

# Micro Biology

By Walter Widmer

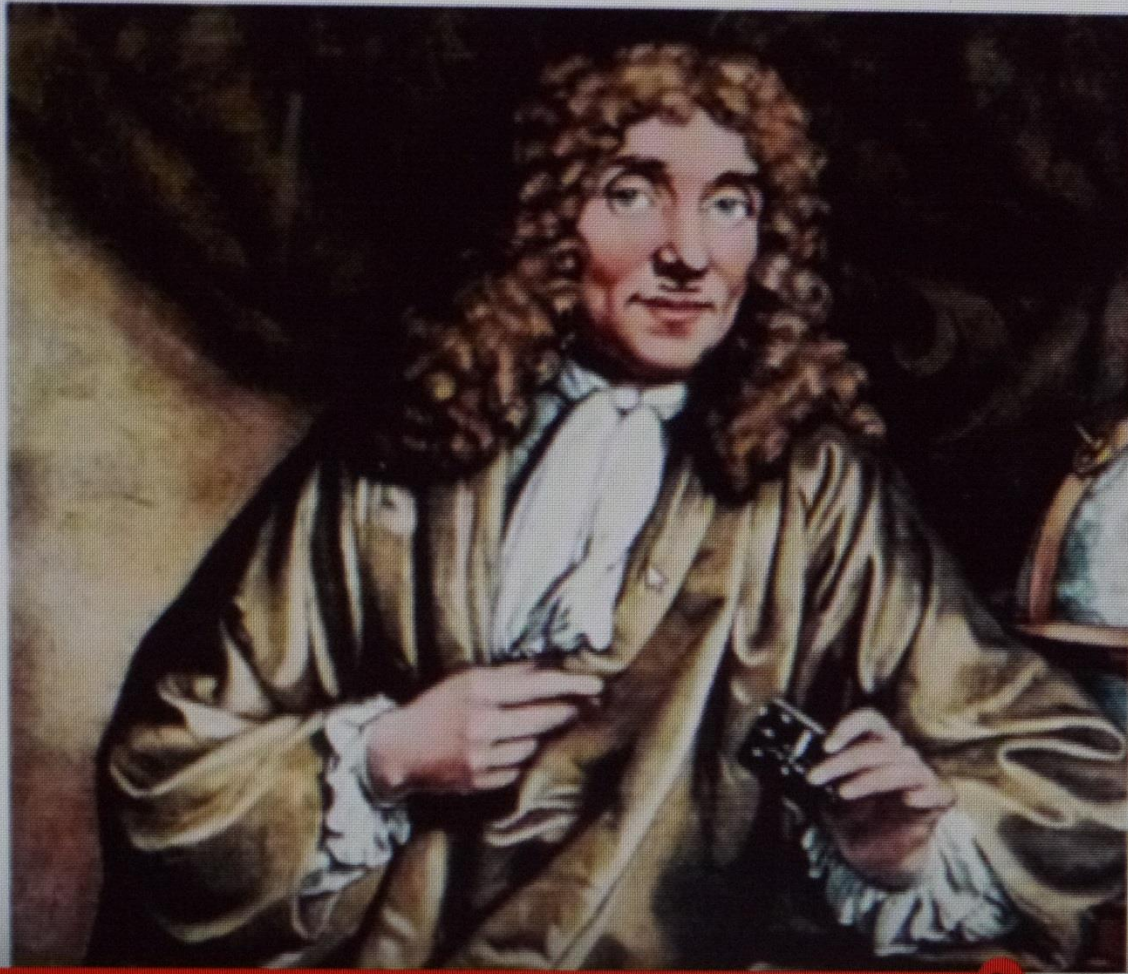
# History

Understanding the known world in the early 1800's. Education did not exist, people were illiterate. life expectancy was around 30 years. Homes were crowded, dirty and sanitation was not practiced. Availability to clean water was rare. Freedom was experienced only by the wealthy.

Doctors were taught death and illness were preordained and little could be done to cure the sick. Their training was centuries old. . .

# Antonie van Leeuwenhoek (1632-1723)

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- Dutch linen merchant
- First to observe living microbes
- Single-lens magnified 300X

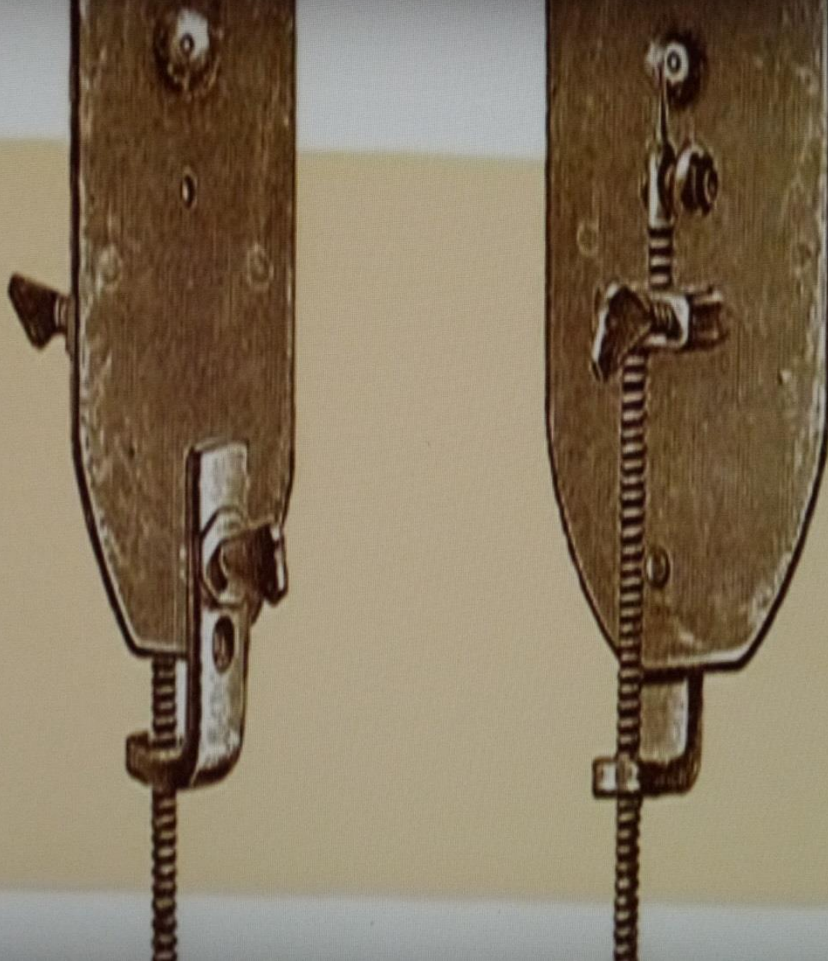


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Microscop van Van Leeuwenhoek



A photograph of the simple microscope used by van Leeuwenhoek. The object studied is placed on the tip of the needle and viewed through the small hole in the plate.

