

A selection of philosophical issues related to natural sciences

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Annotation

- The course focuses on crucial issues of the philosophy of Nature, explaining the differences in chosen concepts of individual philosophers and naturalists and critically interpreting selected concepts of the philosophy of Nature. Special emphasis is placed on reflections about the origin of life; the questions of evolution; and the ethical aspects of maintaining life on the earth.

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Topics

- 1. Jan Evangelista Purkyně – naturalist; philosopher; inventor
- 2. Evolution – the recurrent theme of philosophers and naturalists
- 3. Searching for clues about life
- 4. Josef Velenovský – the aesthetics of Nature
- 5. Adolf Portmann – the beauty of sea animals
- 6. Ernst Haeckel – the artistic forms of Nature
- 7. František Mareš – a native of South Bohemia; physiologist; and philosopher
- 8. Johann Gregor Mendel – the secret of heredity
- 9. Anna Pammrová – living in harmony with Nature
- 10. Charles Robert Darwin – evolution and a journey round the world
- 11. Alfred Russel Wallace – forgotten researcher
- 12. Erazim Kohák – emphasis on ecological values

1. Jan Evangelista Purkyně – naturalist, philosopher and inventor

Jan Evangelista Purkyně (1787 – 1869)

- Physiologist; philosopher; a major figure in the Czech National Revival
- A founding editor of *Krok* (jointly with J. Jungmann and S. Presl)
- The founding editor of *Živa*
- The founder of the Physiological Institutes in Breslau (Wrocław) and Prague
- He set foundations for dactylography

Works

- *Útržky ze zápisníku zemřelého přírodovědce* (first published in 1910)
- *O spánku, snech a stavech příbuzných* (1857)
- *Individuální duševní ústroj člověka* (1864–1866)

Opinions

- The cellular substance is termed by him as protoplasm.
- He conducted a systematic examination on the animal cell structure.
- Together with Schleiden and Schwann, he formulated the idea that both plants and animals principally share one fundamental element – the cell (cellular theory; cellula).
- He conceived physiology as a natural science based on observation while employing the knowledge of physics and chemistry.
- For example, he described heart muscle fibres and cerebellum cells.
- Having examined the impact of medication on the human organism, he is ranked among founding pharmacologists.
- He constructed a device that projects brief moving pictures making them appear stationary – which makes him the founder of cinematography.

Inspired by the ideas of

- Jan Amos Komenský
- Friedrich Wilhelm Joseph Schelling
- Julius Sachs

2. Evolution – the recurrent theme of naturalists and philosophers

Jean – Baptiste Lamarck (1744 – 1829)

- Naturalist
- the first to use the term BIOLOGY
- authored the first coherent evolution theory

Works and opinions

- *Philosophie zoologique* (1809) – explains his theory of evolution
- His ideas about development were connected with unsubstantiated speculations (minerals originated from organic substances – the giraffe has a long neck, having craned it when browsing in the trees – snakes lost their feet while hiding in the holes).
- Evolution is a process of gradual interaction where the organism adapts to its environment and passes on the modification created throughout its life to the descendants – this belief has many opponents and defenders as well.

Georges Cuvier (1769 – 1832)

- Zoologist
- paleontologist

Works

- *Recherches sur les fossiles ossements de quadrupedes (1812)*
- *Discours sur les revoluce de la surface du globus (1825)*
- *Règne Animal distribué d'après son Organisation pour servir de base à l'Histoire Naturelle des Animaux et d'Introduction à l'Anatomie Comparée (1817)*

Opinions

- Evolution is driven by two general principles: the IMMUTABILITY OF SPECIES and CATASTROPHISM.
- In the Earth's history the planet witnessed a number of great geological catastrophes, each of which extinguished all life in a particular area, which was thereafter area was always resettled by another group of animals and plants – all completely different from their predecessors.
- **Further information on the issues of evolution in Topic 10 on Charles Robert Darwin**

3. Searching for clues about life

Preliminary data

- The Earth's age is estimated at more than 4.5 thousand million years.
- The earliest preserved microfossilised organisms date back to about 3.5 thousand million years ago.
- There is indirect, though convincing, evidence that life existed on the Earth as early as some 3.8 thousand years ago.
- During the first 400 or 600 million years of its existence, the Earth had no crust and only then there appeared conditions which facilitated the origin of life.

