



The innovative Estonia: from top science to e-government

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Guest Lecture Course in
Masaryk University

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Outline of the course

- History of Science in Estonia
- Current Cutting-Edge Estonian Science
- E-stonia: Pioneering Public e-Services
- Not just Skype: the Sweet Fruits of Estonian Start-Up Culture
- Science and Innovation Communication and Education in Estonia

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ESTONIA

- Area: 45 339 sq.km
- Population: 1 311 800
- Capital: Tallinn

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Extremely short Estonian history*

- First traces of settlement approx. 9000 BC
- Independent tribes until 13th Century
- The Estonian Crusade 1208-1227
- -> Danish, Swedish, German, Polish, Russian control
- Independence in 1918 (February 24)
- Occupied between 1940-1991

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University of Tartu

1632 – Academia Gustaviana



1802 – Universität Dorpat

1919 – University of Tartu

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Explorers



Johann Adam von Krusenstern

- First Russian circumnavigation (1803-06)
- „South Sea Atlas“



Otto von Kotzebue

- Two circum-navigations (1815-18, 1823-26)
- Oceanographic study of the Pacific



Fabian Gottlieb von Bellingshausen

- Antarctic expedition in 1819-21



Ferdinand von Wrangel

- Arctic Sea travels 1820-24



<http://www.muuseum.ut.ee/teadlased-maailmakaardil/>



Georg Wilhelm Richmann (1711-1753)

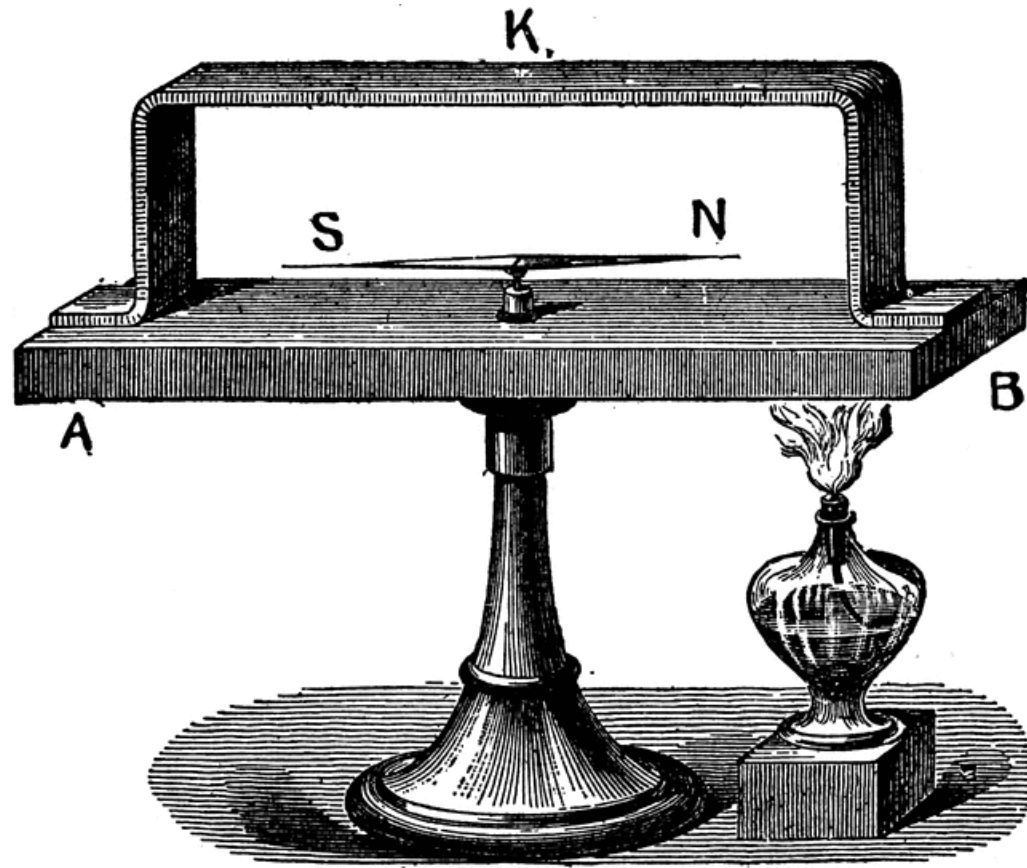
Proved that thunder
clouds contain electric
charge.