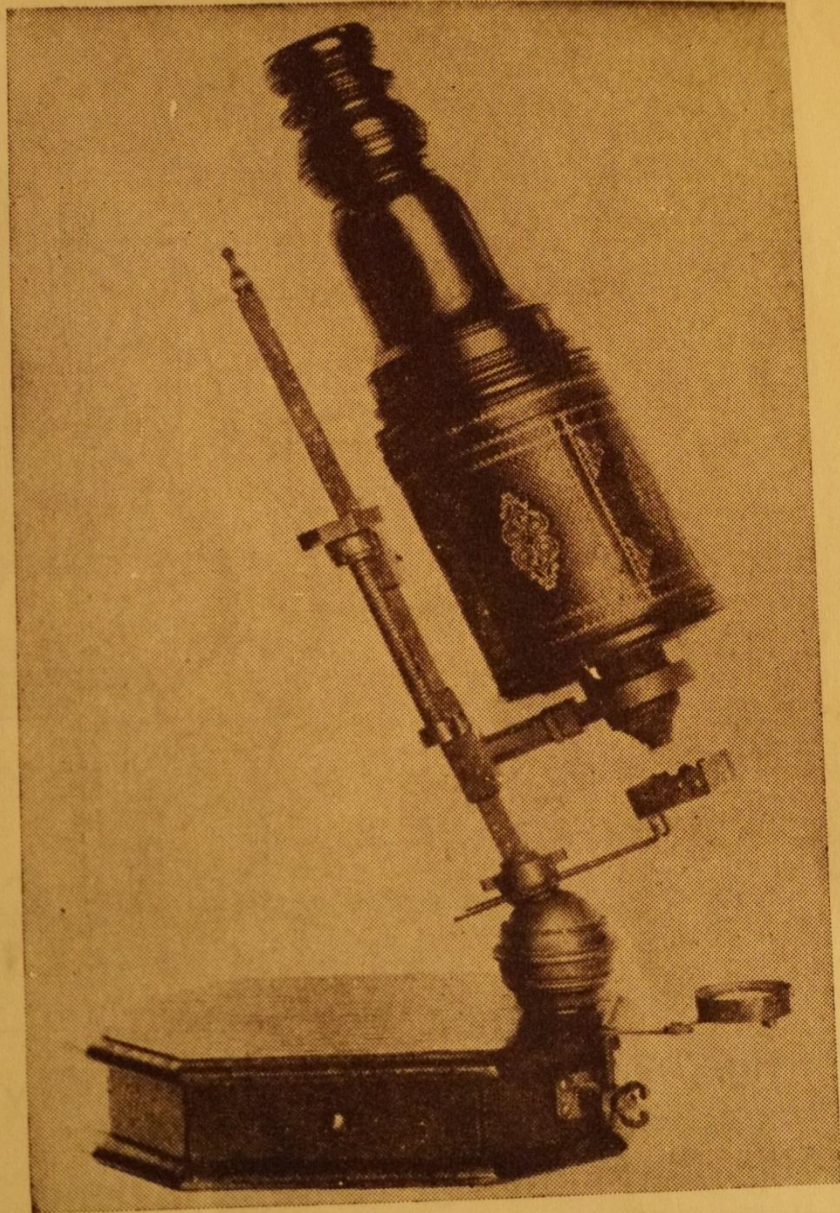


Fig. 2.1 One of Leeuwenhoek's many

A refined Microscope used by Leeuwenhoek in later years. The maximum power he achieved was around 300 X Leeuwenhoek discovered the microscopic world.




# Microbiology

- The study of organisms too small to be seen without magnification
- Microorganisms include:
  - Bacteria
  - Viruses
  - Fungi
  - Protozoa
  - Helminths (worms)
  - Algae



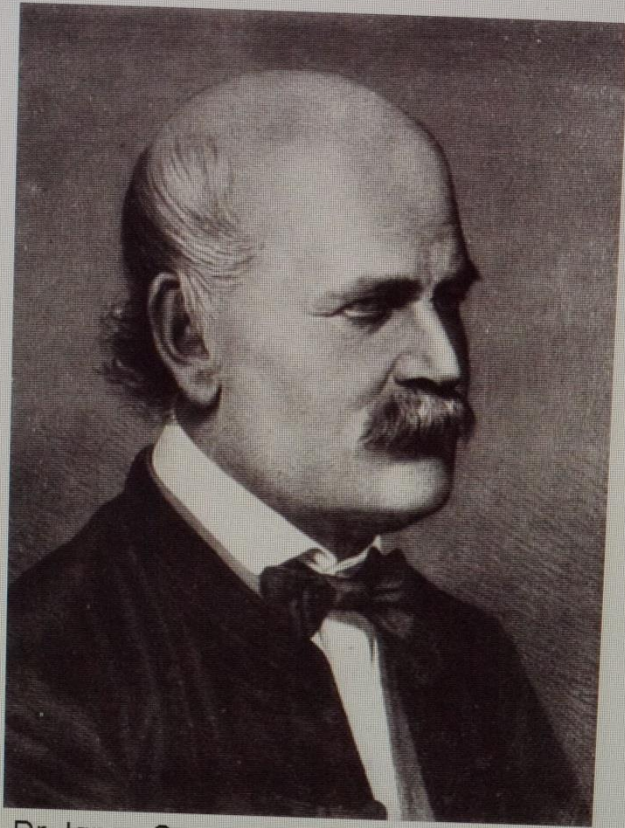


A portrait of Edward Jenner, a man with light brown hair, wearing a dark blue coat over a white shirt and a dark cravat. He is seated and looking slightly to the left of the viewer. The background is dark and indistinct.

