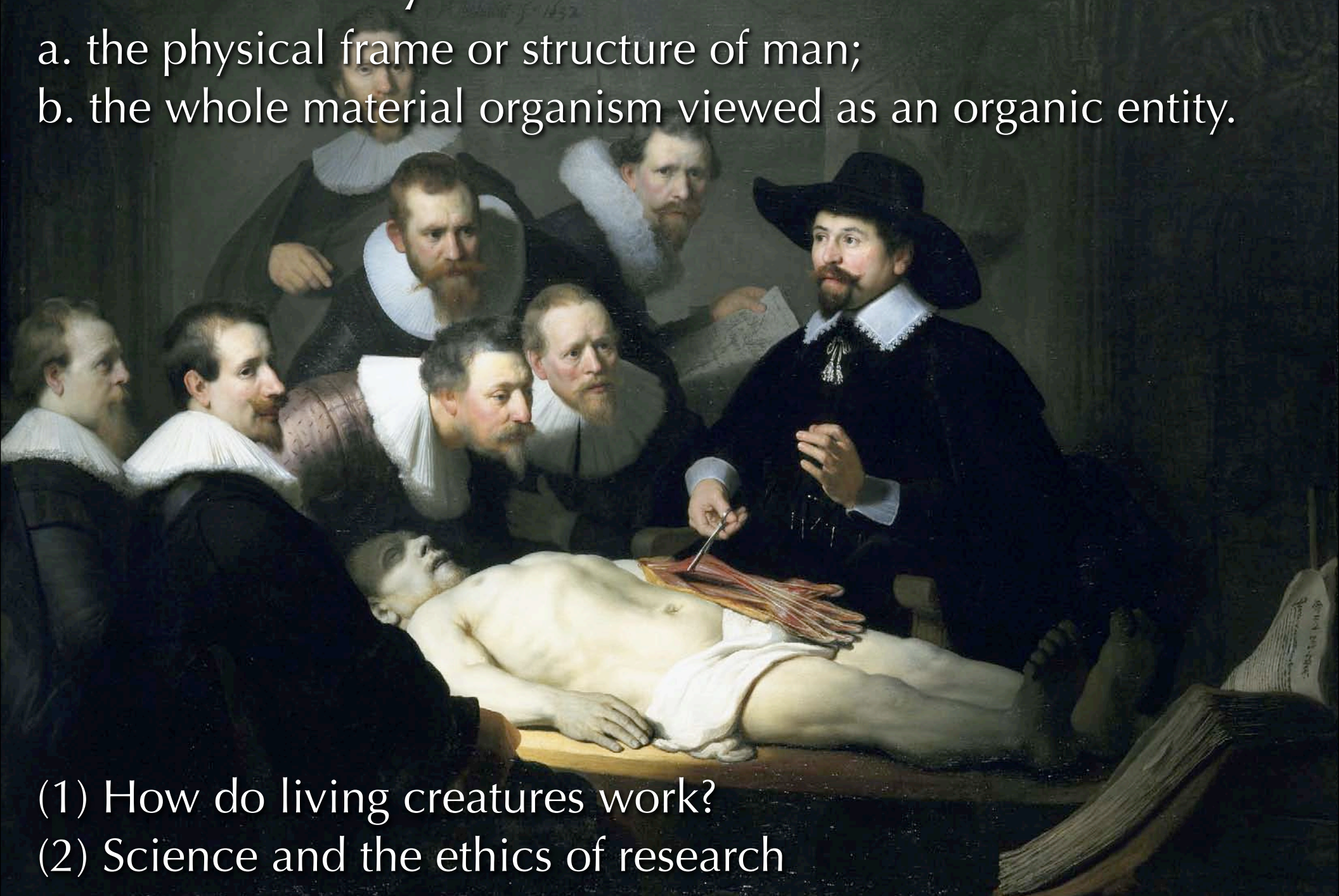


Cell Theory
STS.003, Fall 2010

Unit 4: Body

- a. the physical frame or structure of man;
- b. the whole material organism viewed as an organic entity.



- (1) How do living creatures work?
- (2) Science and the ethics of research

History of Human Dissection

Advertisements for Bodyworlds removed due to copyright restrictions.