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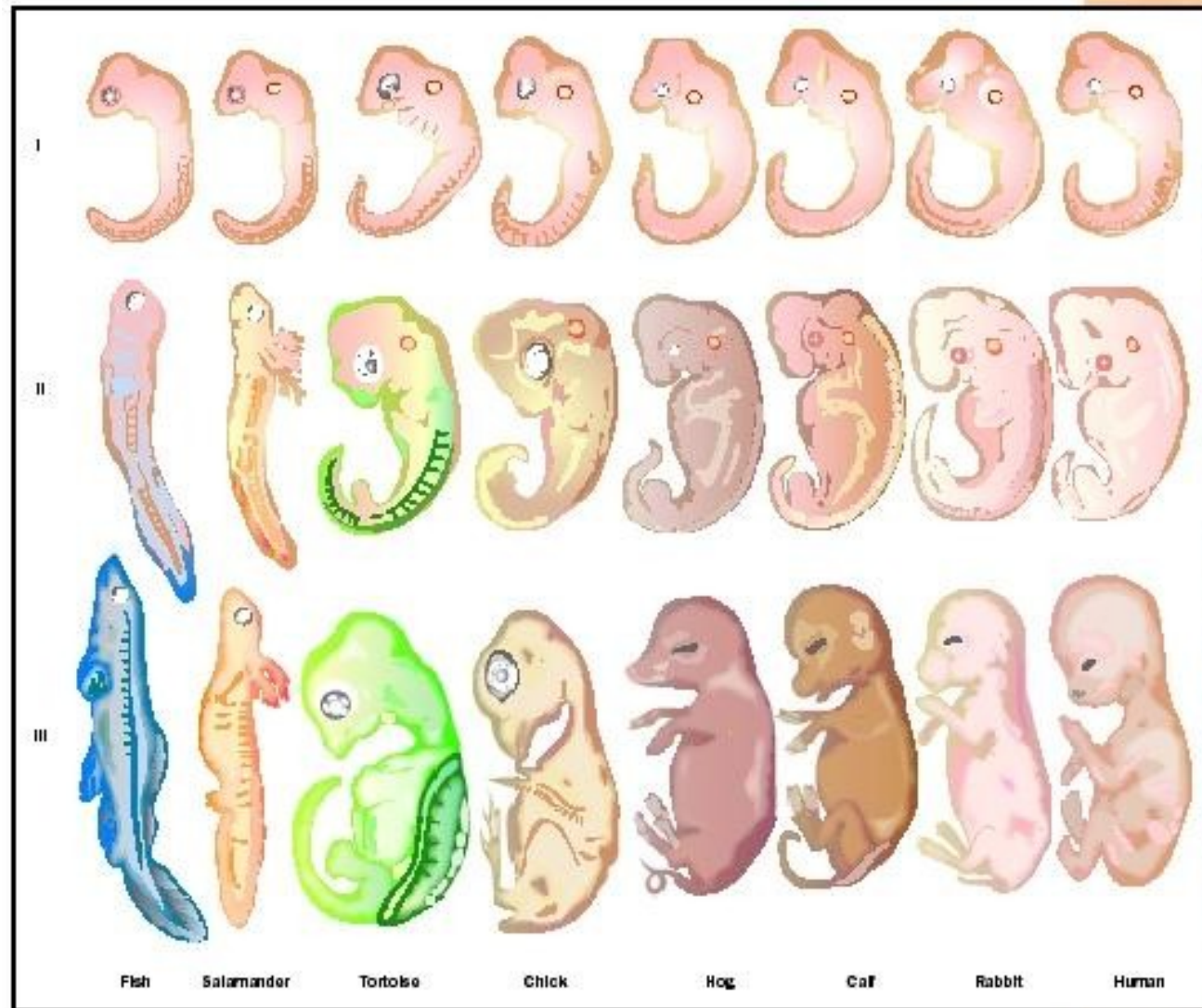
Thomas Johann Seebeck (1770-1831)

- discoverer of the thermoelectric effect
- described the action of the spectrum of light on the chloride of silver



Karl Ernst von Baer (1792-1876)

- Discoverer of the mammalian ovum
- Founder of embryology



Karl Ernst von Baer

- Erosion of river banks
- founder of the Russian Geographical Society
- pioneer in studying biological time
- „On Estonians' Endemic Diseases“



Wilhelm Ostwald (1853-1932)

- Nobel Prize in Chemistry 1909
- work on catalysis, chemical equilibria and reaction velocities
- Ostwald process (patent 1902) for the manufacture of nitric acid