**The Royal Society refused  
to publish his ideas.**

1749 – 1823 Edward Jenner observed that humans who were exposed to COW POX never died from Small Pox. He introduced Vaccination

## Ignaz Semmelweis



Dr. Ignaz Semmelweis, aged 42 in 1860  
copperplate engraving by Jenő Doby

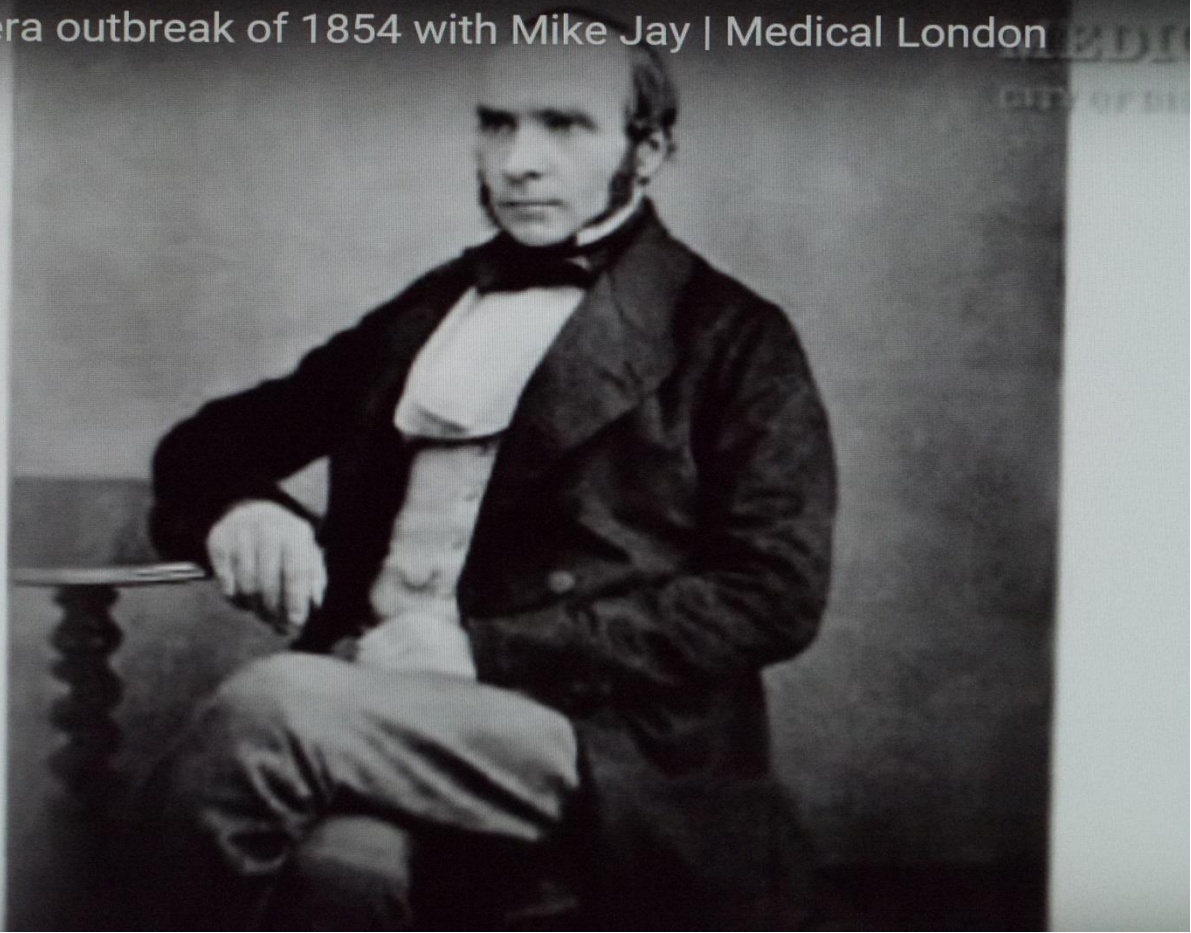
**Born** Semmelweis Ignác Fülöp  
July 1, 1818  
Buda, Hungary

1849 Semmelweis was a Doctor in a Vienna Hospital. A common practice was “blood letting” a treatment that often killed the patient. “Child Bed Fever” was common among women giving birth. Semmelweis strongly advocated washing hands. The medical profession resisted him and forced him from the hospital. It required decades for the practice to be preformed. Today Semmelweis is remembered as a Hero.



