

# Then & Now...

## disease and technology through the ages Part II



# Ancient Greece - 776 BC



Ancient Greek god of  
medicine & health

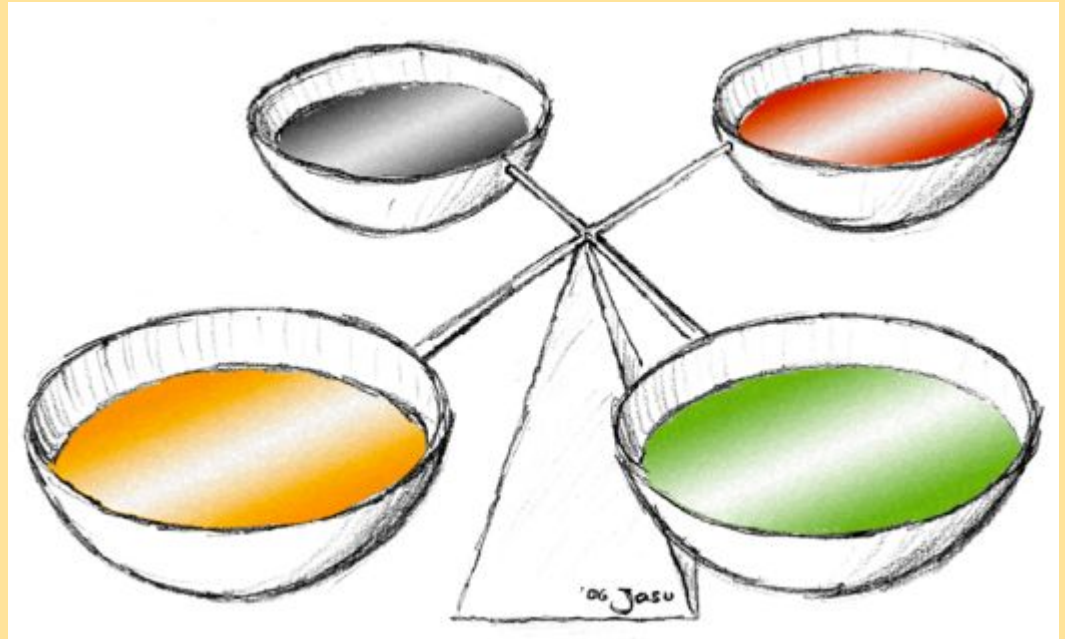
- 1st to study *cause* of disease
  - looked for **natural explanations** not just divine ones
- made discoveries in science, math & astronomy

# Hippocrates, most famous of all ancient Greek physicians

- based knowledge of anatomy on observation of external body
  - human dissection during this time was taboo
- responsible for writing oath of medical ethics: Hippocratic Oath
- became known as the “Father of Modern Medicine”

Greek thinkers emphasized idea of **balance** in all things.

- The idea of balance was reflected by belief in **four humors** of human body:
  - **yellow bile**
  - **black bile**
  - **blood**
  - **phlegm**



# Their Balance Theory for “fours”:

- theory that **four** elements:
  - earth, air, fire & water &



- the **four** seasons:
  - summer, autumn, winter & spring
- were all linked to the **four humors** in human body

- Believed that imbalance in any of these humors, elements or seasons caused illness
- doctors could restore balance by, for example, by bloodletting

**Cupping vessels  
for bloodletting**



**bloodletting  
scalpels**





# CheckPoint

- 1. How many elements were involved in the “balance theory”?** .
- 2. What was the 1st code of medical ethics called?** .
- 3. Name one of the body’s humors.**



CheckPoint cont.

**4. Imbalance of the humors resulted**

**in: |**

**a. bad weather**

**b. some type of illness**

**c. a depletion of blood**

**d. environmental disasters .**



# Romans - 9th Century BC

The background of the slide is a photograph of the Colosseum in Rome, Italy. The structure is a large, elliptical amphitheatre built of travertine, tuff, and brick-faced concrete. It features three tiers of arches. The sky is a clear, bright blue with a few wispy clouds on the right side. In the foreground, there are some green bushes and a paved area with a few people walking.

