The Volgograd State Medical University
The Chair of hygiene and ecology

Lecture:

SUBJECT AND TASKS OF HYGIENE. ORIGINS OF HYGIENE. THE IMPORTANCE OF HYGIENE FORPREVENTIVE THINKING OF THE DOCTOR. MODERN PROBLEMS OF HYGIENE AND ECOLOGY

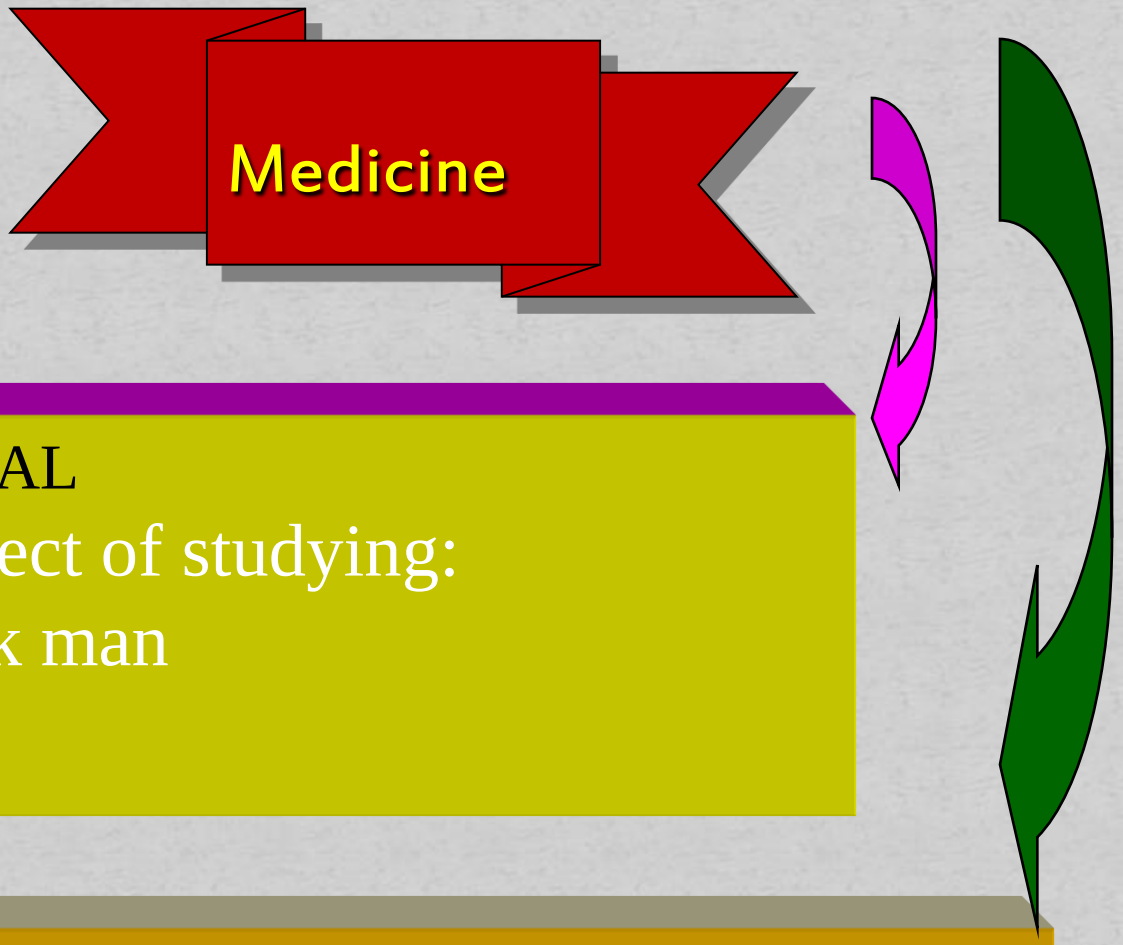
The medical science

- **Therapeutic part**

  which includes making correct diagnoses, prescription of pathogenetically correct treatment and **after recovering** development of recommendations, that is what to do not to become ill again.