Other Tartu professors

- Alexander Schmidt - foundation for the creation of anti-coagulation systems and towards the development of blood transfusion
- Emil Kraepelin - founder of modern scientific psychiatry; diagnosed skizophrenia
- Moritz Jacobi - study of magnetic motors, discoverer of galvanoplastics
- Ivan Kondakov - invented synthetic rubber

Other Estonian-born scientists

- Heinrich Lenz – Lenz’s law „If an induced current flows, its direction is always such that it will oppose the change which produced it.“
- Jakob Johann von Uexküll – zoosemiotics, „umwelt“

Astronomy tradition in Estonia



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Astronomy tradition

- Friedrich Georg Wilhelm Struve (1793–1864)
- Geodetic arc - the first accurate measuring of a long segment of a meridian (UNESCO World Heritage object)



Astronomy tradition

- First measurement of star's distance – Vega (1837)
- First observed supernova from outside our Galaxy (1885)

Ernst Öpik (1893-1985)

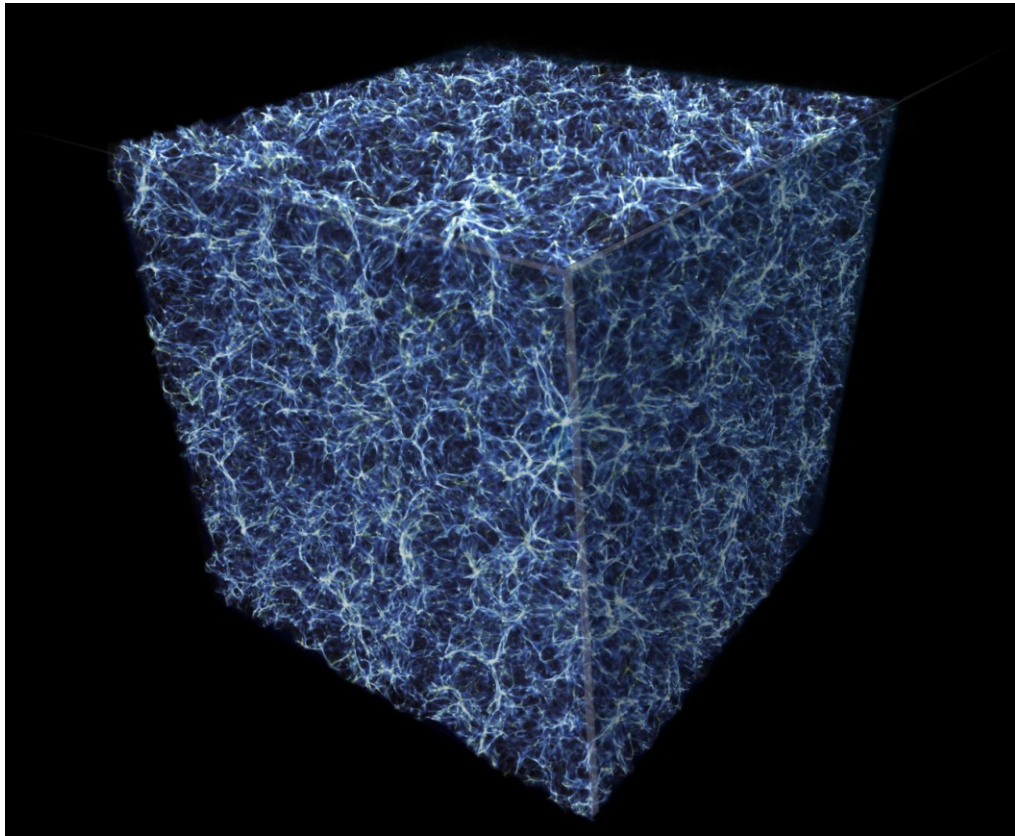
- distance to Andromeda galaxy
- density of white dwarfs
- predicted the frequency of craters on Mars
- thermonuclear reactions as stellar energy source
- Öpik-Oort cloud – origin of comets



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Jaan Einasto (b. 1929)



- Large-scale structure of the Universe
- Dark matter

Science in Independent Estonia

- Focus on national sciences
- Ludvig Puusepp – world's first professor of neurosurgery
- Aleksander Paldrok – treatments of leprosy



<http://statues.vanderkrogt.net>

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Oil shale

- 1838 – first studies
- 1916 – first mines
- 1918 – start of chemical industry
- 1959 – large-scale electricity production