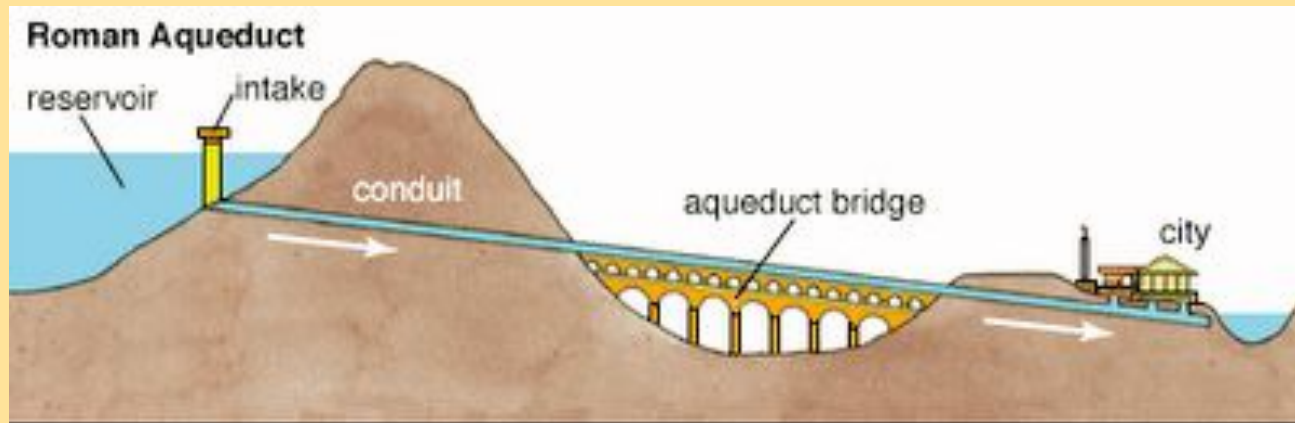
- **Learned about disease & sanitation from Greeks**
- **Developed sanitation system of aqueducts to bring clean water to cities**
- **Built sewers to carry off waste**
- **Built public baths with filtering systems**

**Marks beginning of public health & sanitation.**

# Aqueducts –

- collected water from several natural springs, located far away from city
- Water was chosen according to many factors:
  - position of its springs
  - purity of its water
  - its taste
  - alleged medical properties due to mineral salts

- Gravity moved the water towards the city.
  - Aqueduct acted as a continuous slope



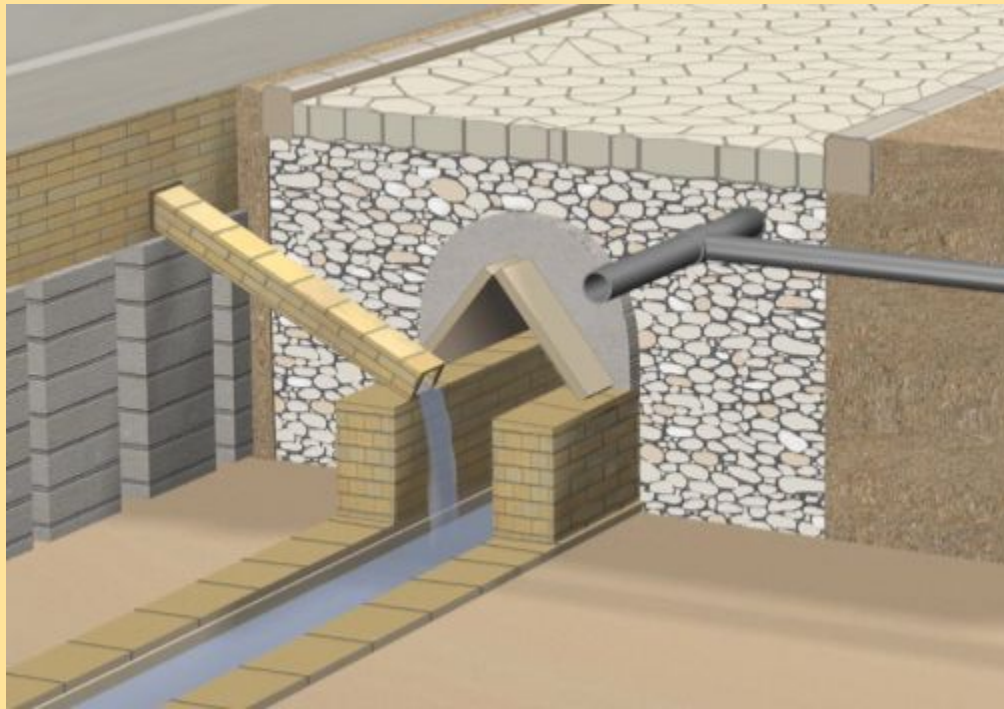
- Water had to be drawn from springs located in hilly areas, above Rome's position



# Ancient Roman aqueduct System



# Roman Sewers – carried waste away from cities



Cutaway view of typical Roman street.  
Shows lead water pipes & central **channel**  
**for sewage** under pavement