- **Preventive part**

  which includes preventive measures against diseases and create the optimum conditions promoting the health of a person


Medicine
MEDICAL
Object of studying:
sick man
PROPHYLACTIC MEDICINE
Object of studying: healthy man, and groups of the practically healthy people

Scientific foundation

medical-biological sciences:

Physiology

Anatomy

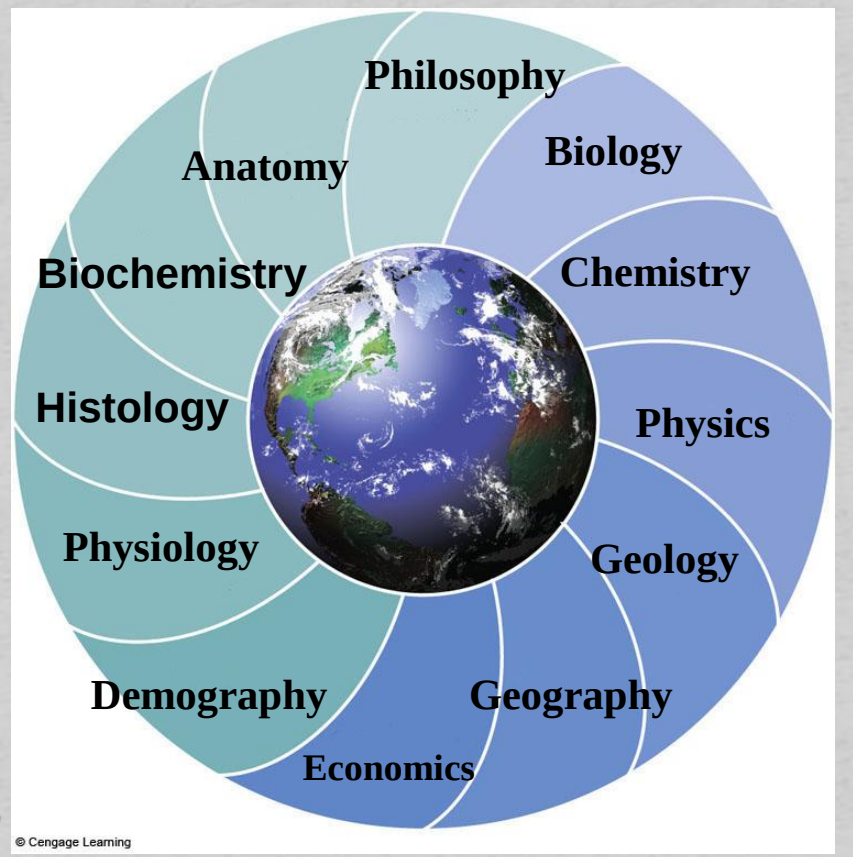
Histology

Biology

Biochemistry

Microbiology

and others



exact sciences:

Physics

Chemistry

Mathematics

Philosophic

and methodological sciences

HYGIENE:

is a branch of preventive medicine which studies the effects of the environment on the health of a person, develops preventive measures against diseases and create the optimum conditions promoting the health of a person.

Origins of hygiene

Greek word

– **medicinal, that brings health**

***"Hygiene"* is a science of health, derived its name from the younger daughter of Asclepius**

HYGIENE

- “study about a healthy way of life, about healthy living conditions, **the aggregate of the measures, which ensure the retention of immunity, health**”

  (D. N. Ushakov).