See: <http://www.bodyworlds.com>



Aristotle:

Matter vs. Form

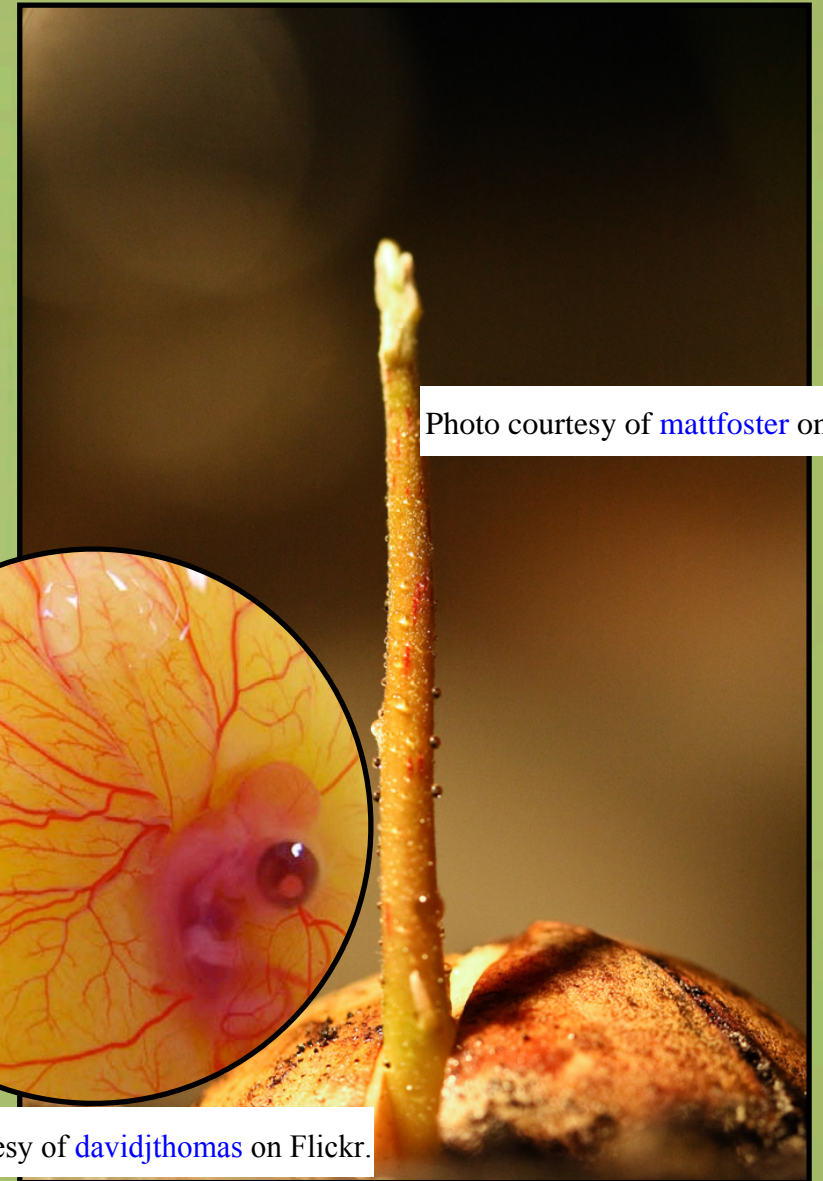


Photo courtesy of [mattfoster](#) on Flickr.

Photo courtesy of [davidjthomas](#) on Flickr.

Actual vs. Potential

Johann Blumenbach

bildungstrieb
“formative pressure”

Photos of the developmental stages of a duck, from embryo to duckling, removed due to copyright restrictions.