# Ancient Roman Sewer



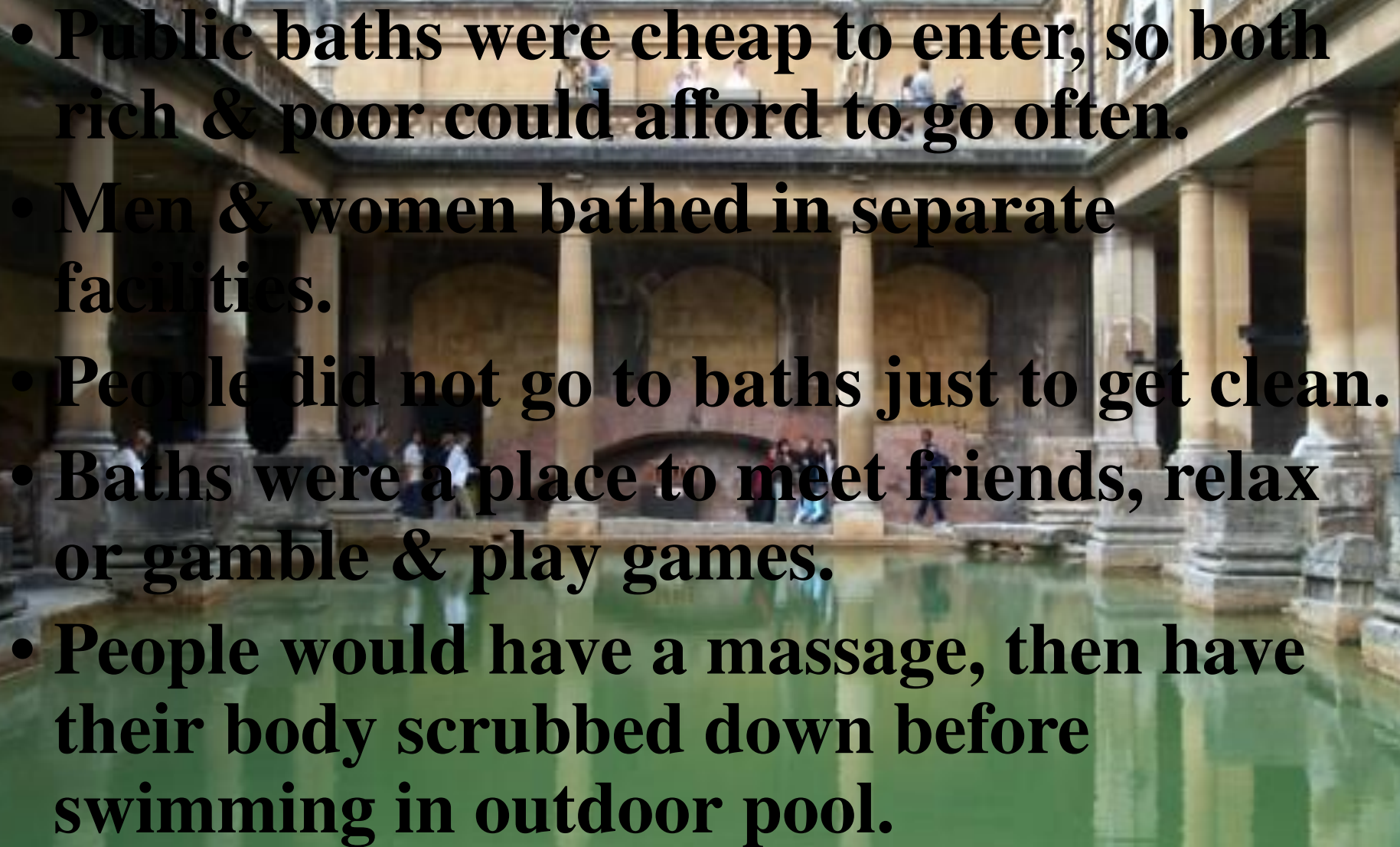
underground sewers  
emptied at streams  
away from cities



# Roman bath and spa--not just for bathing





- 
- **Public baths were cheap to enter, so both rich & poor could afford to go often.**
  - **Men & women bathed in separate facilities.**
  - **People did not go to baths just to get clean.**
  - **Baths were a place to meet friends, relax or gamble & play games.**
  - **People would have a massage, then have their body scrubbed down before swimming in outdoor pool.**



# CheckPoint

- 5. The Romans learned about disease and hygiene from . . . .**
  
- 6. Roman aqueducts carried: |**
  - a. clean water to cities**
  - b. sewage away from cities .**



CheckPoint cont.