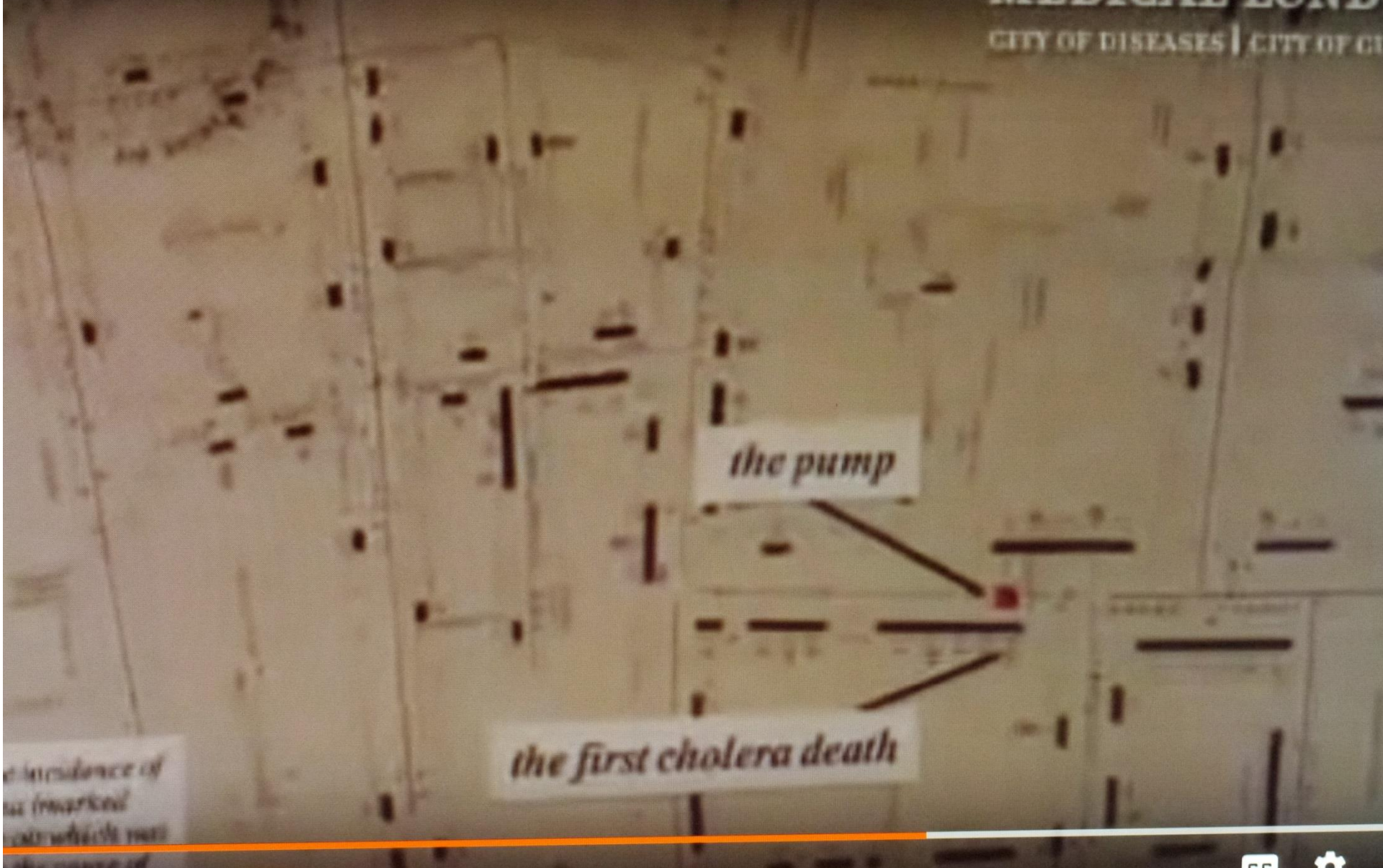


Semmelweis statue at the [University of Tehran](#) 📍

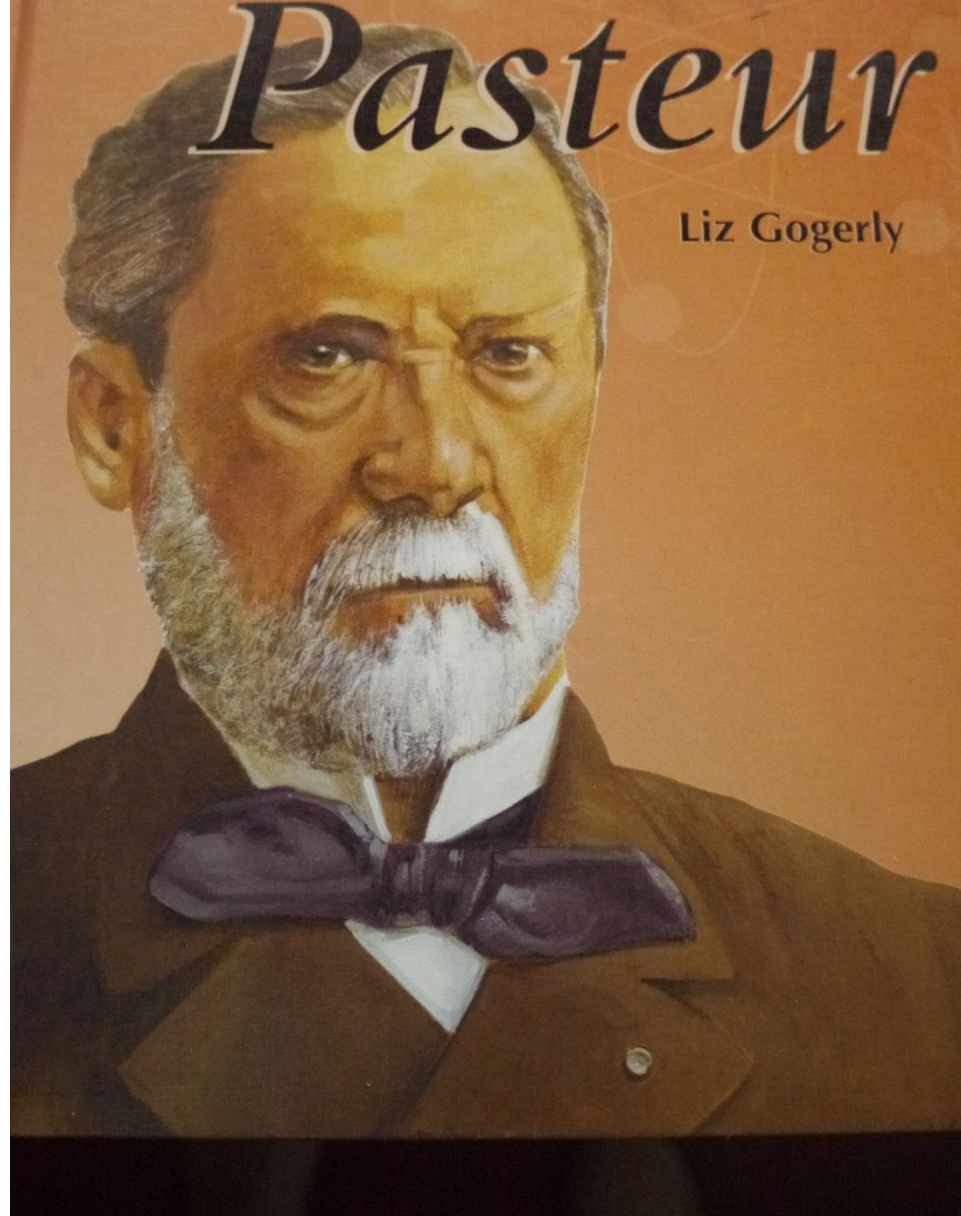


1854 Doctor John Snow realized Cholera patients all lived near a well which supplied the water for the people. The city fathers had to be convinced of the problem and only then did they close of the well. The actual well head is a symbol of the event.