D. Johann Friederich Blumenbach
der Med. Prof. ord. zu Göttingen
über
den Bildungstrieb
und das
Zeugungsgeschäfte.



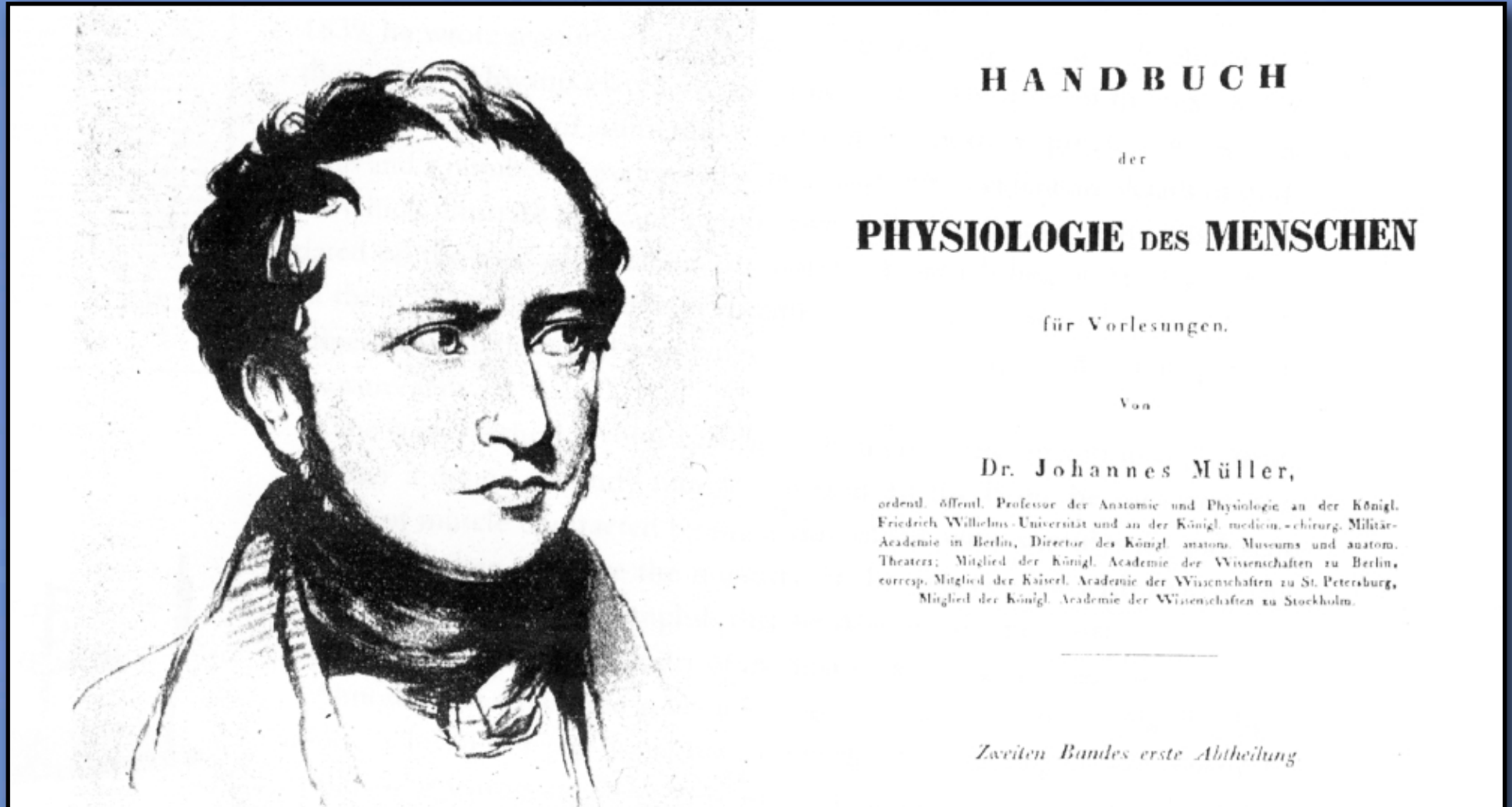
Göttingen,
bey Johann Christian Dieterich, 1781.

Stockton-Hough
LIBRARY.

Studies of Hydra: Regeneration

Photo of a hydra removed due to copyright restrictions.

Vitalism and “Romantic Science”



Johannes Muller, Professor of Physiology
University of Berlin, 1833-1858



Romanticism and Spontaneous Generation

Organic Life beneath the shoreless waves
Was born and nurs'd in Ocean's pearly caves
First forms minute, unseen by spheric glass,
Move on the mud, or pierce the watery mass;
These, as successive generations bloom,
New powers acquire, and larger limbs assume;
Whence countless groups of vegetation spring,
And breathing realms of fin, and feet, and wing.