**7. Only rich people could afford the Roman baths. |**

**a. True**

**b. False .**

# Dark Age (early Middle Age) - AD 400-800 & High Middle Ages - AD 800-1400

- Beginning of Dark Ages
  - Roman Empire was conquered by Huns





# Hun Empire



 **Roman Empire**

0  
0  
500 Kilometers





- During this time church began to dominate the practice of science & medicine
- Study of medical science all but stopped
- Instead of medical intervention, the church held fast to belief “healing through Christ”





# Treatment for ill during this time:

- Prayer
- Exorcism
- Saintly relics
- Superstition



# Terrible epidemics during this period:

- Bubonic plague (Black Death)
- Smallpox
- Syphilis
- Diphtheria
- Tuberculosis



Bubonic plague was responsible for death of  
60 million people

# The Renaissance

(AD 1350 - 1650)

Period which marked rebirth of learning.

- Building of universities & medical schools
- Search for **new ideas**
  - (rather than unquestioning acceptance of disease as will of God)

- Acceptance of dissection for study
- Development of printing press & publishing books
  - (allowed more access to knowledge from research)



# CheckPoint

**8. Who conquered the Roman empire? |**

**a. Greeks**

**b. Mesopotamians**

**c. Germans**

**d. Huns .**

**9. Why did the study of medicine come to a stop during the Dark Ages? .**



CheckPoint cont.

**10. Approximately how many deaths was the Bubonic plague responsible for? |**

- a. six thousand**
- b. six million**
- c. sixty million .**



CheckPoint cont.

**11. What does the word “Renaissance” mean? |**

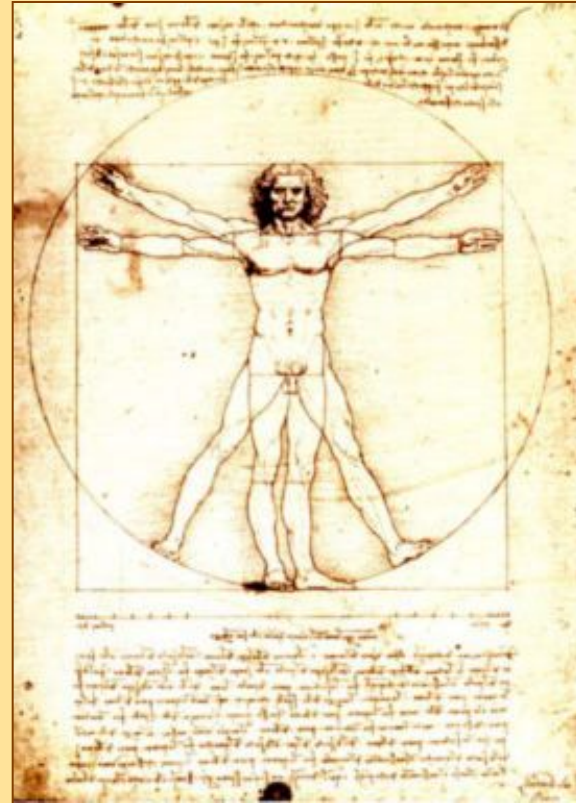
- a. rebirth**
- b. academia**
- c. new ideas**
- d. scholar .**



# Discoveries of Sixteenth & Seventeenth Centuries



# Leonardo da Vinci (1452-1519)



- Italian artist, scientist, engineer
- Studied anatomy of body by dissection of human corpses





# Anton van Leeuwenhoek

1632 - 1723

- Dutchman
- Invented microscope in 1673 & discovered “animacules”





- Leeuwenhoek's microscope was a lens mounted in a tiny hole of a brass plate.
- He held it to the light to see his specimen.





# CheckPoint

**12. Leonardo da Vinci is known as:** |

- a. an engineer**
- b. an artist**
- c. a scientist**
- d. all .**



CheckPoint cont.

**13. What is the name Leeuwenhoek used to describe microorganisms? |**

- a. microbes**
- b. organelles**
- c. animacules**
- d. pathogens .**

# Discoveries of Eighteenth Century



# Edward Jenner (1749-1823)

- Country doctor in England
- Found vaccination
  - protected people against smallpox



- Jenner observed that milkmaids who caught less serious cowpox generally did not catch smallpox.
- Led him to discover technique of vaccination when he deliberately infected a small boy with cowpox.

- Jenner found that this gave the child immunity against deadly smallpox.