- “Prevention is better than cure”

Basic aim of hygiene –

preserving and improving health

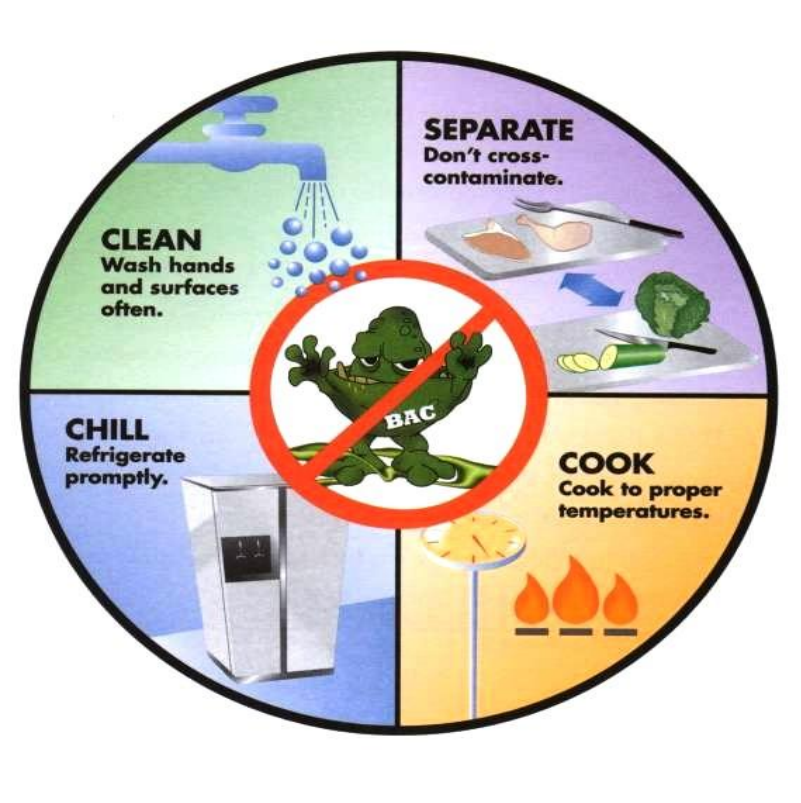
Professor Winslow defined aim of hygiene as "science and art of preventing diseases, prolonging life, and promoting health and efficiency through organized community effort for the sanitation of the environment, the control of communicable diseases, the education of the individual or personal hygiene, the organization of medical and nursing services for the early diagnosis and preventive treatment of disease, and the development of the social machinery to ensure everyone a standard of living adequate for the maintenance of health, so organizing these benefits as to enable every citizen to realize birth right of health and longevity".

The objective of hygiene:

to promote and strengthen the health of both a person and a group of individuals interconnected into collectives, populations, the society as a whole.

SANITATION:

•from the Latin word "sanitas" which means *"health"*



•is a practical branch of preventive medicine which deals with the arrangement and carrying out sanitary, hygienic and antiepidemic measures

Human health depends on many factors. They are:

- Heredity factors 20 %,
- Environmental factors 20 %
- Lifestyle 50 %
- Medicine and public health services 10 %

Distribution of risk factors for various chronic diseases

Diseases	Adverse lifestyle factors	Genetic risk	Environmental pollution	Health deficiencies
Coronary heart disease	60	18	12	10
Vascular brain damage	65	17	13	5
Other cardiovascular diseases	40	35	17	8
Cancer	45	26	19	10
Diabetes mellitus	35	53	2	10
Pneumonia	19	18	43	20
Emphysema and asthma	35	15	40	10
Cirrhosis of the liver	70	18	9	3

Risk factor:

is a factor of any nature (hereditary, ecological, manufacture, life style) which may provoke or increase probability of disturbance

Prophylaxis:

word for word (literally) prevention

measures taken to prevent disease or health problems, rather than to treat or cure an existing condition.

Primary prevention:

measures aimed at reduction of the risk of a disease.

getting a vaccination to prevent an illness or brushing teeth to prevent gum disease.

Examples of Primary Prophylaxis

- Specific procedures, lifestyle changes, and medications.

- Eating plenty of fruits and vegetables each day may be prophylactic.
- It may reduce the risk of heart disease.