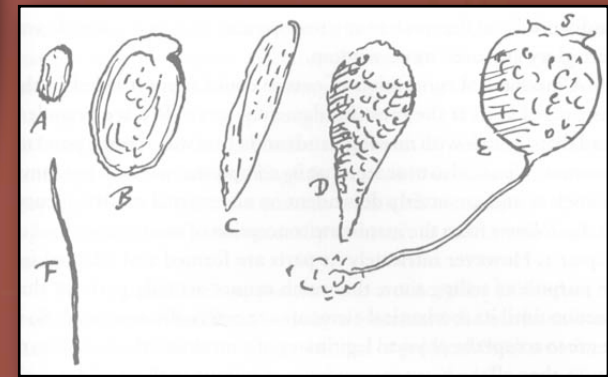
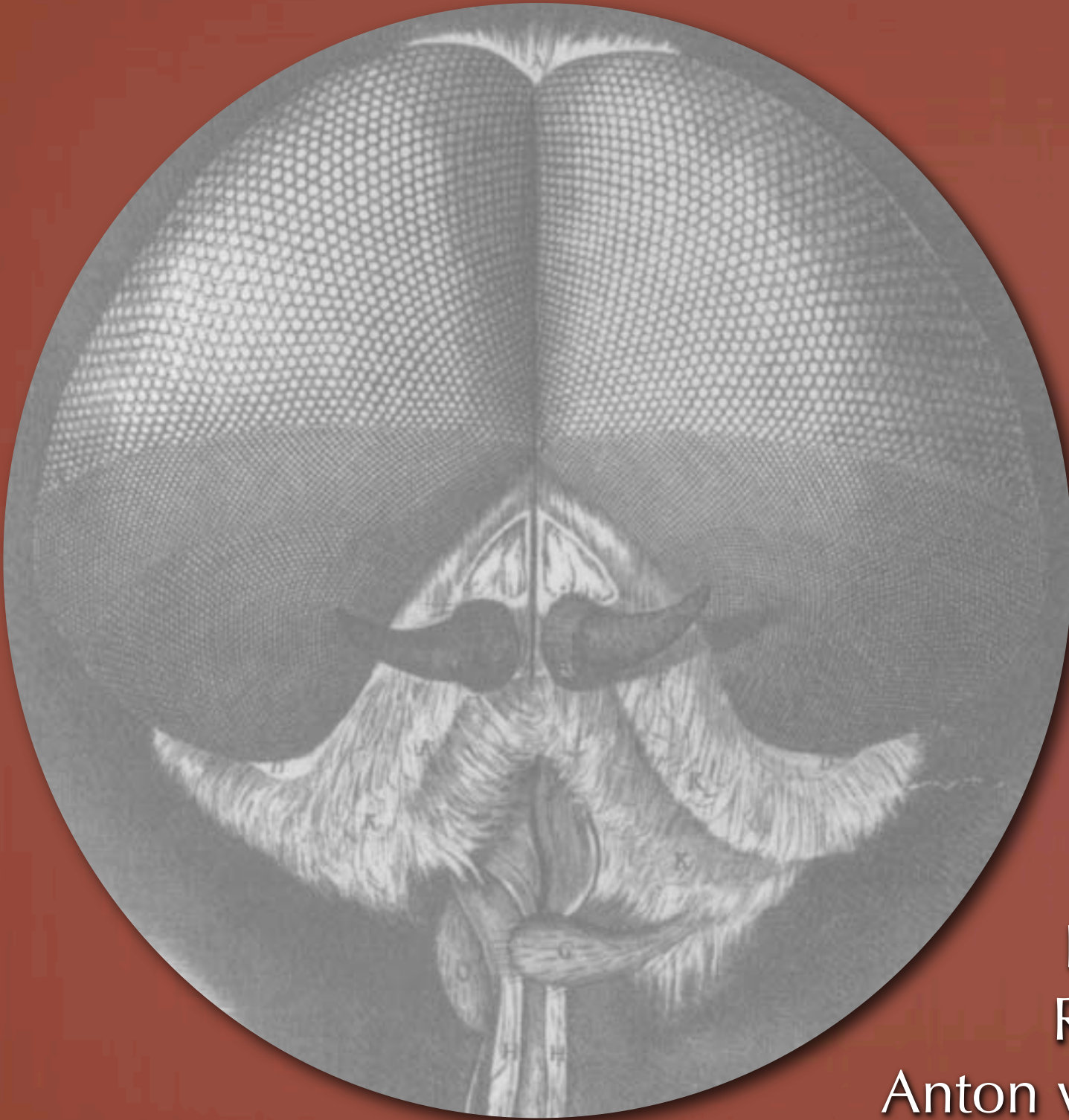
-- Erasmus Darwin, 1803



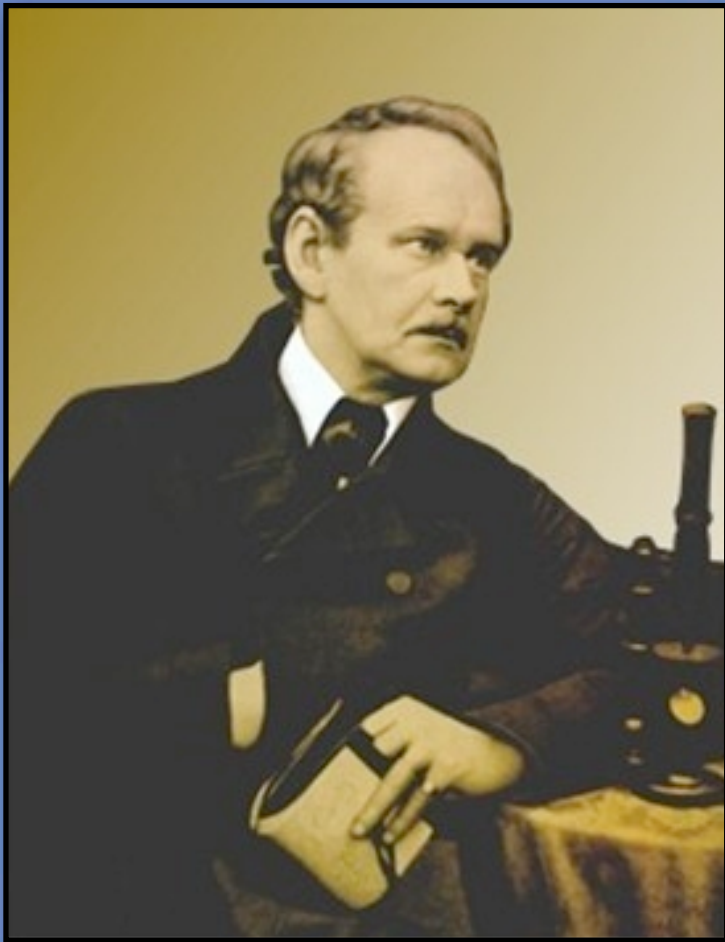
Lazzaro Spallanzani
(1729-1799)