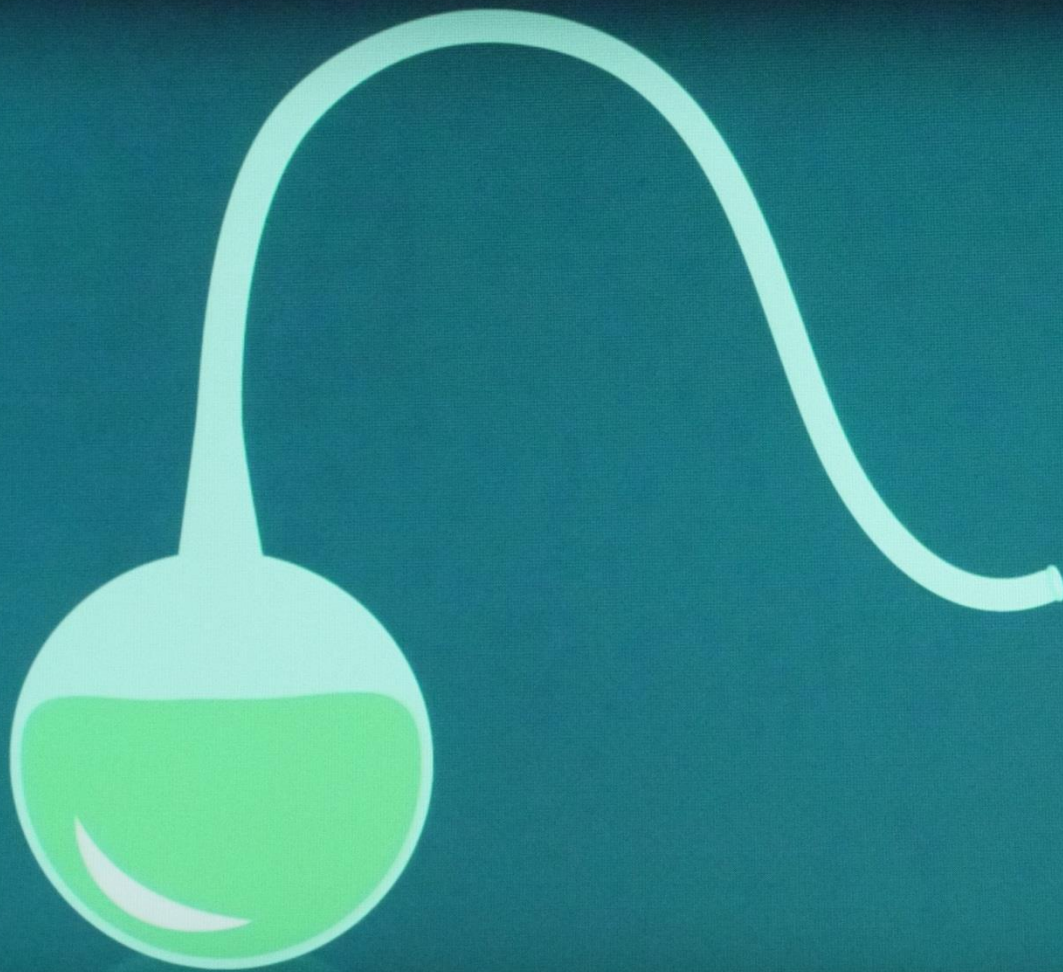


The map used by Snow. The dark marks represent cholera cases.



Louis Pasteur had the first of 4 Strokes at the age 43. His dedication to his work never ceased. He died at the age of 72.

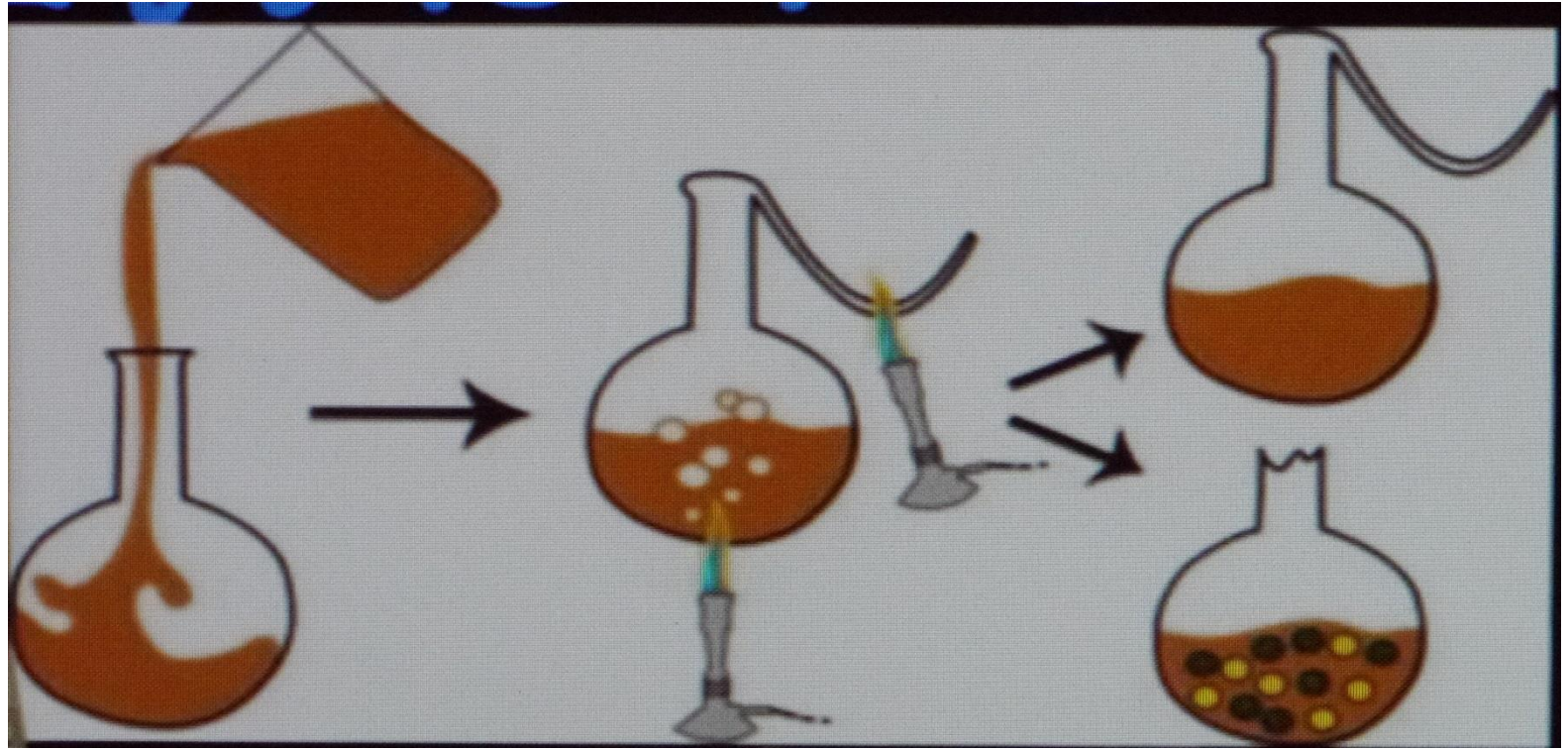




## SWAN-NECK FLASK

Designed so that a **STERILE LIQUID**  
**COULD BE EXPOSED** to the air  
but **NO OUTSIDE PARTICLES-**  
-like dust or bacteria-  
-could get past the **CURVE**  
**IN THE FLASK'S NECK.**