The most popular theories of life

- creationist (religious) theory
- the theory of self-creation
- life originating from prebiotic molecules (bio-monomers)

Creationist (religious) theory

- beliefs which agree that there was something (someone) that acted as the Creator
- because it is a simple idea, it is shared by polytheistic and monotheistic religions
- it is held even by very primitive shaman populations in Asia, Africa, America and the Pacific
- specifically in Europe, until the early 19th century the superior authority was the Bible claiming that our world and its components were created by God – this process is described in the first book of Moses, entitled Genesis (Gn).

The theory of self-creation

- living creatures originating from anorganic substances; living matter originating from inanimate substance called “naive abiogenesis”
- Aristotle, for example, claims that living organisms are born from mud, rotten meat, etc.
- These ideas were invalidated by Louis Pasteur, who proved that fermentation and decomposition do not produce bacteria and microbes, BUT CONTRARY TO IT – bacteria can be destroyed by heating to high temperatures (pasteurisation)

Life originationg from probiotic molecules (bio-monomers)

- There are three popular hypotheses endeavouring to explain the origin of probiotic
- molecules:
 - 1. Synthesis in the reducing atmosphere
 - 2. the import of these molecules from the space by meteorites and comets
 - 3. Deep sea synthesis on the surfaces of metallic sulfides

- The reducing atmosphere contained methane; ammonia; hydrogen; water vapour; and carbon dioxide. The energy needed for the synthesis of chemical compounds was produced by electric discharges; by ultraviolet radiation from the Sun; by volcanic activity. The rain washed the substances out of the atmosphere, floating them to water reservoirs (sea shores) where they stocked during the evaporation, producing a concentrate of organic molecules (amino acids) gathering in the shallow seas. When heated, amino acids can bond to polymers rolling into balls - droplets of coacervates. The origin of self-replication, i.e. the ability to create one's duplicate, was accompanied by the appearance of first organisms. (A. I. Oparin; J. B. S. Haldane; etc.)

4. Josef Velenovský – the aesthetics of Nature

Josef Velenovský (1858 – 1949)

- Naturalist
- Philosopher
- Controversial, yet original man of thought
- Professor of systematic botany at Charles University; Prague
- Director of the Botanical Institute

Works

- **Works (natural sciences):**

- *Flora Bulgarica* (1891)
- *Mechy české* (1897)
- *Játrovky české* (1901)
- *Srovnávací morfologie rostlin* (1905 – 1913)
- *České houby* (1920 – 1922)

- **Works (philosophy):**

- *Přírodní filosofie I. (díl přírodnický)* (1921)
- *Přírodní filosofie II. (díl kulturní)* (1922)
- *Poslední moudrost čili nauka o kosmickém duchovnu* (1935)
- *Obrázky* (1928)
- *Literární studie* (1932)

Opinions

- All philosophy is essentially only the philosophy of Nature.
- Critique of positivism and naturalism
- Apart from physiological functions, the bodily organs of an animal or plant also have a beautiful artistic form (**the principle of ornamentalism**).
- Ornamentalism is a law respected in the whole universe.
- He was one of the first Czech scientists to write about **wildlife protection**, suggesting the protection of whole territories (such as the Bohemian Forest and the Giant Mountains).

Inspired by the ideas of

- František Mareš
- Ladislav Čelakovský
- Spiritualism and occultism

5. Adolf Portmann – the beauty of sea animals

Adolf Portmann (1897 – 1982)

- Zoologist; philosopher; anthropologist
- His works have more favourable response from philosophers and psychologists than biologists
- One of the most original biologist thinkers in the 20th century

Works

- *Die Tiergestalt*
- *Das Tier als soziales Wesen*
- *Neue Wege der Biologie*
- *Tarnung in Tierreich*
- *Meerstiere und ihre Geheimnisse*

Opinions

- The most significant force in wildlife is the “drama of the world”, i.e. the play and the performed action.
- The metaphor of theatre
- The beauty of living organisms is most captivating if there is no selection pressure: in rain forest; on the bottom of tropical seas; in coral sea lagoons.

