thy medicine be thy food.**
 - “In food, excellent medication, in food bad medication, bad and good relatively.”
 - From the *Oath*: “I will apply dietetic measure for the benefit of the sick according to my ability and judgement...”
- **First, do no harm (*Primum, non nocere*):**
 - From the *Oath*: "to abstain from doing harm"
 - *From Epidemics*: "The physician must ... have two special objects in view with regard to disease, namely, to do good or to do no harm“.
- The Hippocratic Oath (~275 BC?) Probably written by others.

Asian Medicine

Mesopotamia and Assyrian Empire (~900 BC)

Assyrians thought disease caused by gods and devils.

Treatment included therapy and rituals to appease the gods.

Kisir-Ashur (end of 7th century BC), earliest documenting doctor.

Detailed records of training, diagnosis, treatment & practice.

Cuneiform clay tablets on symptoms and diagnosis.

Some text has description of incantations and prayers.



Ancient Egyptian Medicine (2)

Egyptian doctors used many advanced techniques:

Closing wounds with sutures.

Preventing and curing infections with honey.

Stopping bleeding with raw meat.

Immobilization for head and spinal injuries.

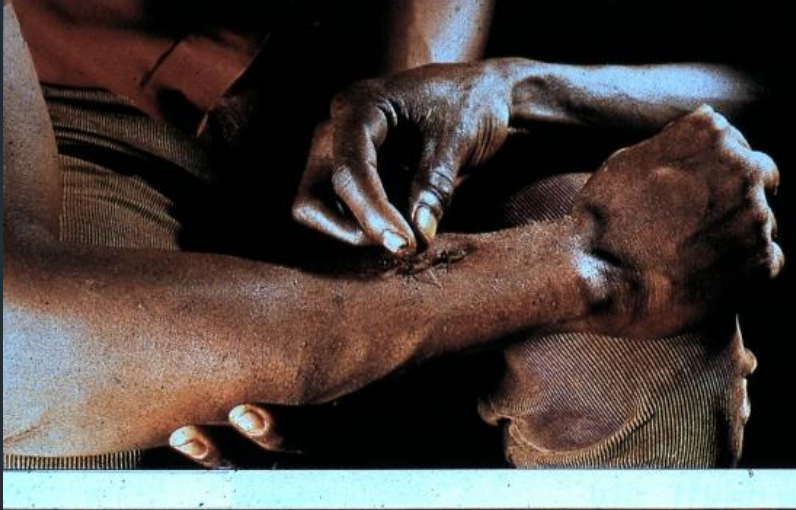
Used willow leaves in bandages .

There was no public health infrastructure:

No sewage systems.

No systematic medical care.

No public hygiene.



Use of fire ants
to “suture”
wounds.

Ancient Egyptian Medicine (4)

Egyptian Doctors believed there were 3 types of injuries:

- **Treatable injuries:** Dealt with immediately.
- **Contestable injuries:** Non-fatal. If survival possible:
 - 1.No intervention.
 - 2.The doctor would observe the patient.
 - 3. If survived, doctor would decide to intervene or not.
- **Untreatable injuries:** The doctor would not intervene.

Ancient Egyptian Medicine (~1200 BC) (1)

- Physicians were part of the priesthood.
- Specialization to one or few organs or body sites.
- Had Titles like:
 - Keeper of the Pharaoh's Right eye.
 - Keeper of the Pharaoh's Left eye.
 - Inspector of liquids.
 - Shepherd of the Royal Anus (Neru Pehut).
 - In *The Egyptian*, Sinuhe was the "Guardian of the Eye and Anus of Pharaoh".



Medicine in Ancient India

Medicine in Ancient India: 2 Compendia (Samhita) in Sanskrit

(~250 BC)



Charaka, “Father of Medicine”:
etiology, symptoms & therapy



Sushruta, “Father of Surgery”:
121 instruments, many surgical procedures. (~600 BC)



Sushruta in Old India (~600 BC)

- Performed procedures and designed instruments.
- Foundational text of Ayurveda medicine.
- Reconstructive and plastic surgery:
 - Rhinoplasty
 - Extract kidney stones
 - Sutures
 - Extract foreign bodies



Ayurvedic Medicine (5,000 years old)

42

- Five elements combine to form the three *doshas*:
 - Ether
 - Air
 - Fire
 - Water
 - Earth

- Three balanced life forces (*doshas*):
 - *Vata dosha*: Heart mind, cell division.
 - *Pitta dosha*: Hormones and digestion.
 - *Kapha dosha*: Immunity and growth.