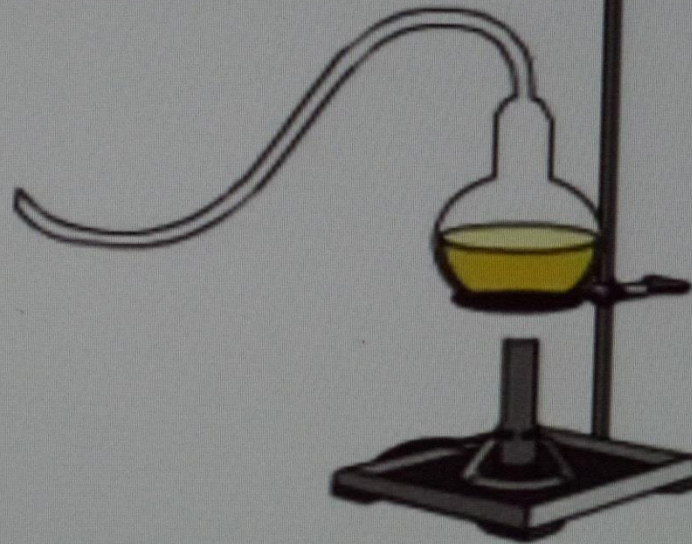
Broth poured into open flask, Next it is boiled and a twisted tube is produced restricting air flow. Upper right no growth develops but in the broken neck it is contaminated and organisms grow.



## Pasteur's Experiment



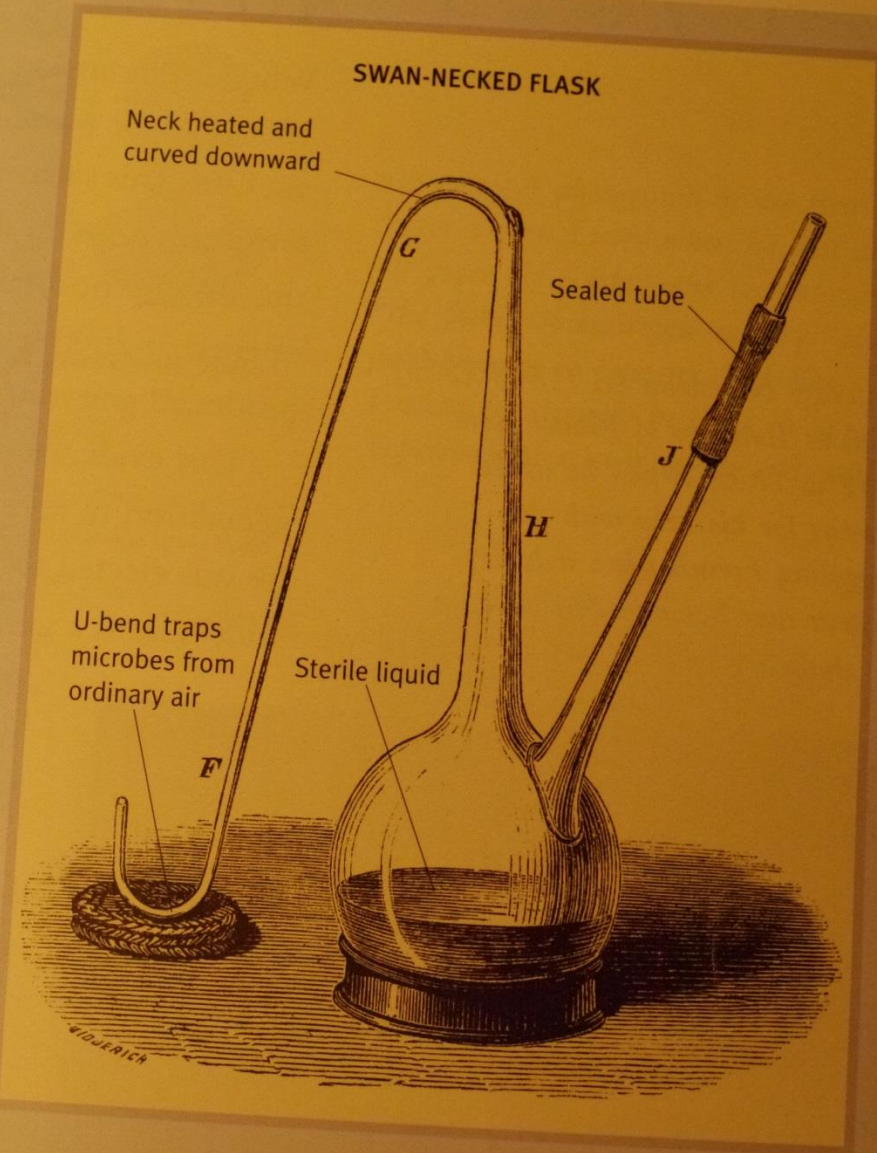
Experiment 1



Experiment 2

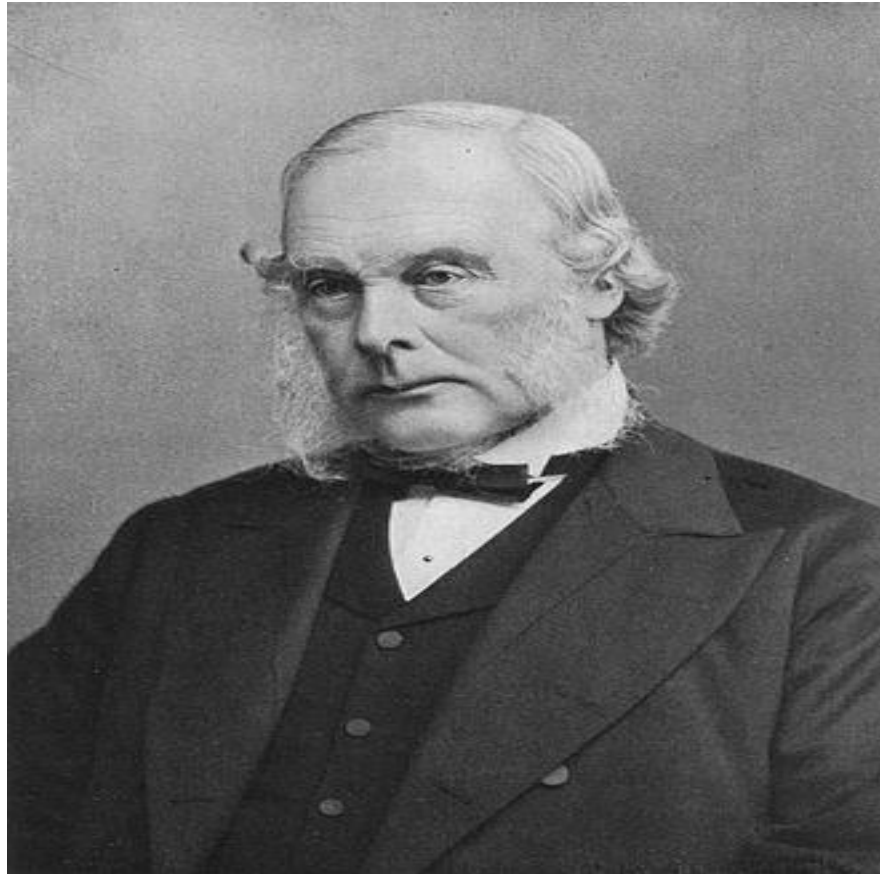
Pasteur boiled the contents of both flasks. # 1 cooled and was open to the air, it became infected. # 2 was capped with a curved tube, still open to the air but the curvature prevented easy access. Flask # 2 did not become infected. The air contained Microorganisms.

