Topic № 1.2 «The man and the technosphere»

Lection for 2d gr. students

Items:

1. The conception of the technosphere. The structure of the technosphere.
2. Types of technosphere zones.
3. The biosphere. The noosphere. The knoxosphere. The homosphere.
4. Dangerous and hazardous factors of the technosphere.

1. The conception of the technosphere. The structure of the technosphere.

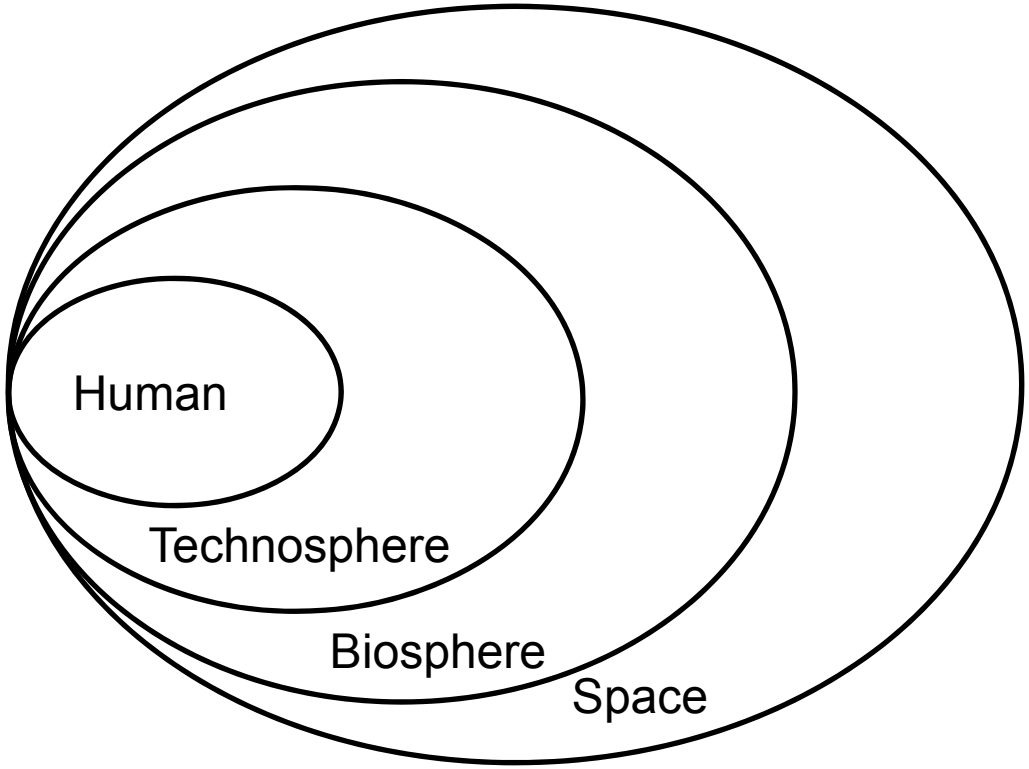
The technosphere is a complex self-perpetuating system and yet current trends of environmental degradation and resource consumption threaten its future.

The technosphere, the structures and organizations of the human economy that facilitate industrialized life is the hallmark of human civilization on the Antropocene. The technosphere has brought material prosperity, convenience and self-perpetuating to many, but also environmental damage and resource depletion.

The technosphere – is a part of biosphere, transformed (by human) to the man-made objects, techogenical objects (buildings, roads, enterprises etc)

Peculiarities of technosphere:

- **Direct or indirect impact of technological tools**
- **Accordance to the socioeconomic human requirements**



The technosphere – is a part of the biosphere characterized by rapid industrial development and as a result, manufacturing plants widely interact with the natural environment.

Technogenesis problems:

1. Chemical water pollution

2. Heat pollution

3.Greenhouse climate effect

4. The problem of dusting as the result of emission from industrial enterprises

5. Biodiversity and biomass decrement

The technosphere is usually regarded in two combinations:
"human-technospere"
"human-biosphere"

The history of the technosphere. Anthropocene.

The start of the period of large-scale human effects on our planet (the Anthropocene) is debated. The industrial view holds that most significant impacts have occurred since the early industrial era (~1850), whereas the early-anthropogenic view recognizes large impacts thousands of years earlier.
At 1850 industrial era first began to gain strength at a global scale.
The industrial era was start of the Anthropocene (e.g. atmospheric concentration of two major greenhouse gases CO_2 and CH_4 – began to rise exponentially by 1850.)

From a geological perspective, the technospere represents the newest expression of earth function. It is the latest in the series of revolutions which mark the history of the planet. In its global nature, high level of energy use, and appropriation of external resources, the technoshere resembles the older Earth systems which we call “spheres”, such as biosphere, hydrosphere and etc.

2. Types of technosphere zones.

1) Industrial zone

2) Zone of sanitary protection

3) City (urban) zone

3) Settlement zone

4) Transport zone

1) Industrial zone -
industrial quarter of the city – territory of the city with enterprises with service offices, buildings, roads etc.