- Made popular in US because of Deepak Chopra.

Doshas and Health

- Harmonize your *doshas* with your inborn nature.
- Your combination is called *tridosha*.
- Your *tridosha* gives you a unique *prakriti* (nature).
- Ayurvedic healer must identify your *tridosha* and your *prakriti* and prescribe treatments to harmonize them.

Greek, Roman

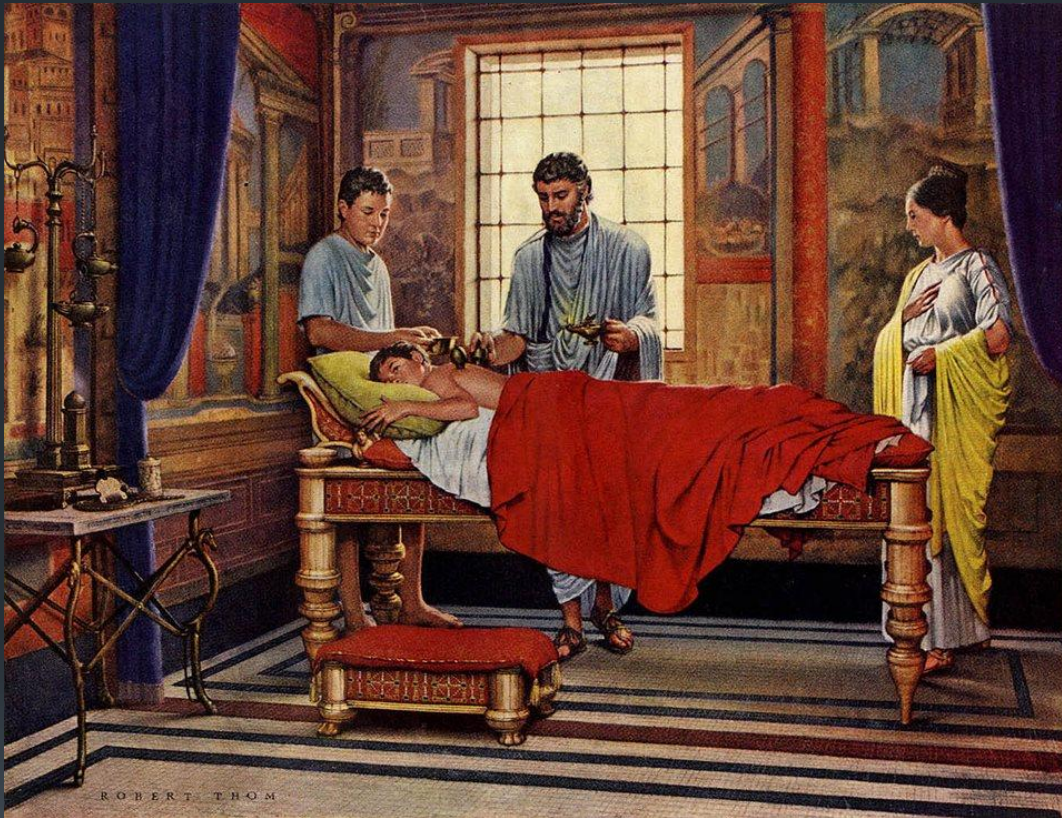
Arabic

Chinese

Dark Ages, Early Middle Age

Galen (130-220 AD)

45



Galen “cupping” a patient for bloodletting

Preached predeterminism.