Young animals of two kinds

- “*Nesthockers*”: the young remain in the nest for some time; relatively helpless after birth; relying on their parents’ care; (insectivores; rodents; carnivores).
- “*Nestflüchters*”: the young can soon follow their parents; are born well capable of moving; furred; (ungulates; cetaceans).

Human

- The young are born helpless; with open eyes; having normal hearing; well developed grey matter.
- The human child reaches the “*Nestflüchter*” developmental stage at about one year of age.
- Growth and development noticeably accelerated in pubescence.
- Human old age – a meaningful stage of life; has a special function in the societal structure.

6. Ernst Haeckel – Artistic forms of Nature

Ernst Haeckel (1834 – 1919)

- Professor of zoology
- Philosopher
- The most prominent representative of darwinism in Germany
- A member of the *Monistenbund*
- His philosophical opinions are labelled as **monism**

Works

- *Generelle Morphologie der Organismen* (1866)
- *Die Welträtsel* (1899)
- *Kunstformen der Natur* (1899 – 1904)
- *Lebenswunder* (1904)
- *Gott-Natur (Theophysis)* (1914)

Welträtsel

- Haeckel's work representing his philosophical ideas
- Influenced other philosophers
- In Germany it was published in more than 400, 000 copies
- Translated into 27 languages
- There does not exist any God, only the mechanics of atoms
- In defiance of dualism

Philosophical opinions

- Nature adheres to one principle – monism.
- Nature has a soul – which is reflected in the beauty of animals and plants.
- The creations of Nature are works of art.
- The reality is reduced to decorative forms which are harmonious and pleasing to the eye.

7. František Mareš – a native of South Bohemia; physiologist and philosopher

František Mareš (1857 – 1942)

- Physiologist;
- Philosopher;
- Politician;
- Rector of Charles University; Dean of the Medical Faculty;
- Director of the Physiological Institute;
- Editor of *Živa* periodical;
- Defender of the authenticity of the Manuscripts;
- Author of the first textbook of physiology written in Czech

Works

- *Úvahy z cest* (1890)
- *Idealism a realism v přírodní vědě* (1901)
- *Fysiologie I, II, III, IV* (1906 – 1929)
- *Život – tvůrčí síla* (1914)
- *Pravda nad skutečnost!* (1918)
- *Pravda v citu* (1922)
- *Soumrak duchovní kultury před svítáním* (1939)

Opinions

- Natural science cannot reveal the truth.
- In science, facts are very important, but the facts alone do not suffice to reveal the truth.
- The truth is above reality.
- The truth is in the feeling.
- Life can be explained only from the position of vitalism.

Inspired by the ideas of

- Immanuel Kant
- Arthur Schopenhauer
- Hans Christian Driesch

8. Johann Gregor Mendel – searching for the black box of heredity

Johann Gregor Mendel (1822 – 1884)

- Monk and abbot of the augustinian monastery in Brno
- Teacher of natural history;
- Natural scientist
- Founder of genetics; he experimented with plant hybrids (e.g. crossbreeding sweet peas)
- Meteorologist
- His bestknown work is the lecture on: “***Versuche über Pflanzen-Hybriden***” (1866)

Mendel pursued scientific researches when nothing was known about

- Cell division
- The origin of germ cells
- Chromosomes and their placement in the cell
- The conditions for fertilisation

Mendel's contribution to natural science

- During his experiments he made very exacting demands on the purity of animal and plant species and on measurement precision.
- He was the first to observe the transmission of individual characters.
- He made an assumption about material dispositions paired in cells (not knowing yet where the material dispositions are located in the cell and not labelling them as genes).
- He could formulate mathematical regularities in the transmission of particular material dispositions.

Why was Mendel forgotten?

- In the times of respectable university scholarship, a monk working in a monastery was not considered a serious man of science.
- His combination of botany and mathematics, first ever, was very unusual in the 19th century.
- The results he achieved in plant crossbreeding were confirmed only in some species, in others, the achievements varied.

9. Anna Pammrová – living in harmony with Nature

Anna Pammrová (1860 – 1945)

- Her works are currently gaining due recognition.
- She lived in seclusion, away from civilisation.
- From 1899 she lead a cloistered existence in the woods off Žďárov u Tišnova.
- Her ideal was life in harmony with Nature.