2) Zone of sanitary protection - green forest ranges for protection territory from harmful industry impact.

3) City (urban) zone
Represents the history of each town and internal city entity.

3) Settlement zone – a part of city territory with dwelling areas, houses, malls, parks and etc. This objects don't need any sanitary protection arrangements.

4) Transport zone – is the system of terrestrial, overground and underground highways

3. The biosphere. The noosphere. The knoxosphere. The homosphere.

The biosphere – the part of the earth's surface and atmosphere, inhabited by living things

The homosphere — the lower part of the atmosphere, in which there is no great change in its composition, human working and living area (zone of any human activity: work, rest etc).

The noosphere. **Vladimir Vernandsi (russian biochemist) described the noosphere in 1926, as the merging of the technosphere and the biosphere. Qualitatively new of biosphere evolution, determinated by historical mankind development**

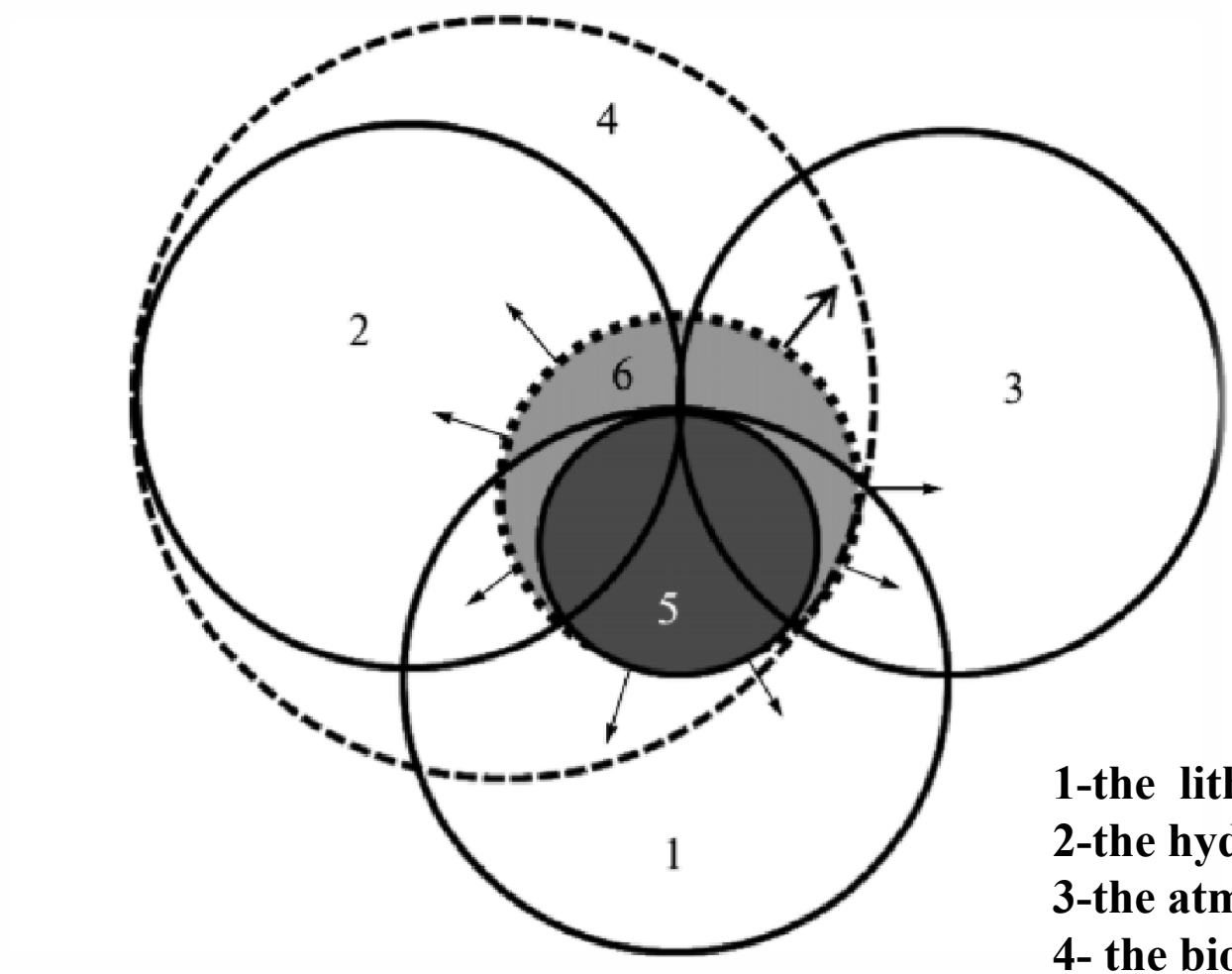
It is known that there is as yet no common definition for the term "noosphere" (literally, "the sphere of intelligence"), which was introduced in 1927 by E. Lerouar, and various authors put different meanings into it, from virtual to real. According to V.I. Vernadsky "The noosphere is a new geological phenomenon in our planet.