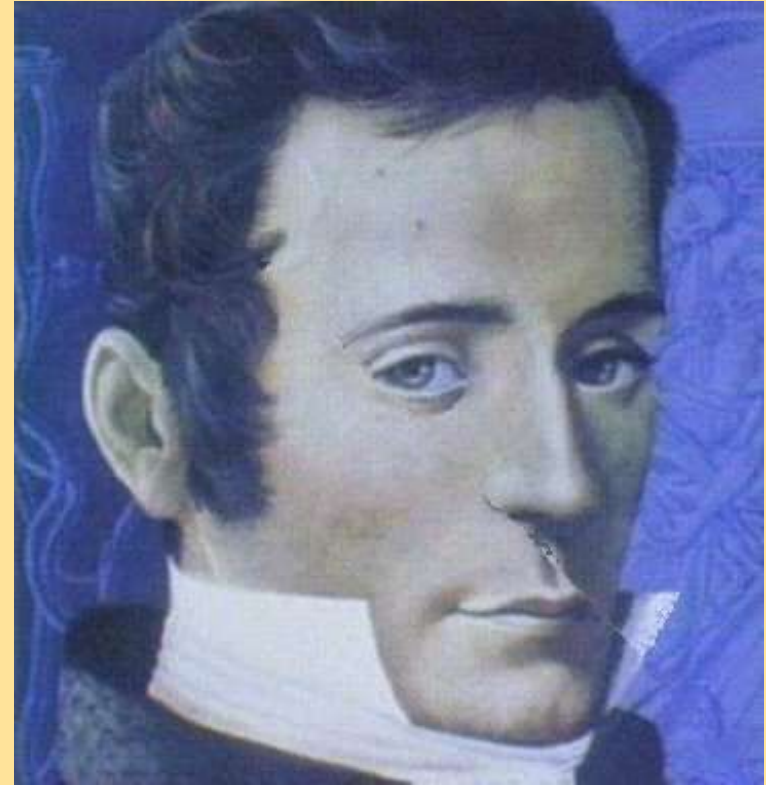


The word "vaccination,"  
made up by Jenner for his treatment  
(comes from Latin *vacca*, a cow).

Word later adopted by Pasteur for  
*immunization against any disease.*

# Rene Laënnec (1781-1826)

- French physician
- Invented cylinder stethoscope
  - Originally made from paper; later made from hollow wooden tube
- Hailed as **Father of Thoracic Medicine**







Before stethoscope, doctors put ear directly to body

# What led to invention of stethoscope?

- Laënnec:

“In 1816, I was consulted by a young woman laboring under general symptoms of diseased heart, and in whose case percussion and the application of the hand were of little avail on the account of the great degree of fatness...”

- “I rolled a quire of paper (24 sheets) into a kind of cylinder and applied one end of it to the region of the heart and the other to my ear.”



# CheckPoint

- 14. The word *vaccination* is derived from a Latin word, which means . . ?.**
- 15. Laënnec's first stethoscope was made of:**
- a. paper**
  - b. wood**
  - c. copper**
  - c. hardened rawhide .**



CheckPoint cont.

**16. Before Laënnec's stethoscope, how did physicians listen to heart & lung sounds?**

-

# **Nineteenth Century Disease & Medicine**



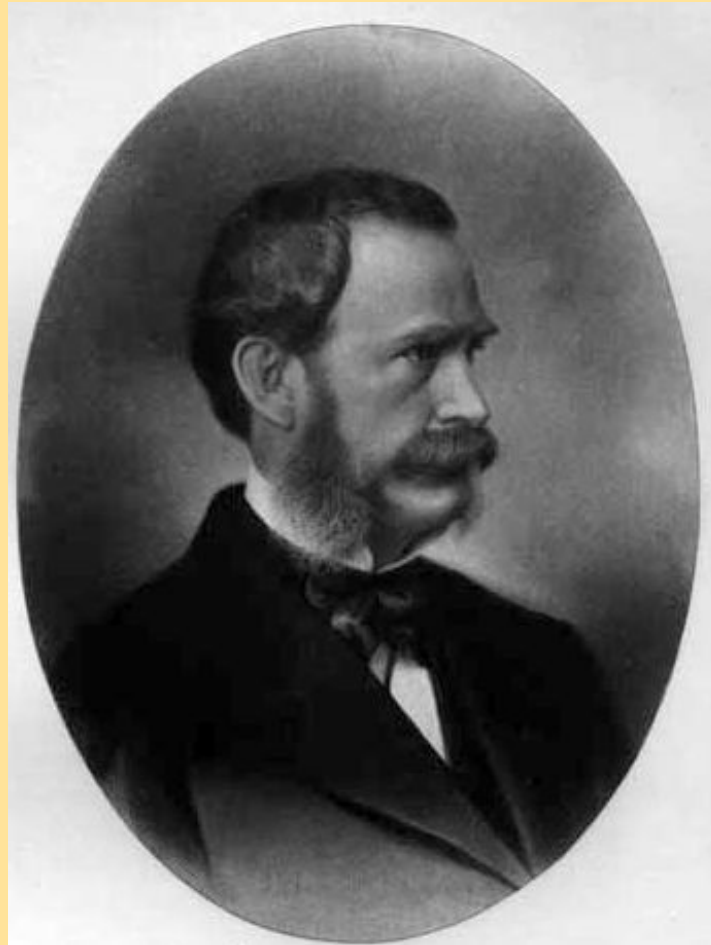
# James Blundell (1790-1877)