Searched for “Master plan”

Belief in the deity
(demiurge)

Deity didn't cause or cure
disease

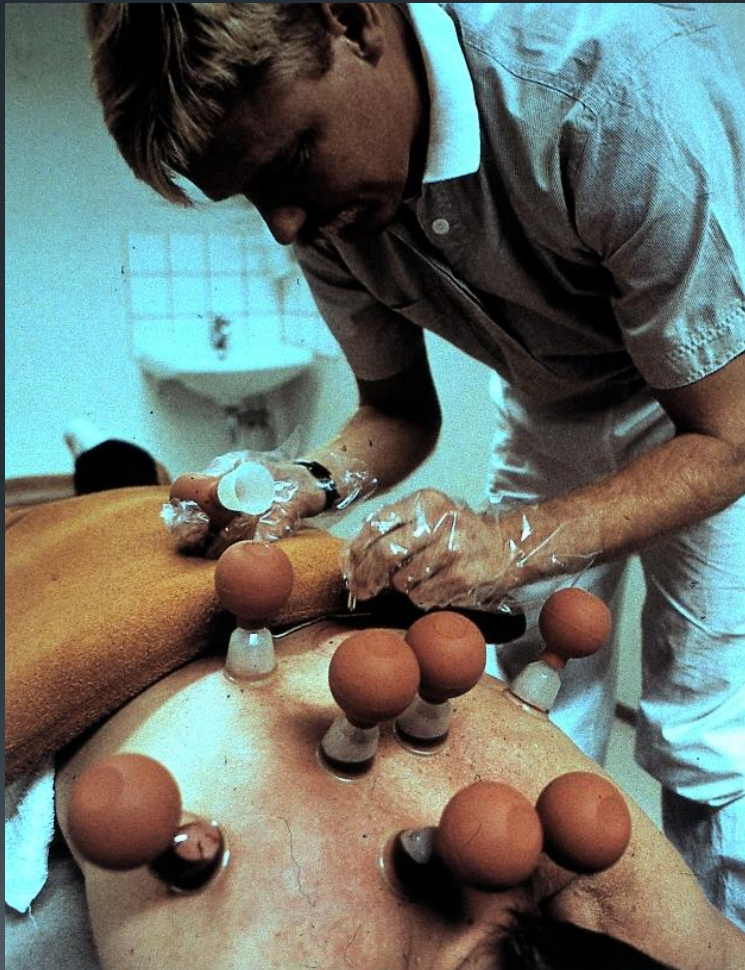
Medicine was a science

Observation and
experimentation.

Prescribed “galenicals”.

Pneuma = life
principle/essence

Cupping for Bloodletting



Modern-day cupping with suction bulbs.

Avoids hot cups, minimal pain.

Effective, quick, visible results.

For chest pains, coughs, congestion.

Used also on children.

Leaves transient circular red marks.

May be confused with abuse.

Leeches for Bloodletting



Arabic Medicine: Rhazes (854-925)



Surgical procedures.

Many surgical instruments.

Wound cauterization.

Smallpox and Measles.

Text on children's diseases.

Mercurial purgatives.

Pupillary reaction to light.

Uroscopy (1)

In ancient era



Arabic Uroscopy Color chart

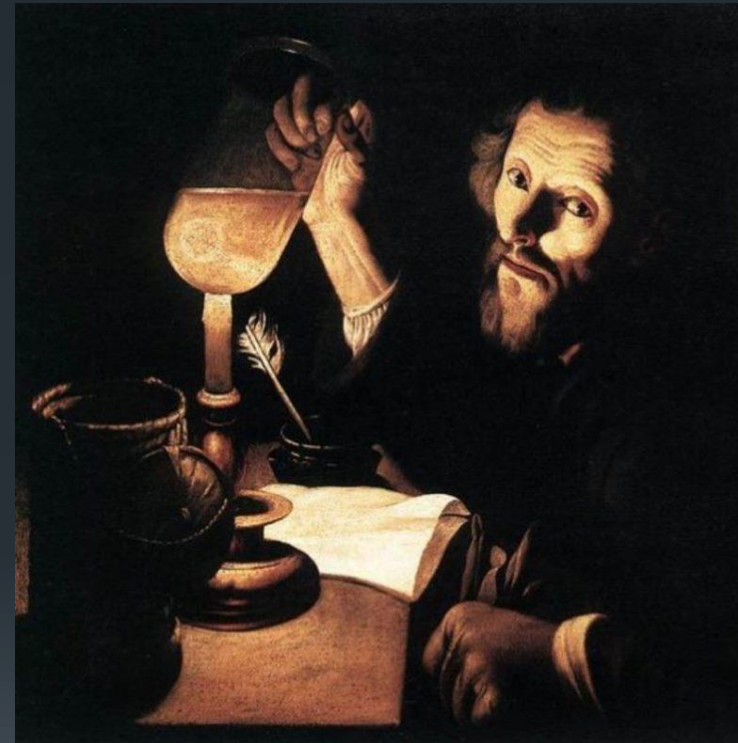
- Examination of urine by the senses.
- Used since olden times.
- Analyzed the urine by:
 - Color (bile pigments, blood).
 - Odor (musty, stale beer, cabbage).
 - Fluidity (watery or thick).
 - Limpidity (clarity).
 - Nature (foam, stains clothes).
 - Hypostais (sediment).
 - Taste
 - Diabets mellitus (sweet).
 - Diabetes insipidus (flavorless)