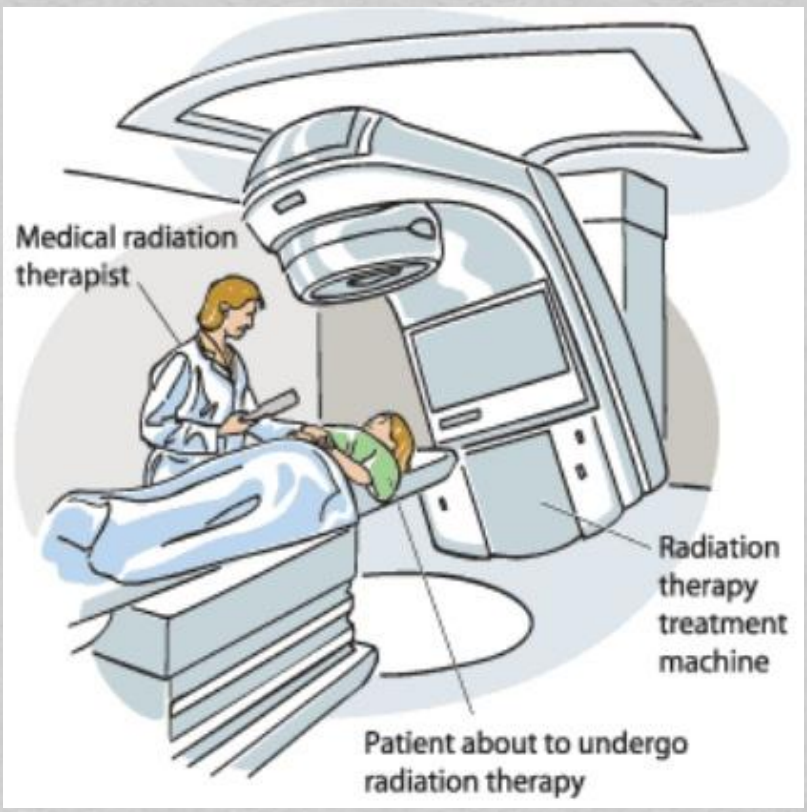
Secondary prevention:

measures to prevent the progress of the symptoms of the available disease, its complication and unfavorable outcome.

If health care workers are exposed to the Human Immunodeficiency Virus (HIV), they may take antiretroviral drugs to help prevent the virus from developing into an active infection.

Examples of Secondary Prophylaxis

A patient who has had surgery to remove a tumor may receive radiation therapy to prevent the recurrence of cancer.



The initial and the secondary preventive maintenance is chosen in medicine

- **The initial preventive maintenance** – are actions for the reduction of the probability of occurrence of diseases.
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- **The secondary preventive maintenance** – are actions for the prevention of progressing of already available disease, its complication and a failure.

- **Hygiene becomes hygiene when it studies not the environment, but a person in the environment.**

The tasks of hygiene:

- 1.Studying of natural and artificial factors of an environment, the social conditions influencing on the health of the person;

- 2. The scientific substantiation and the development of the hygienic specifications, rules and actions for maximal use of positive factors of an environment and an elimination or f restriction of adversely working factors.

- 3. The introduction in practice of public health services of the developed hygienic recommendations.

Basic objects which are under the hygienic norms setting can be divided into two groups.

The first group contains factors of anthropogenous origin which are unfavorable for human being, and are not necessary for the normal life activity (dust, noise, vibration, ionizing radiation, etc.). MAC, MAL and LD are those parameters which are set for this group of factors.

Hygienic standardization:

Environmental standards are definite ranges of environmental factors which are optimal or the least dangerous for human life and health.

Basic objects of hygienic standardization are:

MPC – maximum permissible concentration (for chemical admixtures, dust and other hazards)

MPL – maximum permissible level (for physical factors)

LD – dose limit (for ionizing radiation)

Optimum and permissible parameters of microclimate, lighting, solar radiation, atmospheric pressure and other natural environmental factors.

Optimum and permissible daily requirements in food and water.

The second group

The second group contains factors of natural surrounding which are necessary (in certain amount) for normal life activity (food-stuffs, solar radiation, microclimatic factors and others). For this group the following parameters, must be set: optimum, minimum and maximum permissible parameters.