- 1818- performed 1st successful human blood transfusion
  - transfused blood from husband to his wife by means of syringe



- Blundell performed 10 transfusions up to 1830
  - about half were successful
- At this point, blood typing had not been developed & transfusions were risky.
- In 1870's, doctors began using milk from cows, goats & humans, as blood substitute
- This was replaced with saline solution in 1880's

# William Morton (1819-1868)



- Dentist who developed anesthesia techniques that made surgery painless

# 1st operation using anesthesia



# Ether inhaler invented by William Morton, about 1846

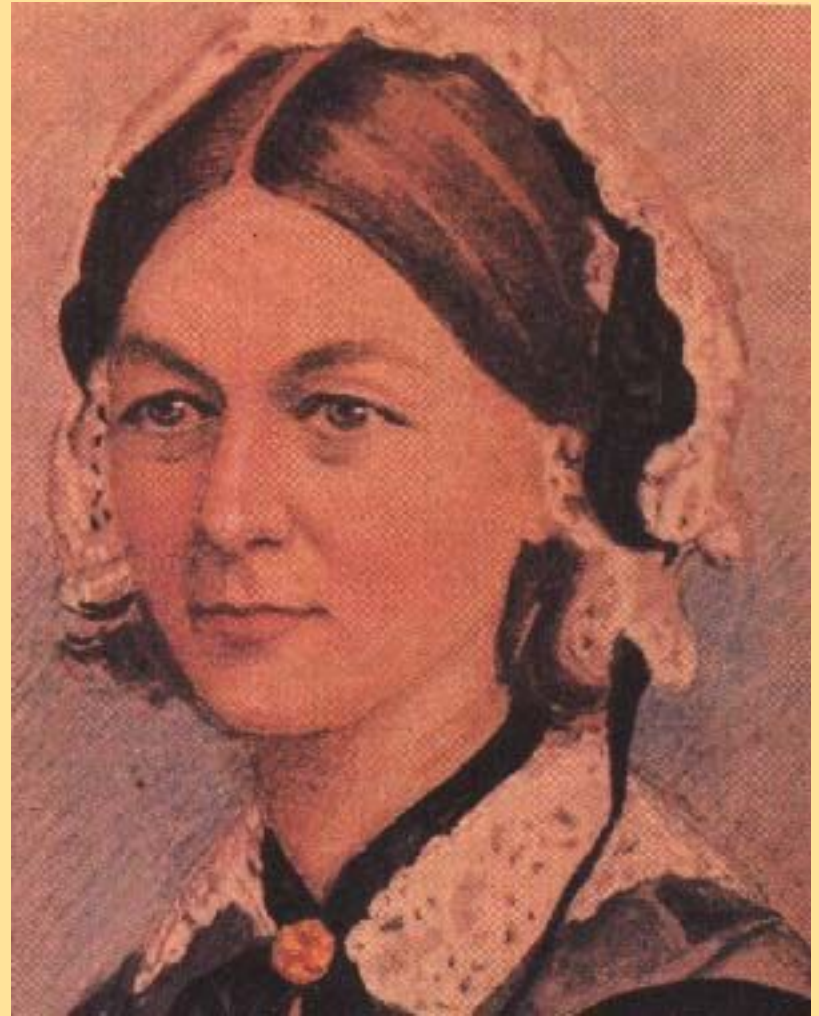




# Florence Nightingale

(1820 - 1910)

- pioneer of nursing
- reformer of hospital sanitation methods



# Florence Nightingale tending the ill



- Although bedridden for many years, she campaigned tirelessly to improve health standards
  - published 200 books, reports & pamphlets
- In recognition of her work Queen Victoria awarded Miss Nightingale the Royal Red Cross in 1883.
- She died at age 90