Drawing produced by Pasteur illustrating his swan necked flask to disprove “Spontaneous Generation”.



streets  
and  
ABOVE: A copy of Pasteur's own  
drawing of his swan-necked flask.





1887 Joseph Lister after studying Pasteur's work realized that organism could cause sickness in operations. "Father of Modern Surgery".



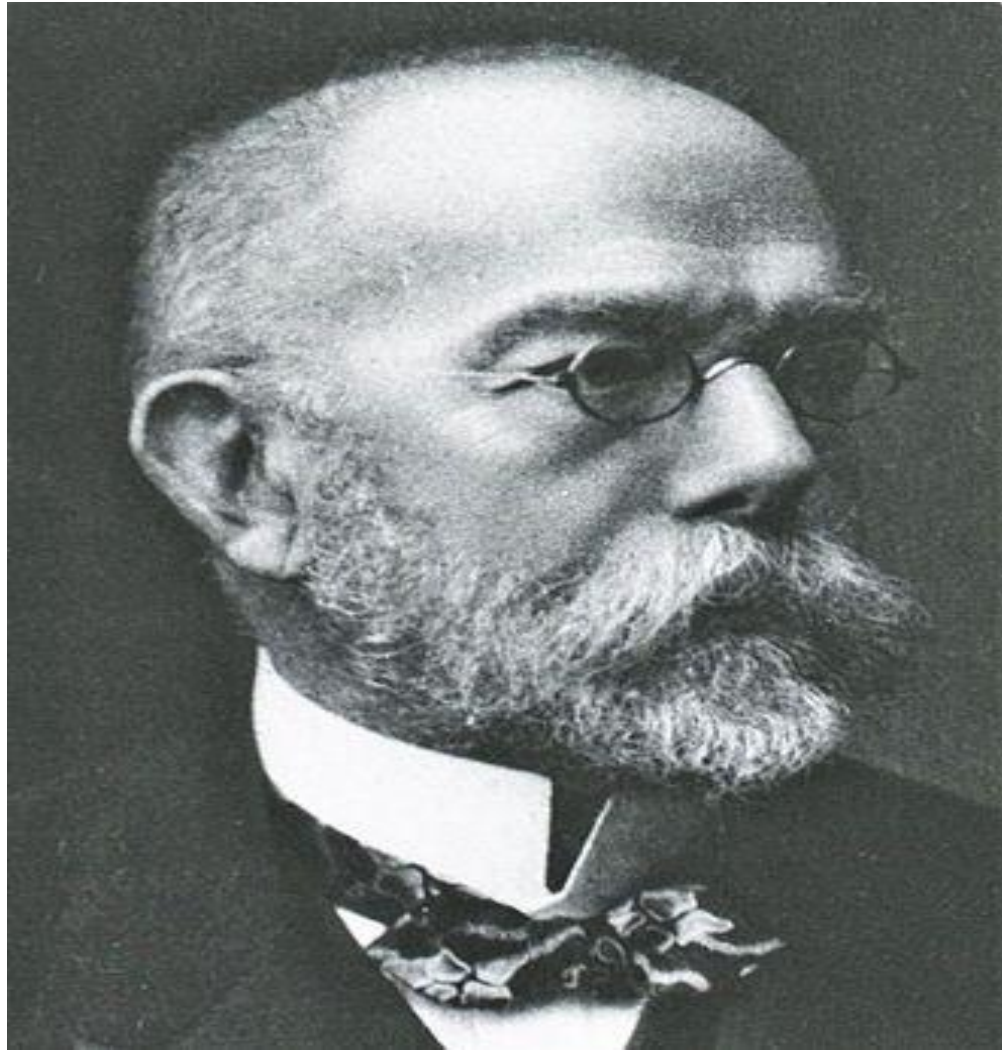
Chickens also got Cholera. Pasture produced a vaccine for the chickens. Another example of his achievements.