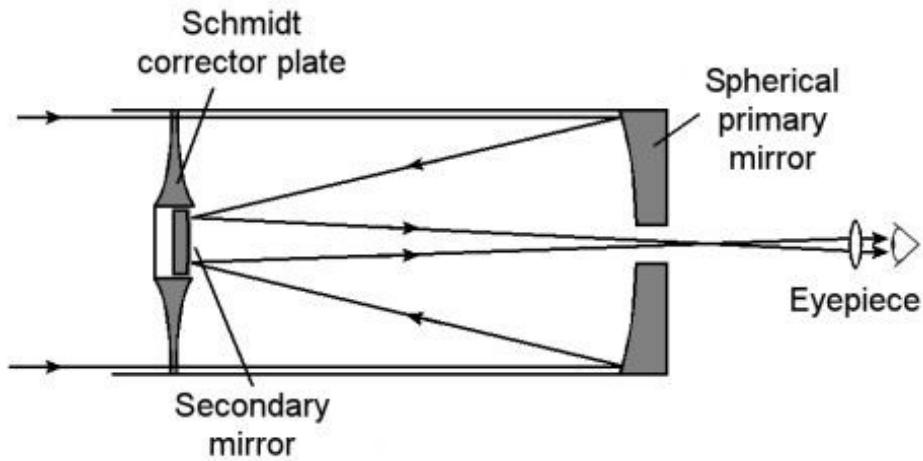


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Inventors

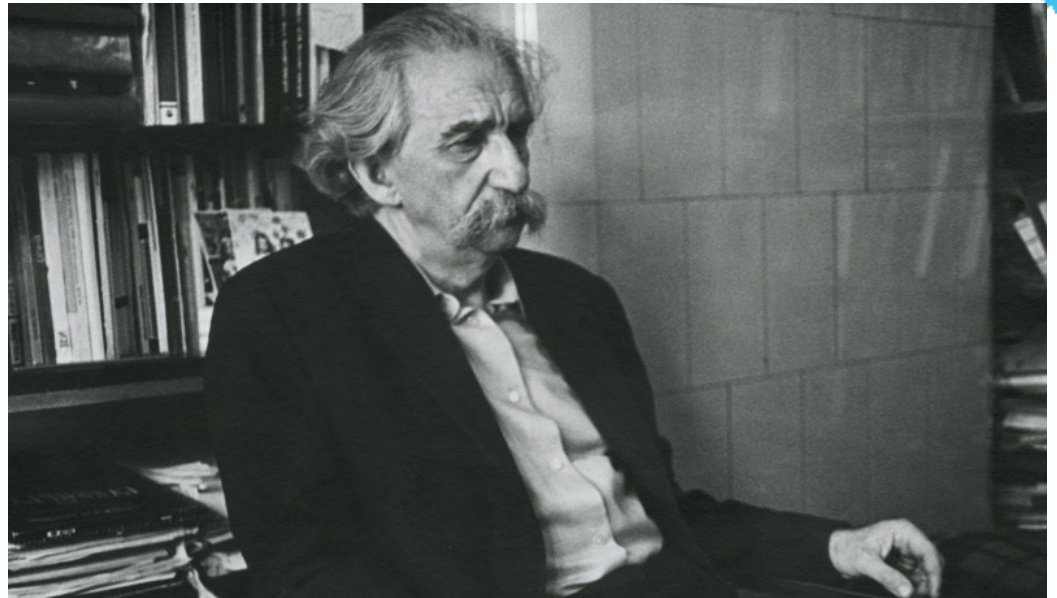
- Bernhard Schmidt



- Walter Zapp – Minox camera

Tartu-Moscow Semiotic School

- Juri Lotman
- The language of art, cultural rules, religion etc. are secondary modelling systems, or more complex languages built upon natural language.
- semiosphere



Estonian science in exile



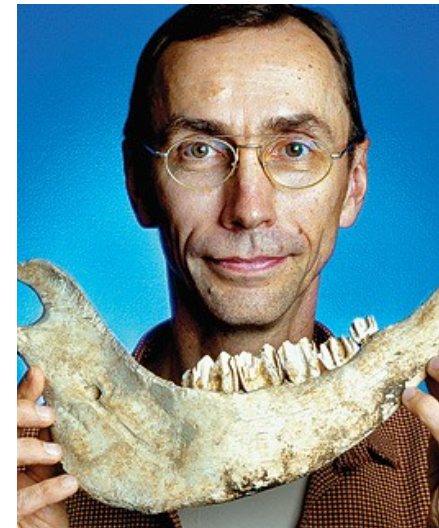
**Jaak
Panksepp**

neural mechanisms of
emotion, functions of
play



**Endel
Tulving**

distinction of
episodic and
semantic memory



Svante Pääbo
Neanderthal genome

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