Uroscopy (2)

In Middle ages

50

- Urine in matula (clear glass container).
- Unscrupulous users abounded:
 - Claimed that no exam needed.
 - Diagnosed and prognosticated just by looking at urine of the patient.
 - If bubbles were small: tendency for migraine.
 - If bubbles large: colic, air in viscera.
- Prevalent quackery and imposture.
- Precursor of modern urinalysis.



Abulcassis (Al-Zahrawi) (936-1013)

30-book encyclopedia: *Kitab al-Tasrif*.

Broad range of medical topics:

- Surgery - ophthalmology, urology, orthopedics.
- Medicine, pathology, pharmacology.
- Nutrition and Dentistry.
- Childbirth.

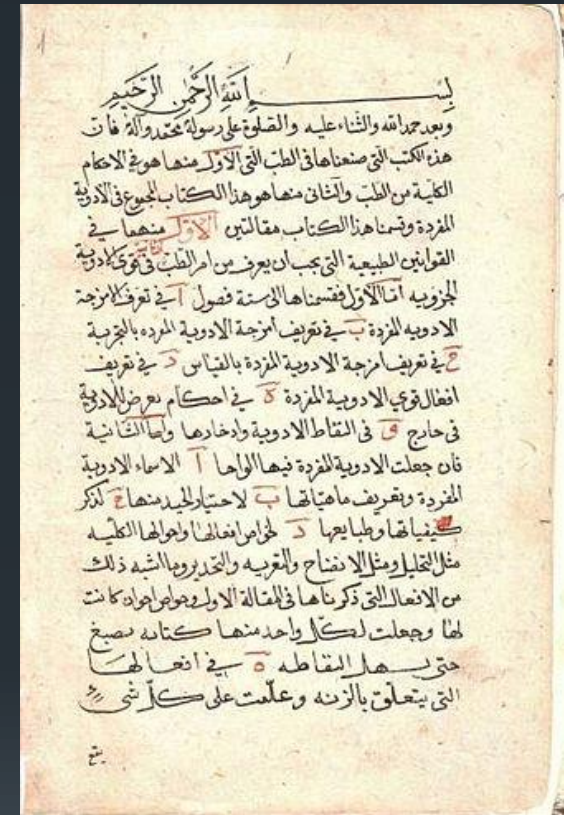
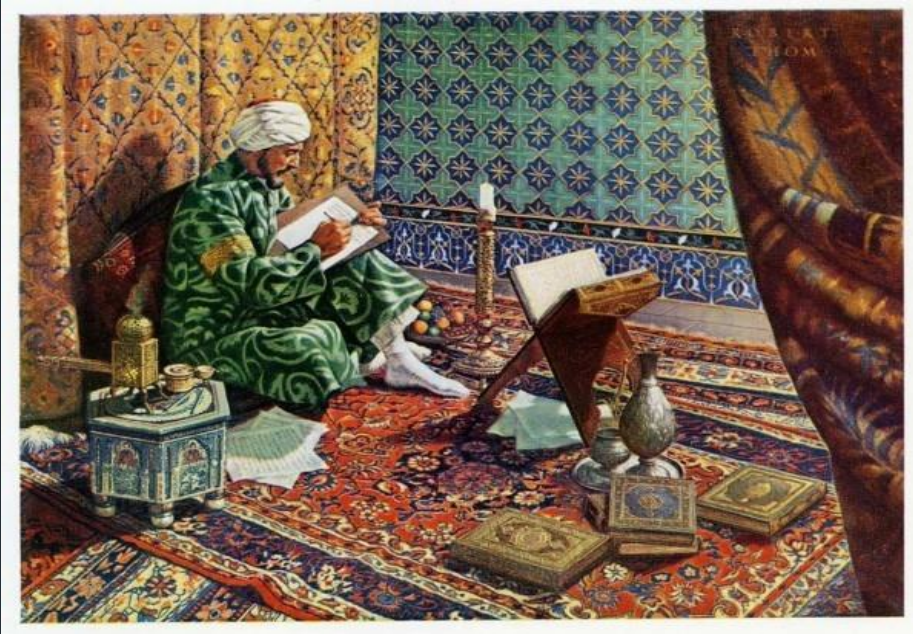
Described hereditary nature of hemophilia.