Experiments on Spontaneous Generation

Diagram of spontaneous generation experiments
removed due to copyright restrictions.



Early Microscopy:
Robert Hooke and
Anton van Leeuwenhoek



Matthias Schleiden,
Structure of Plants, 1838

Theodor Schwann: Cell Theory



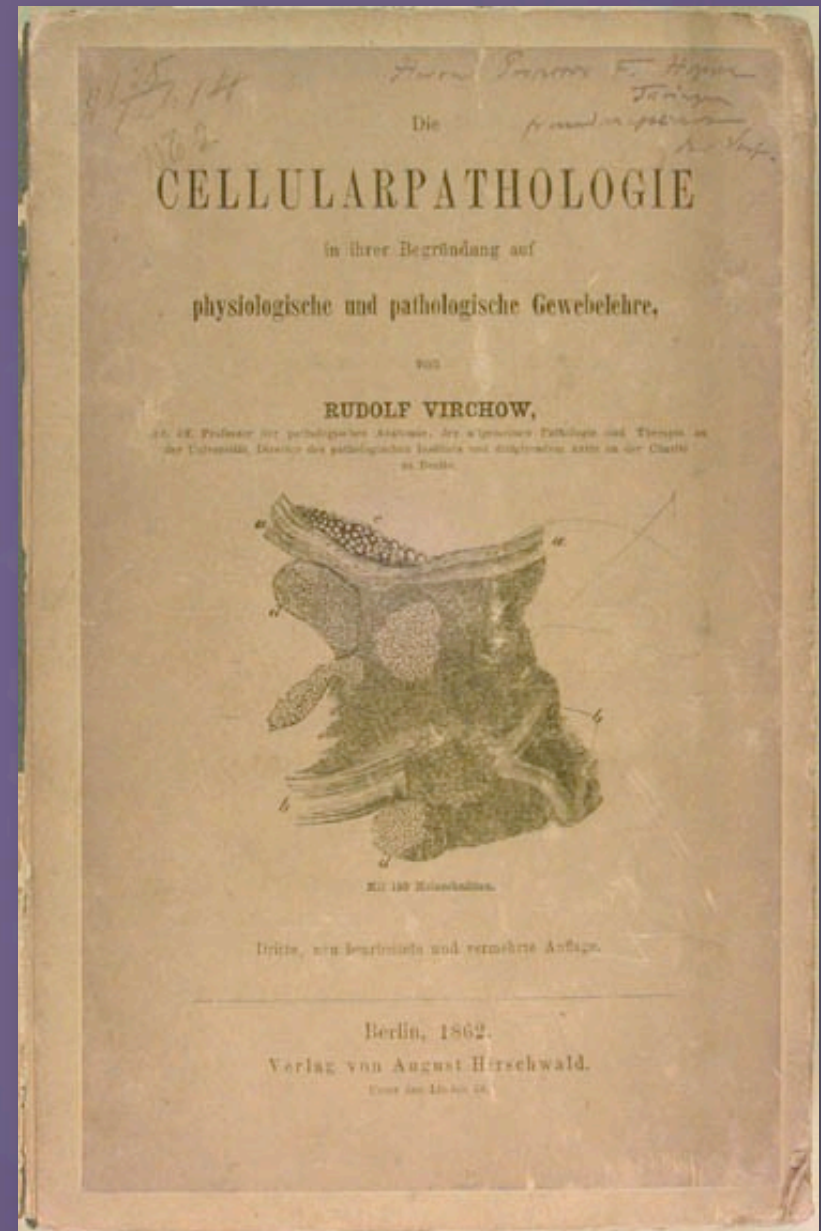
*Microscopic Researches into Accordance in the
Structure and Growth of Animals and Plants (1839)*

Berlin Physical Society, 1845

“there are no force in organisms other than physicochemical forces”



Rudolf Virchow,
Cellular Pathology





Images of sodium, potassium, magnesium, and iodine removed due to copyright restrictions.