# CheckPoint

## MATCHING:

**17. Reformed hospitals;  
pioneered nursing**

**18. Successful blood  
transfusions**

**19. developed anesthesia  
techniques.**

**a. Morton**

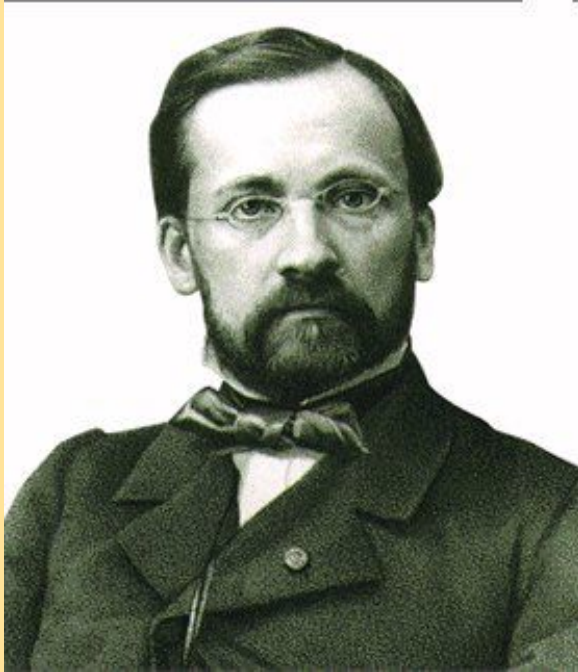
**b. Nightingale**

**c. Snow**

**d. Blundell**



# Louis Pasteur (1822-1895)



- Father of Bacteriology
- Discovered that microorganisms were everywhere
- Proved that microbes caused disease

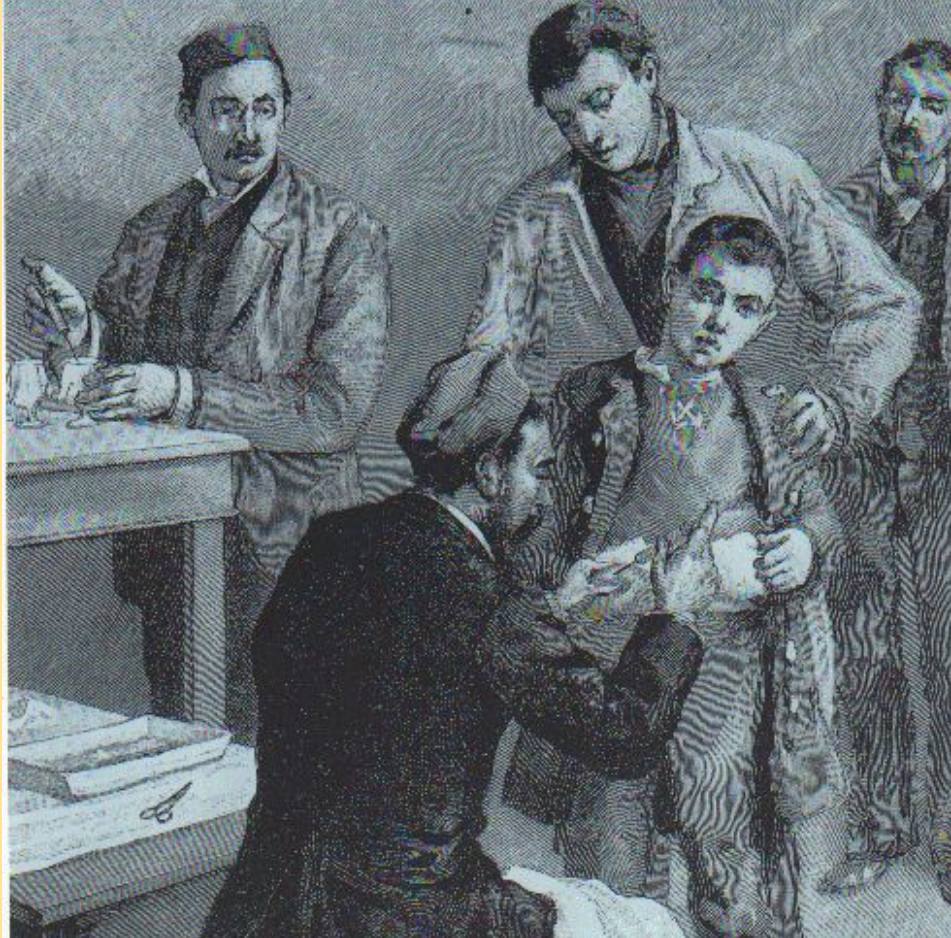


Discovered that heating of milk killed germs--hence the term “pasteurization”.



The process of boiling a liquid to destroy bacteria is still used today; most dairy products are pasteurized.