Specialized in cauterization.

1st surgical treatment of hydrocephalus.



Avicenna (Ibn Sina, c. 980 – 1037)



- Persian Muslim polymath: Father of modern medicine.
- Wrote 450 works, 150 on philosophy and 40 on medicine.
 - *The Book of Healing* philosophy & science
 - *The Canon of Medicine* a medical encyclopedia.
 - Standard text at many medieval universities.
 - Remained in use as late as 1650.
- Corpus includes writings on astronomy, alchemy, geography, geology, psychology, Islamic theology, logic, mathematics, physics and works of poetry.

Paracelsus

Paracelsus

(beyond Celsus)

54



- His *Philosophia sagax* was published in 1571.
- It is a treatise on hermeticism, astrology, divination, theology, and demonology.
- Laid the basis of Paracelsus's later fame as a "prophet".

Paracelsus

(1439-1541)

- Regarded Nature as the One, a living organism.
- Believed in the healing power present in Nature and the human body.
- Referred often to occultism and alchemy.
- Burned Galen's and Avicenna's books in Basel in 1527.
- Said most of his remedies came from gypsies, monks, barbers, surgeons, midwives, hangmen and herb-collecting old women.

Paracelsus

Attacked theory of humors and proposed his own:

- Diseases have external causes.
- Disease is a chemical process.
- Disease is localized in organs
- Plants & minerals contain *arcana* (essence, virtue and potency)
- Classified diseases by drugs that cure them.

Paracelsus

- Objected to excessive bloodletting, saying that blood could not be purified by lessening its quantity.
- The great medical problem of the period: syphilis,
- Vigorously attacked the treatment with guaiac wood as useless, a scam perpetrated by the Fugger family, main importers of the wood.
- Hoped to return to Nuremberg and publish a treatise on the "French sickness".
- The Leipzig faculty of medicine prohibited its publication.

Paracelsus: Tria Prima

Tripartite alternatives (~1530) to explain the nature of medicine and of the human identity:

- A *combustible element* (***sulphur***) representing the soul: emotions and desires.
- A *fluid* and changeable element (***mercury***) representing the mind: imagination, moral judgement and higher mental faculties.
- A *solid*, stable element (***salt***) representing the body.

Paracelsus

- Doctors believed infection was a natural part of the healing process.
- He defined disease as a separation of pure from impure.
- The universe's macrocosm was represented in every person as a microcosm.
- As humans must ward off the influence of evil spirits with morality, they must also ward off diseases with good health.

Paracelsus and others

The Doctrine of Signatures

Doctrine of Signatures (DOS)


61
















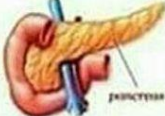








- If a plant looks like a part of the body, then this signifies its ability to treat/cure that anatomy.
- Cures for diseases can be found in the same locations where the malady occurs.
- Paracelsus: *similia similibus curantur* (like cures like).
- Galen: *Contrarian contrariis curantur* (opposite cures the opposite)
- Hahnemann ridiculed the concept of DOS.

Doctrine of Signatures

YOU ARE WHAT YOU EAT

Foods that resemble organs they're good for

 NegusNetwork

					
Carrot	Eyes	Walnut	Brain	Grapes	Lungs
					
Tomatoe	Heart	Ginger	Stomach	Figs	Strotum
					
Citrus	Breast	Sweet potatoe	Pancreas	Kidney Beans	Kidney
					
Bones	Celery	Hearing	Mushroom	Avocado	Uterus

@NEGUSNETWORK

Doctrine of Signatures

Anatomical Parts ⁽¹⁾



Hot Lips fungus



Doll's eye fungus



Breast & Nipple fungus



Deadly snapdragon seed pods

Doctrine of Signatures

Anatomical Parts (2)