Works

- *Alfa: embryonální pokus o řešení ženské otázky (1917)*
- *O mateřství a pamateřství (1919)*
- *Cestou k zářnému cíli (1925)*
- *Zápisky nečitelné (1936)*
- *Odezva z lůna stvoření (1937)*

Opinions

- Reflected upon the woman's position in the society - women's emancipation.
- The history of mankind is a compelling story about woman's subjugation.
- The deformation of the woman's original function has brought the human race to crisis.
- Mother is a caregiving protectress.

Other opinions

- Civilisation and culture have taken a stand against man.
- Man is unwilling to admit there is no purpose in life.
- Nihilism
- Critique of modern civilisation and culture
- Man is expected to blend with nature and its sounds.
- Man's salvation is in solitude where only mankind can avoid excessive consumption.

Inspired by the ideas of

- Otokar Březina
- Jean – Jacques Rousseau
- Lev Nikolajevič Tolstoj

10. Charles Robert Darwin

Charles Robert Darwin (1809 – 1882)

- Naturalist; explorer
- Scientific research was also an intellectual pursuit of his grandfather, Erasmus Darwin (1731–1802)
- Between December 1831-October 1836, he travelled round the world aboard the Beagle
- The route followed from Cape Verde to South America via the Falklands - the Galápagos – Tahiti - New Zealand- Australia – Tasmania- St Helena the Azores
- <http://www.darwin-online.org.uk/>

The most influential works

- *O pohlavním výběru*
- *O původu člověka*
- *O původu druhů* (1859)

Opinions

- Organisms produce a large progeny, all of which cannot survive; because of high mortality, only some of them mature to further reproduction.
- Individuals of the same species can change in all characters giving rise to variations.
- The variations that are advantageous in the struggle for existence are hereditary.
- The basic unit of evolution is a population (an ensemble of individuals).

11. Alfred Russel Wallace

Alfred Russel Wallace (1823 – 1913)

- Naturalist; anthropologist; explorer
- He reached the same conclusions as Darwin
- The results of Wallace's researches passed into oblivion
- Darwin was astonished at the conformity of Wallace's opinions with his own ideas

Works

- *Palm trees of the Amazon and their uses* (1853)
- *The Malay Archipelago. I. II.* (1869)
- *Contributions to the Theory of Natural Selection* (1870)
- *The Geographical Distribution of Animals* (1876)
- *Tropical Nature, and Other Essays* (1878)
- *Island Life* (1881)
- *Darwinism: An Exposition of the Theory of Natural Selection, with Some of Its Applications* (1889)
- *Travels on the Amazon and Rio Negro* (1889)
- *My Life. I., II.* (1905)

Opinions: The Creator was active in the history of life no less than three times

- First he created living matter.
- At a higher stage of development he breathed consciousness into it.
- At the highest developmental stage he endowed man with soul.
- The human body originated from natural selection; the spiritual capacities were conferred on it through divine intervention.

12. Erazim Kohák

Erazim Kohák (1933)

- Czech philosopher
- publicist
- after 1948 he emigrated with his parents to the U.S.A.
- at American universities he studied philosophy and theology
- in 1995 he returned to the Czech Republic
- he works at the Centre of Global Studies of the Philosophical Institute, the Academy of Sciences of the Czech Republic

Works

- *Pražské přednášky. Život v pravdě a moderní skepse*
- *Člověk, dobro a zlo*
- *Zelená svatozář*
- *Poutník po hvězdách*
- *Oheň a hvězdy*

The starting point of his philosophy

- phenomenology and the traditional Protestant values
- American personalism
- philosophy conceived as an endeavour to direct man to God, to the world and to man
- the philosopher's duty is not only to pursue professional competence, but similarly important are his pedagogical activities where he addresses the widest targeted public on fundamental issues of common interest
- emphasis is placed on the ethical dimension of contemporary societal issues

The thematic scope of his ideas

- man's relationship to man and humankind
- the core of democracy is appreciating the inner worth of all being and the attitude of respect and good will resulting from it
- the direct experience of Nature, so familiar to man, leads to ecocentrism: man is a being responsible to himself and to Nature in general
- man deliberately assumes responsibility for the consequences of his existence on the Earth, seeking a sustainable concept of his habitation on the Earth
- man's attitude to God is of cardinal importance