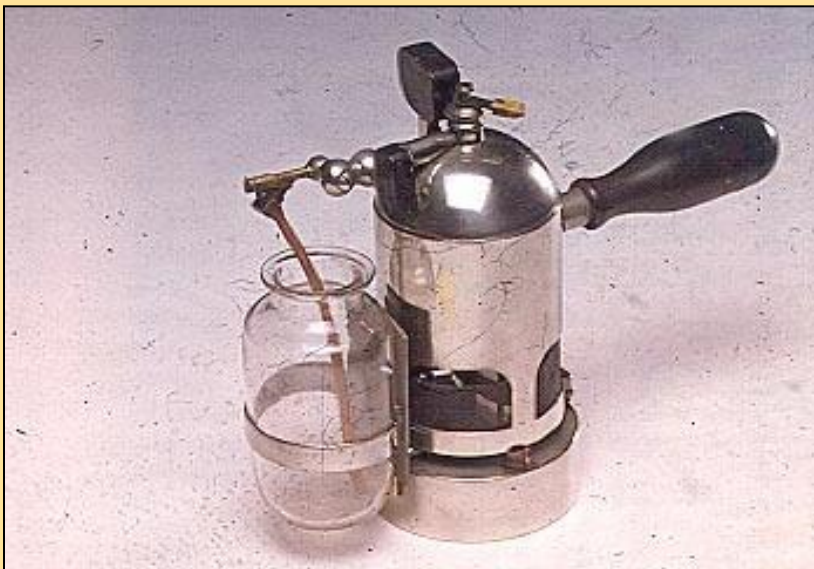
# **Pasture also developed vaccines against anthrax & rabies.**



**Louis's pupil, Emile Roux, inoculating boy  
against rabies at Pasteur Institute**

# Sir Joseph Lister (1827-1912)

- Discovered that carbolic acid killed germs
- Used as an asepsis in surgery



Carbolic acid  
sprayer



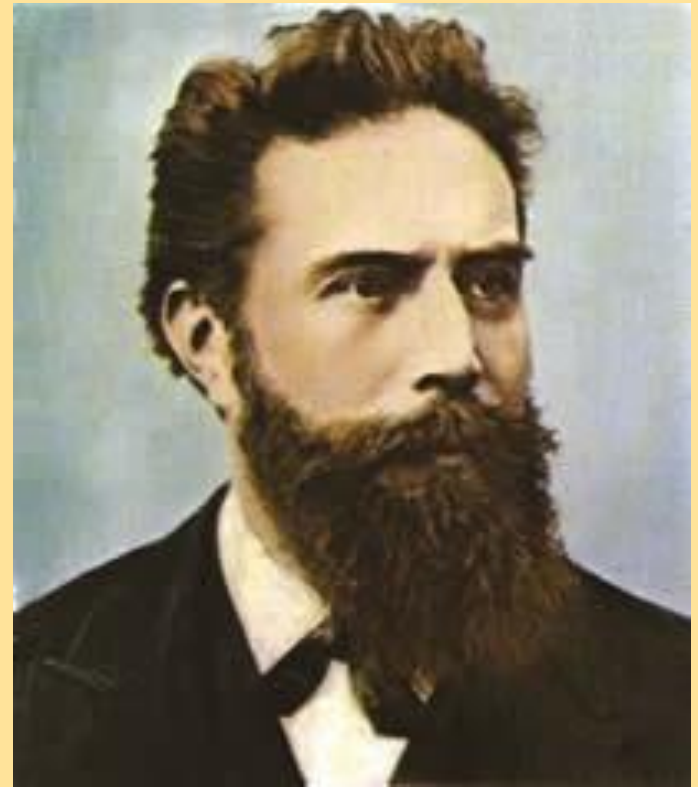
# Lister Introduces Antisepsis



- For six weeks, Lister had treated a boy's compound fracture wound with carbolic acid.
- When Lister removed dressings from fracture, he found wound had healed without infection--something unheard of!

# Wilhelm Roentgen (1845-1923)

- German physicist
- Discovered x-rays in 1895





# Roentgen's wife, Bertha, & his x-ray of her hand



Poem appeared in *Photography* magazine, 1895

*The Röntgen Rays, the Röntgen Rays,  
What is this craze,  
The town's ablaze,  
With the new phase  
Of X-rays ways.  
I'm full of daze,  
Shock and amaze,  
For nowadays,  
I hear they'll gaze,  
Thro' cloak & gown- and even stays,  
These naughty, naughty Röntgen Rays*



# CheckPoint

## MATCHING:

**20. Developed rabies vaccine**

**21. Discovered x-rays**

**22. Used carbolic acid to kill germs .**

**a. Lister**

**b. Laennec**

**c. Pasture**

**d. Roentgen.**

# Biomedical firsts of the 20th-century:

**EKG Machine**

**Respirators**

**MRI, CT scans**

**Laser surgery**

**Organ  
transplants**

**Open-heart  
surgery**

**Pacemaker**

**Onward to new  
medical  
advances . . .**

**-The End-**