Humphrey Davy Electrochemistry and Elements

Michael Faraday



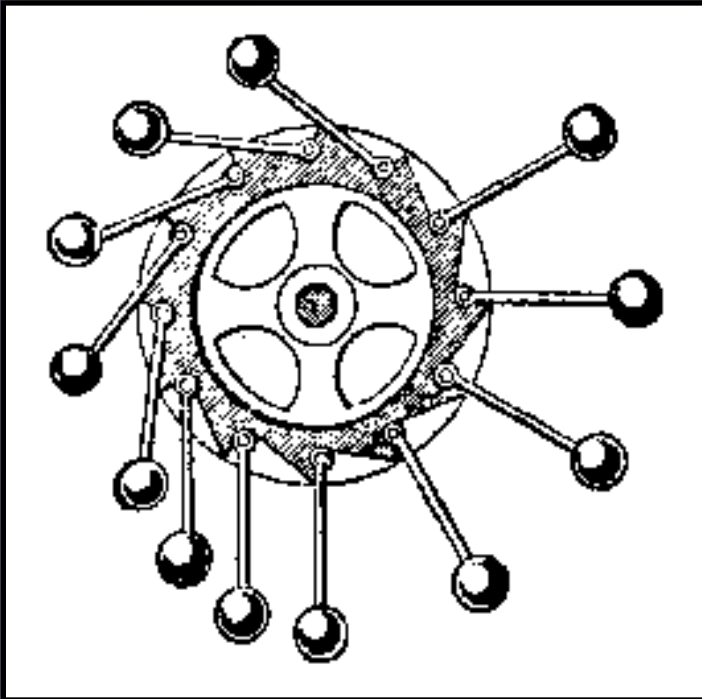
Image of benzene experiments due to copyright restrictions.

Friedrich Wöhler, 1828

Ammonium Cyanate \longrightarrow Urea

Image of a German stamp
commemorating Friedrich
Wöhler removed due to
copyright restrictions.





Hermann Helmholtz

Animal Heat, Vitalism,
and Perpetual Motion

“The animal body therefore does not differ from the steam-engine as regards the manner in which it obtains heat and force”

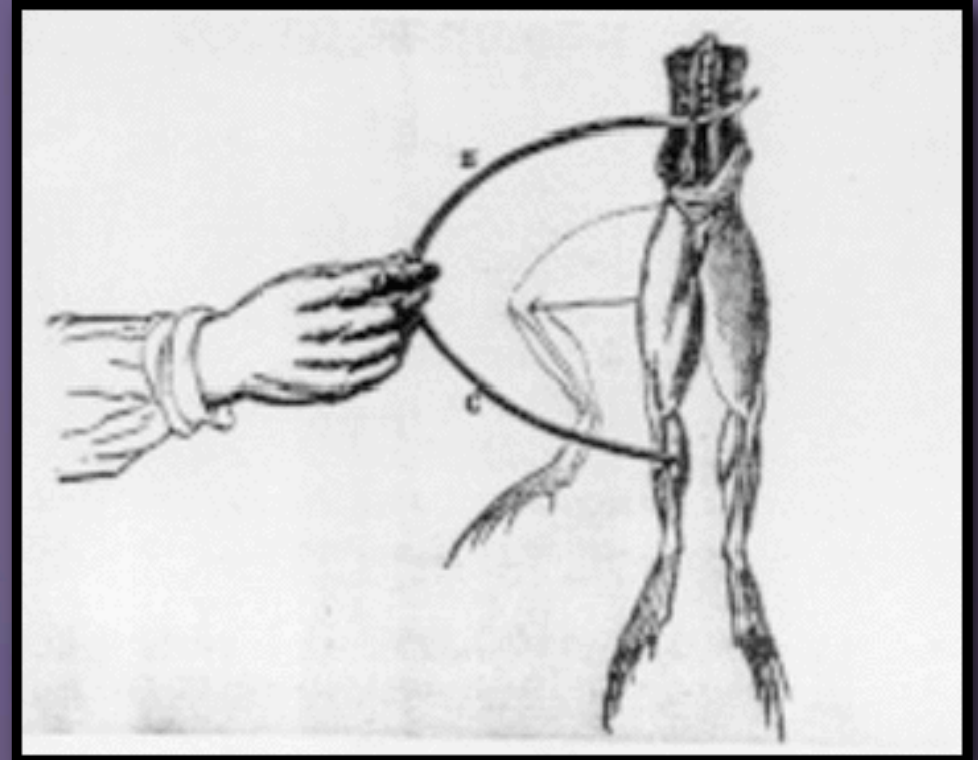


Illustration of Pasteur's experiment to disprove spontaneous generation removed due to copyright restrictions.



Image of a flask used by Pasteur removed due to copyright restrictions.

Louis Pasteur

Disproof of Spontaneous Generation

Yeast



Photo courtesy of [tessawatson](#) on Flickr.

Photo courtesy of [ChristmasStockImages.com](#).