Wood ear fungus



Purple Jellydisc fungus



Devil's fingers fungus



Wrinkled peach mushroom

Doctrine of Signatures

Anatomical Parts (3)

65



Vietnamese loofah fruit



False morel mushrooms



Mandragora root

Doctrine of Signatures

Anatomical parts ⁽⁴⁾

66



Carnivorous pitcher plant



Dancing man orchid



Orchid bulb roots



Poppy plant

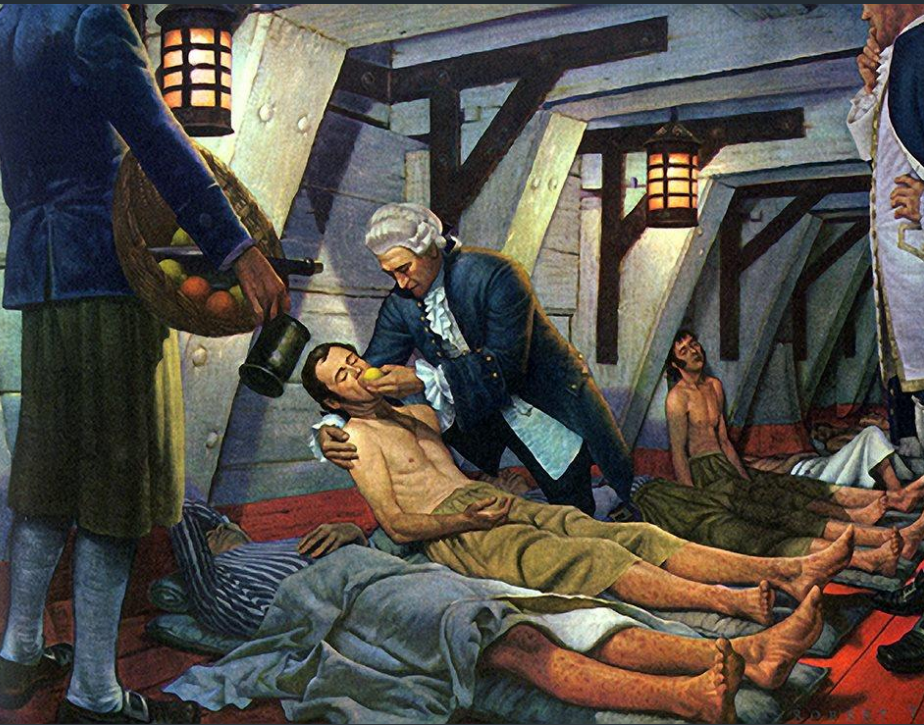
Real Science

Vesalius (1514-1564)

- 1543: De Humanis Corporis Fabrica
 - Dissection of human bodies.
 - Pointed to Galen's multiple errors.
 - Galen only dissected animals!
 - Many muscle insertions were incorrect.
- "Galen was deceived by his monkeys."
- Incurred wrath of Galenists, who ostracized him.



James Lind and Scurvy (1747)



Scurvy Killed ~1 M
seamen
1600 - 1800.

Mostly in long
transatlantic trips.

Diet-Disease link
known but cure not
known.

Symptoms:

- Full body aches.
- Purple skin spots.
- Swollen gums, rotting teeth.
- Sudden death

Lind proved
value of citrus
fruits or juice.

British sailors
called "Limeys".

Cartier's colony in Quebec was cured of scurvy with a tea prepared by the natives from white cedar or spruce (1536 !). Recipe lost in translation of oral traditions.

Age of Microbiology

Louis Pasteur (1822-1895)

- Proved the germ theory of disease.
- Vaccines from weakened germs for:
 - Anthrax
 - Rabies
 - Fowl cholera
- Invented process of Pasteurization.
- Solved industrial biochemical problems.



Microbes are produced from parent organisms,
not by spontaneous generation.

