

HISTORY OF MICROBIOLOGY

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Page numbers in TFC's 8th: pp 1- 17, Black's 6th: 1-10, Bauman's 4th: 1-25, 3rd: 1-53

Ancient Practical Arts: Birth of "civilization": agriculture between Tigris and Euphrates:

Developed grain, beer, bread, grapes, wine, milk, cheese: all require microbes (p 7, 13)

Significance of microbes?

Prior to 20th century: 30% of world's inhabitants *died* of TB

Almost 50% children died from infectious disease

Even today: 50% child mortality due to infectious diseases (*still*)

CELLS (recognition depended on *new technology* of **microscope**)

1665 **Robert Hooke** *Micrographia* English, noted pores in cork: called cells

1673 **Anton van Leeuwenhoek**

(p. 2) major improvements in "microscope". Looked at "sediments" from his teeth: more 'animalcules' in his mouth "moving in the most delightful manner" than in all of Holland. peppercorn infusions, described morphologies of bacteria.

1838-39 **Matthias Jakob Schleiden and Theodor Schwann**

(botanist and zoologist), deduced that all living matter composed of cells.

= **UNIFIED CELL THEORY.**

SPONTANEOUS GENERATION CONTROVERSY (p 7-10)

Hippocrates (5th Cent BC) proposed miasma (foul gas) caused putrefaction

Aristotle (325 BC) thought that life arose spontaneously

van Helmont (1577-1644) formula for mice: dirty rags, wheat bran, place in dark open barrel, 2 weeks - 1 month would have mice.

i.e., Maggots arose "spontaneously" from decaying meat?

Francesco Redi (p 8) (1626-1697) 1668

Italian, **first true scientific experiment**, tested spontaneous generation hypothesis: sealed three jars tightly with meat, left three jars unsealed. Open jars produced maggots, sealed did not. But critics thought that fresh air was required. He repeated expt so that air could get in, using gauze to keep out flies, deduced that maggots appeared only when flies preceded

John T. Needham (1713-1781) 1745

heated infusion of chicken broth and corn, poured into covered "clean" flasks. Soon contaminated (turbid: Latin, confused, disordered, crowd). Said could only be due to spontaneous generation.

Lazzaro Spallanzani (1729-1799) 1765

modified Needham's experiment: the fluid was sealed in the flasks, and *then* boiled. They did not show contamination if sterilized in the sealed flask

Laurent Lavoisier 1743-1794

Discovered oxygen in air. Many thought this could be the "vital principle."

Nicolas Appert: 1810 Invented canning.

Perfected **autoclave**: placed food in thick bottles, boiled for 5 hrs, sealed with cork and wax. Used by Napoleon, lent strength to his army.

Rudolf Virchow 1858

German: biogenesis; all cells came from cells: *Omnis cellula e cellula.*

Louis Pasteur (1822-1895) 1861

(p 9, 12 etc) filled long-necked flasks with beef broth. Bent necks of some into S shape, other straight. Reasoned that S trapped airborne contamination. Boiled to sterilize. Deduced that micro organisms ubiquitous, can be destroyed by heating. Blocking access to medium will prevent growth, led to development of aseptic [not putrid] technique:

ASEPTIC TECHNIQUE:

Once microbes are eliminated, the environment will remain sterile until microbes are reintroduced.

Aseptic manipulations are some of the most important maneuvers to be learned in Microbiology.