Fermentation: Wine, Beer, and Microbes



Diseases of Silkworms: Bacteria



Robert Koch, Studies of Anthrax, 1876

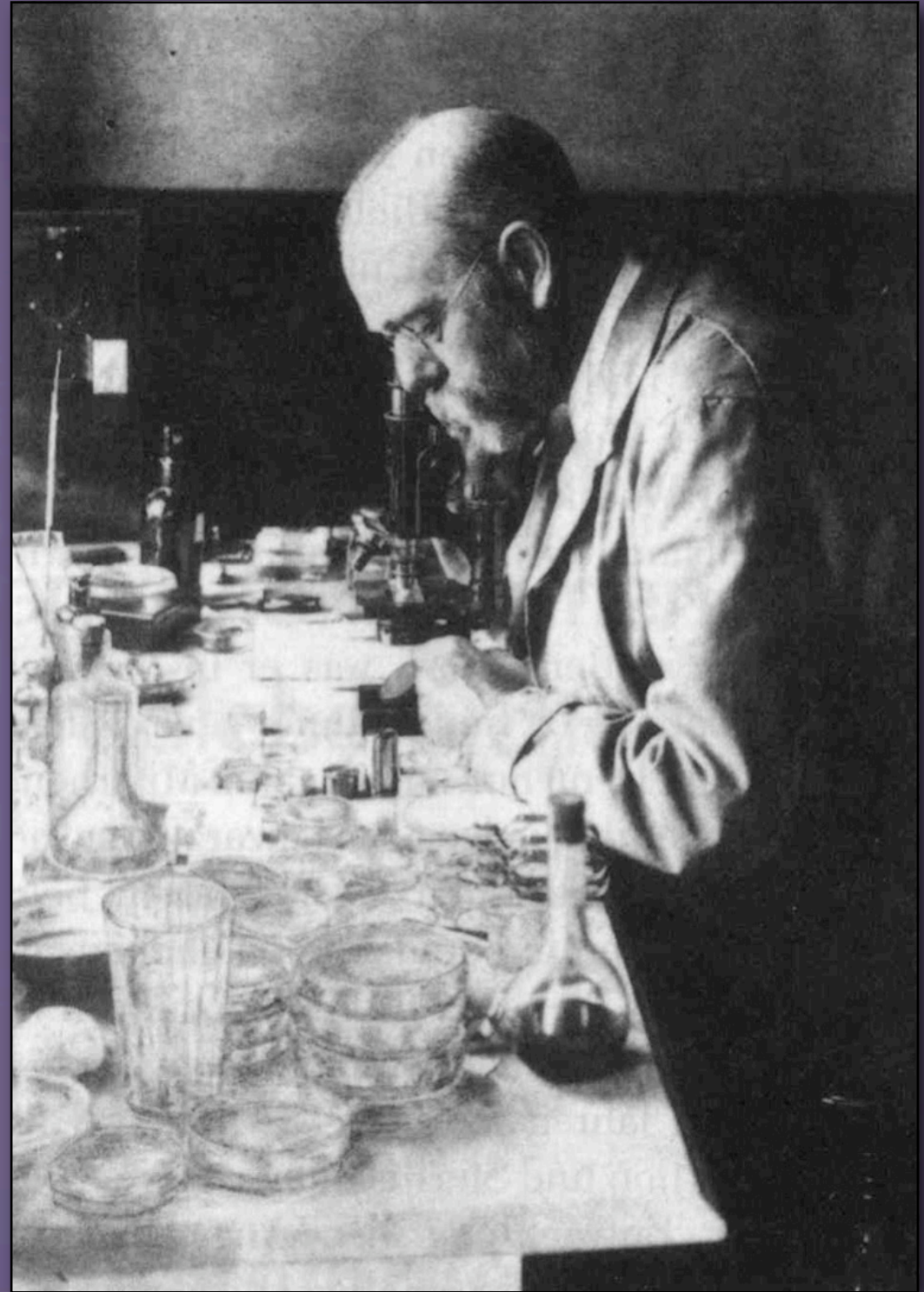


Photo courtesy of [reinholdbehringer](#) on Flickr.

Image of anthrax removed
due to copyright
restrictions.

Koch's Technology: Petri Dishes and Pure Cultures

Photo of a petri dish culture removed
due to copyright restrictions.



Koch's Postulates

Illustration showing how pure cultures are created removed due to copyright restrictions.