For the first time a human becomes its largest geological power. It can to restructure the habitat by labor and thought, restructure it in a drastic way, as compared with what there had previously been ..." (Vernadsky, 1944).

The noosphere – the sphere of human mental activity especially in regard to its influence on the biosphere.

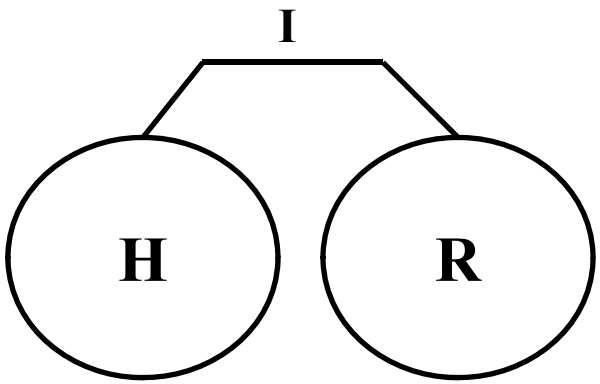
The knoxosphere - space or area with permanent risk existence.

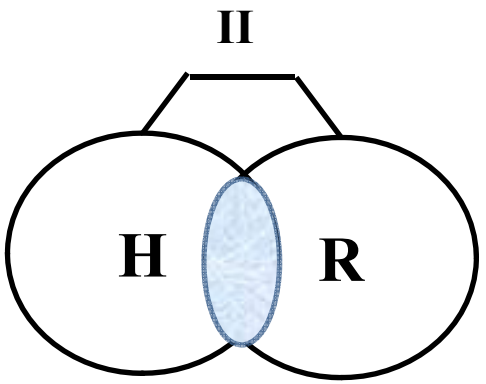
The scheme of “spheres” arrangement



1-the lithosphere
2-the hydrosphere
3-the atmosphere
4- the biosphere
5 – the noolithosphere
6 – the noosphere

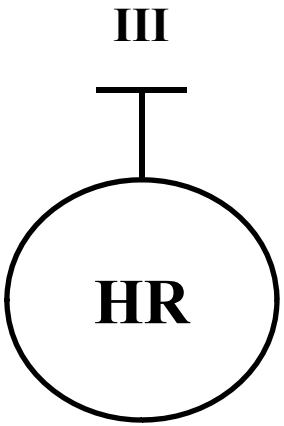
4. «Dangerous and hazardous factors of the technosphere»

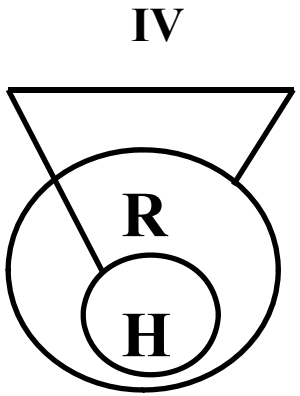




Arrangement variants of hazardous (high-risk) zone (R) and human-being zone (H)

I – safe situation; II –situation of short-run or local hazard; III – dangerous situation; IV – conditionally-safe situation





I - guarantees the situation of total safety. This is the "principle of distance security" - the distance between human-being zone and zone of potencial menaces (e.g. distance control, remote observation)

II - he negative impact is possible only in the crossed area, hazard is possible at the moment of short duration in the risk zone (e.g. current inspection, fleet repair)

III - negative impact is possible at any moment, dangerous situation

IV - negative impact is possible under the condition of protection equipment defects

Natural (inartificial) hazards - arise as the result of climatic and nature changes

Technogenic hazards arise as technosphere products. Technospere items (machines, facilities, buildings) create technogenic hazards

Anthropogenic hazards arise as the result of human error occurrences or unapproved actions

According to the nature of impact all factors are divided: :
(in accordance with Russian state standard specification 12.1.003-74)

Harmful

This factors can cause some diseases or performance decrement (under specific conditions):

- **Dust content of the air;**
- **Noise;**
- **Ionizing radiation;**
- **Physical toil;**
- **Toxic agents;**
- **Water and food pollution;**
- **Incorrect lightening;**
- **Monotone activity.**

Hazardous

This factors can cause injuries, traumas, severe health disturbances (under specific conditions):

- **Fire;**
- **Transport vehicles;**
- **Poisoning agents;**
- **Sharp devices and etc.**

Physical:

- Mobile transport vehicles, unstable parts of constructions
- Sharp devices;
- Dust content of the air
- Ionizing radiation
- Incorrect lightening
- Barometric pressure changings
- Noise enhancing

Harmful and dangerous factors

Chemical:

- Industrial poisonings
- pesticides
- Drugs
- Household chemistry
- Warfare poisoning agents.

Biological:

-Pathogenic microorganisms (bacteriums, viruses, fungus and etc)

- Plants and animals.

Psychosocial factors arising from job content, workload, work pace, control, work organization, interpersonal relations and leadership, organizational culture and roles, fairness and justice, environmental conditions, equipment, as well as job security and career opportunities

Thank you for your attention!