Robert Koch (1843-1910)

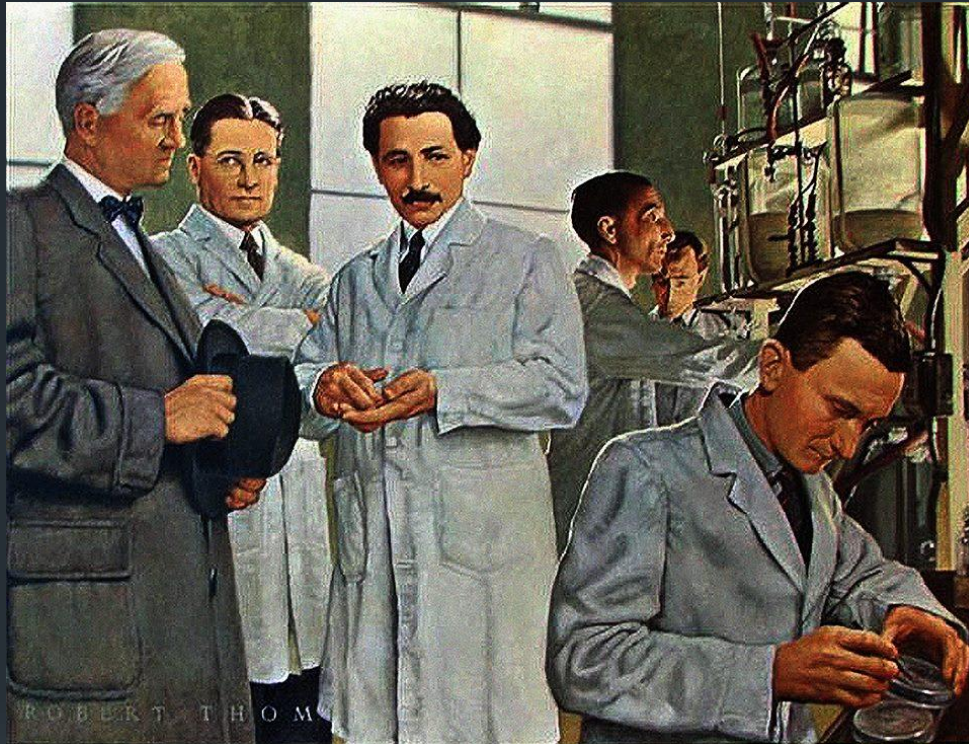
- Heinrich Hermann Robert Koch, German physician and microbiologist.
- Identified the specific causative agents of tuberculosis, cholera, and anthrax.
- Discovered *tuberculin*, intended to treat tuberculosis.
- Observed the phenomenon of acquired immunity.

Koch's Four Postulates

Used to determine the cause of most infectious diseases:

- 1. The organism must always be present, in every case of the disease.
- 2. The organism must be isolated from a host containing the disease and grown in pure culture.
- 3. Samples of the organism taken from pure culture must cause the same disease when inoculated into a healthy, susceptible animal in the laboratory.
- 4. The organism must be isolated from the inoculated animal and must be identified as the same original organism first isolated from the originally diseased host.

Alexander Fleming- Penicillin (1928)



- Discovered penicillin in 1928
- Collaborated with Oxford team, shared 1945 Nobel with Drs. Florey & Chain.
- Launched the antibiotic era.
- Helped save thousands of wartime lives.
- Principle of serendipity (unplanned fortunate discovery).

Wilhelm Röntgen X-Rays (1896)

75



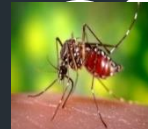
January 23, 1896

- Took X-ray picture of hand of Prof. von Kölliker in Würzburg, Germany.
- Named X-rays (unknown radiation).
- Described possible medical uses.
- 1901 (First) Nobel Prize in Physics
- Unaware of hazards until much later.
- Department stores used it to fit shoes.

Walter Reed and Yellow Fever (1901)



Headed US Army Commission on yellow fever in Cuba.



Team was able to prove that mosquitoes transmitted the virus.



Many Cuban and American lives saved.



Control measures used in Panama.



Unethical experiments on live subjects.

Modern Perspective of Disease (2)

Déjà-vu All Over Again?

Mirroring ancient beliefs, many now think disease caused by:

- Imbalance between body, self and milieu.
- Evil beings in the environment: infections, bacteria, viruses.
- Invasion by malefic forces: tumors, malformations, deformities.
- Stealing of the spirit: psychiatric illnesses amnesia, autism.
- Curses/ill wishes by enemies: strokes, seizures, evil eye, cachexia.
- Toxicants: diabetes, asthma, metabolic diseases, allergies.
- Mishandling/mismatch of individual and collective **energy** fields.
- Disharmony of self-being and mother earth (any & all diseases).

Ramírez 2019