- Pathogen found in all victims
- Can be isolated and grown in pure culture
- Causes disease when infected into healthy animal
- Can be re-isolated from the new victims



Robert Koch, 1882
Mycobacterium tuberculosis

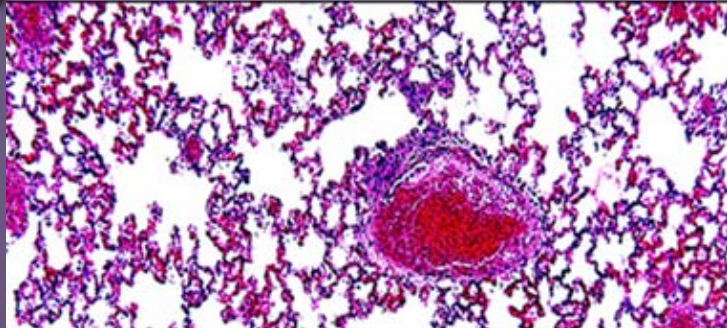


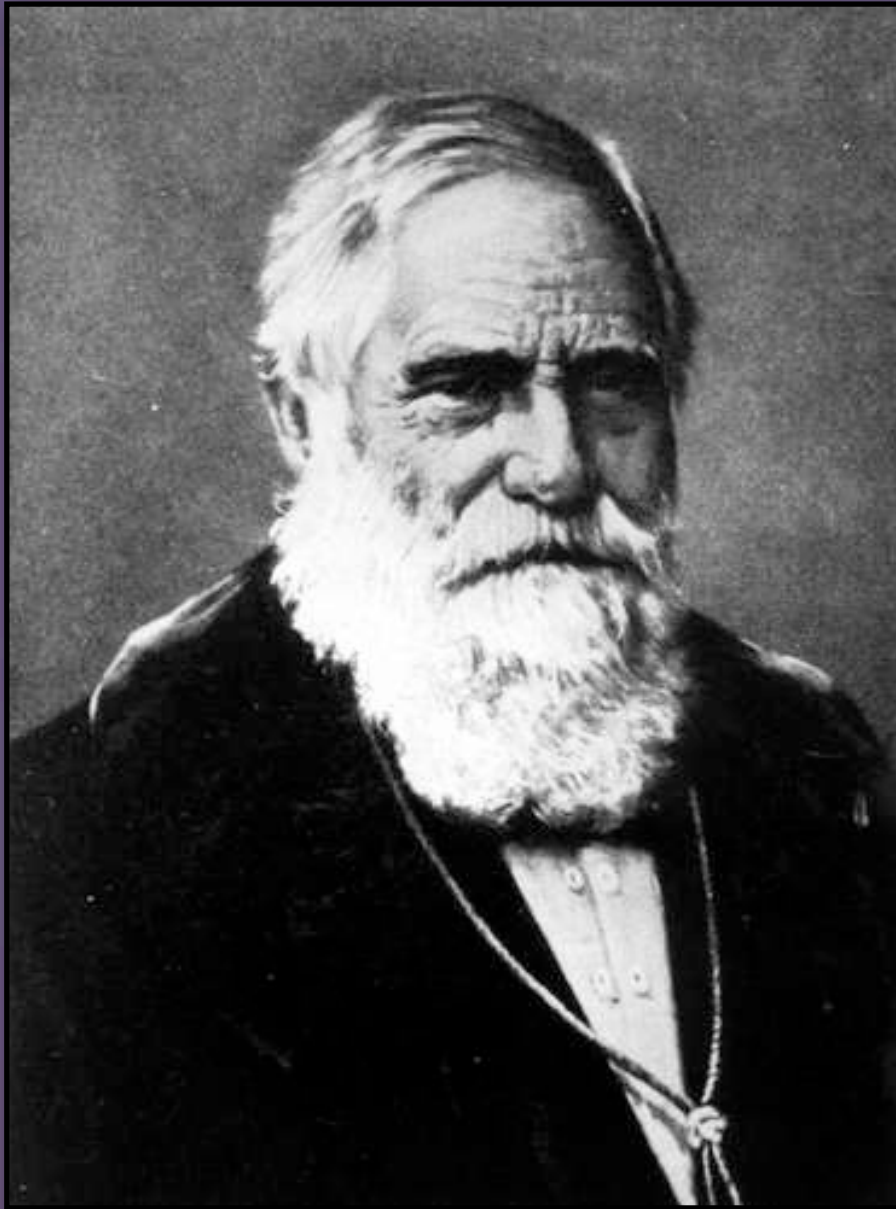
Photo courtesy of [AJC1](#) on Flickr.



Photo courtesy of [AJC1](#) on Flickr.

Koch's Egypt Expedition: *Vibrio cholerae*, 1883





Max von Pettenkofer:

Testing the etiology of cholera

“Even if I be mistaken, and this experiment that I am making imperils my life, I shall look death quietly in the face, for what I am doing is no frivolous or cowardly act of suicide, but I shall die in the service of science as a soldier perishes on the field of honor.” -- 1892

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STS.003 The Rise of Modern Science
Fall 2010

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