ir's Revolutionary Vaccines



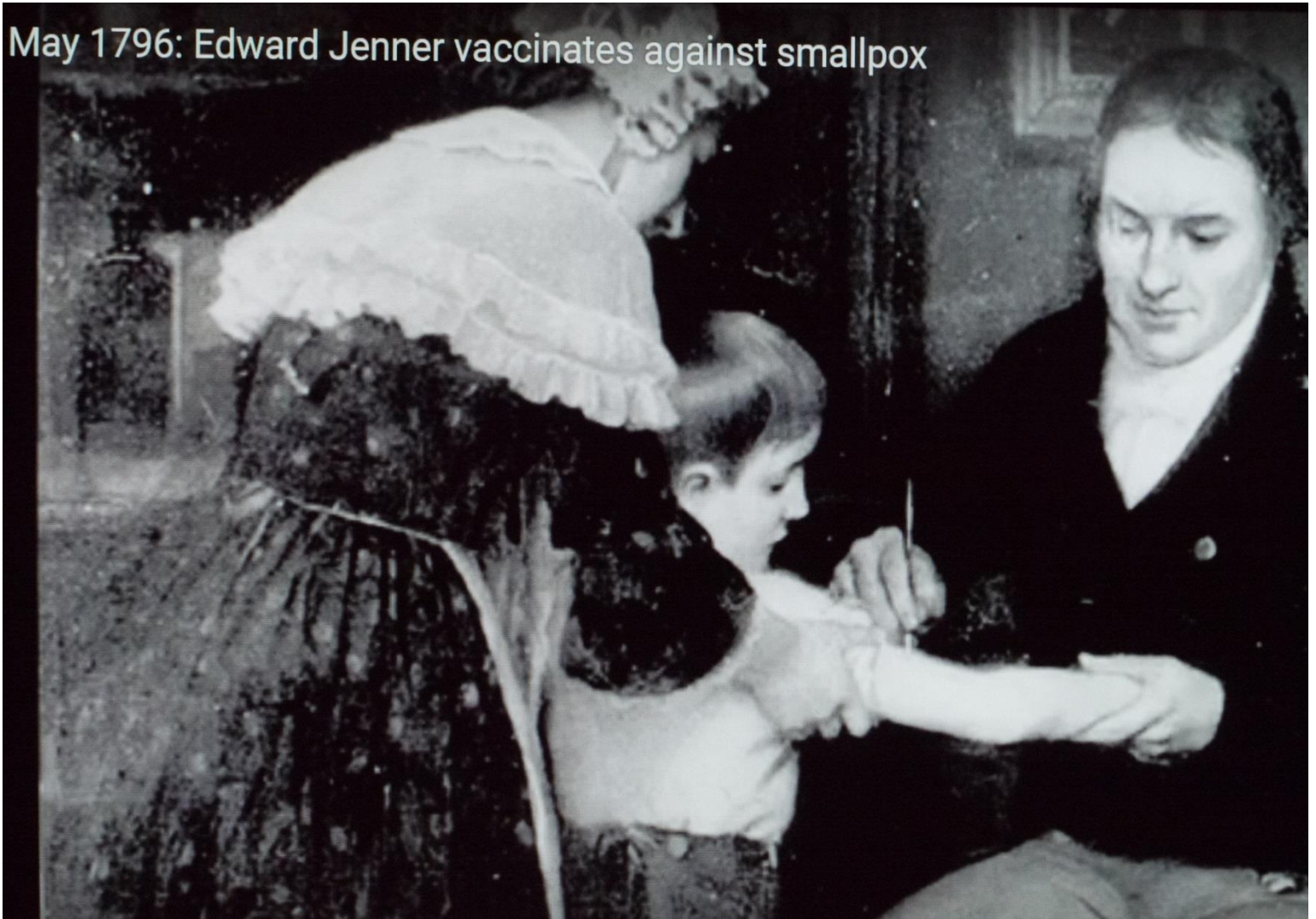
These animals represent the Sheep and cattle industries saved by Pasteurs vaccine for Anthrax.



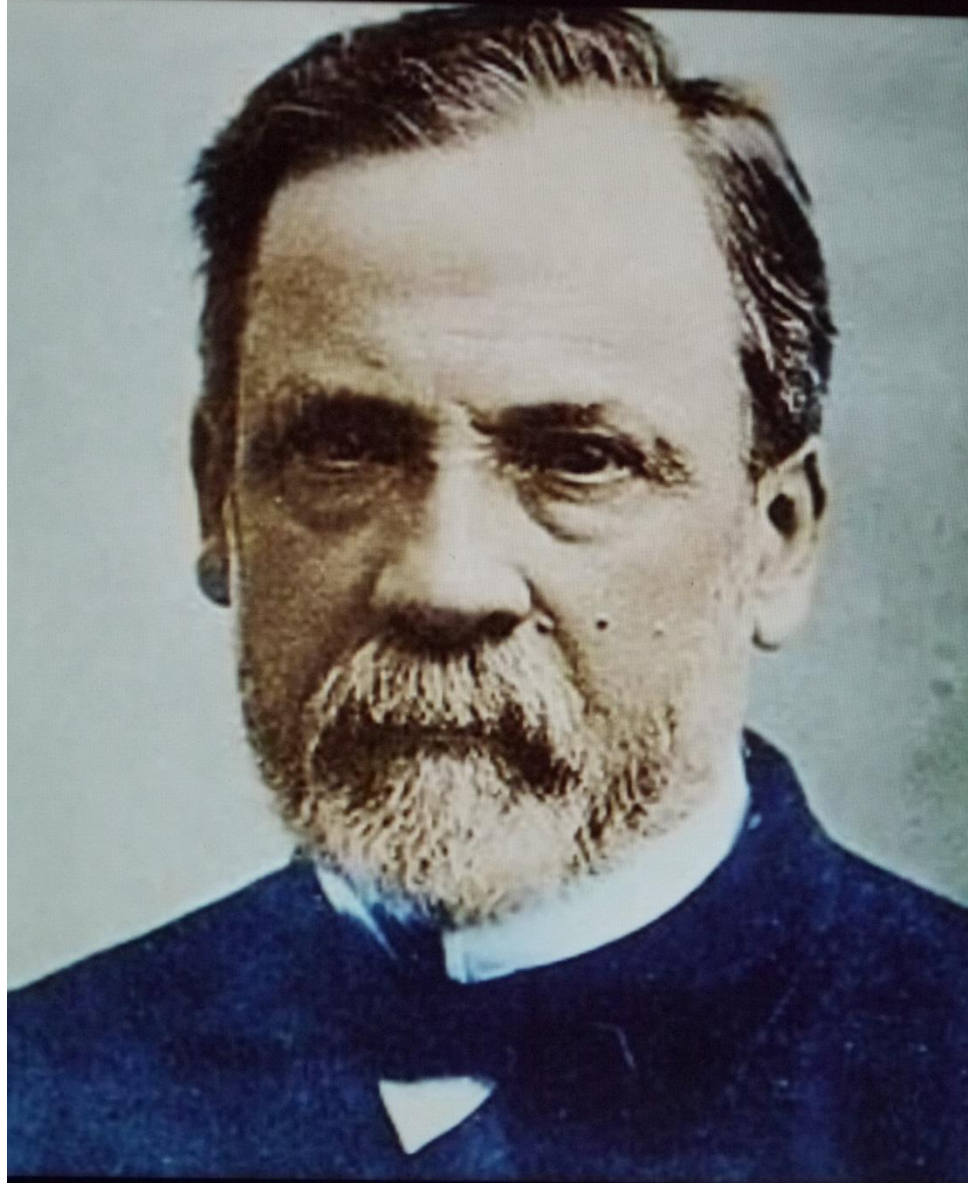
1882 Robert Koch established a procedure to study microscopic organisms. And identify & name them.



May 1796: Edward Jenner vaccinates against smallpox



1885 Pasteur inoculating a 9 year old child against Rabies – first time ever preformed on a human.



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