Basic methods of hygienic researches

Biological methods:

for evaluation bacteriological pollution of air, water, soil, foodstuffs and other objects

Toxic methods:

affect of chemical substances on organism, established maximum permissible concentrations of chemical substances in water, air, soil

Phisiological methods - to study the body's reactions to the effects of various environmental factors.

Clinical methods

Sanitary and statistical methods

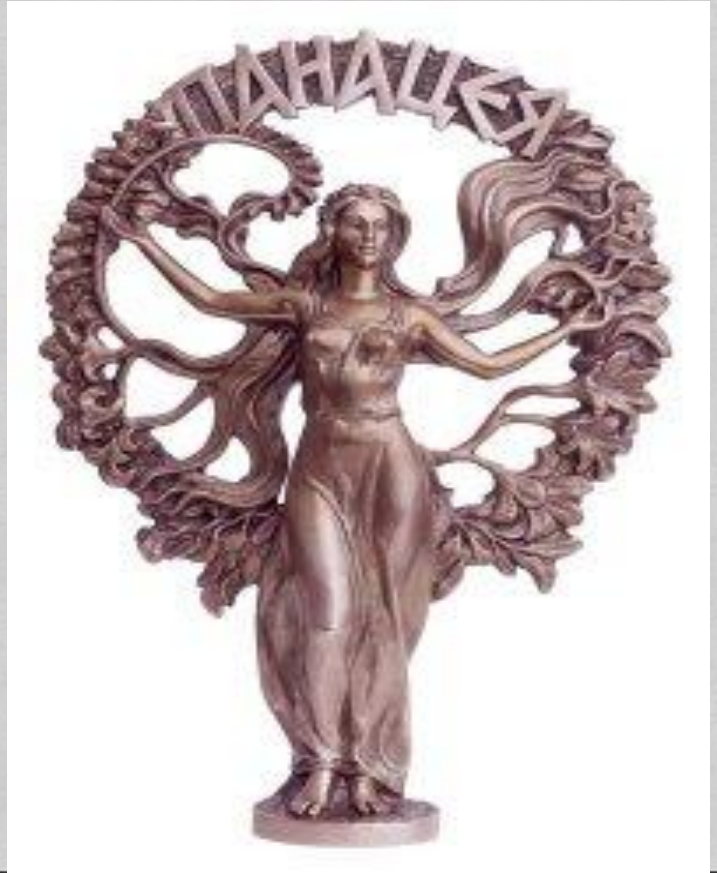
Hygiene has many aspects:

- **(*hygiene of nutrition)*** (sanitary preparation of food, cleanliness);
- ***public hygiene* (*communal hygiene)*** (supervision of water and food supply, communicable disease, disposal of garbage and sewage, control of air and water pollution);
- ***industrial hygiene*** (measures that minimize occupational disease and accident);
- ***mental hygiene*** (recognition of mental and emotional factors in healthful living);
- ***personal hygiene*** (proper living habits, cleanliness of body and clothing, healthful diet, a balanced regimen of rest and exercise);

Asclepius

The word *hygiene* comes from *Hygeia,* the Greek goddess of health, who was the daughter of Aesculapius, the god of medicine.

His elder son, Mahaon, was a skillful surgeon. His second son, Podalirius, was famous for the treatment of internal diseases and till now he is known as the patron of therapy. His elder daughter, Panaceya, could prepare a medicine for any disease. She is known as the patroness of drug therapy. The word *"panacea"* which means a remedy for any disease.



The younger daughter, Hygieya, is the goddess of health

She was represented as a nice girl with a cap in her arms, wind rounded by snake.

The snake drink poison from the cap and render harmless.

The stages of the development of hygiene

1. Empirical hygiene

Ancient Rome

Ancient Greece

Ancient China

The water-pipe and the water drain systems

The most ancient of them are the ones which were built more than 3 thousand years ago in India, in the city of Mohenjo Daro

- The requirements imposed on personal hygiene as well as physical exercises are reflected in old Indian laws of Manu and Aurveda (1000 – 500 years B.C.).
- The emphasis was made on the intake of milk, honey, fresh vegetables.

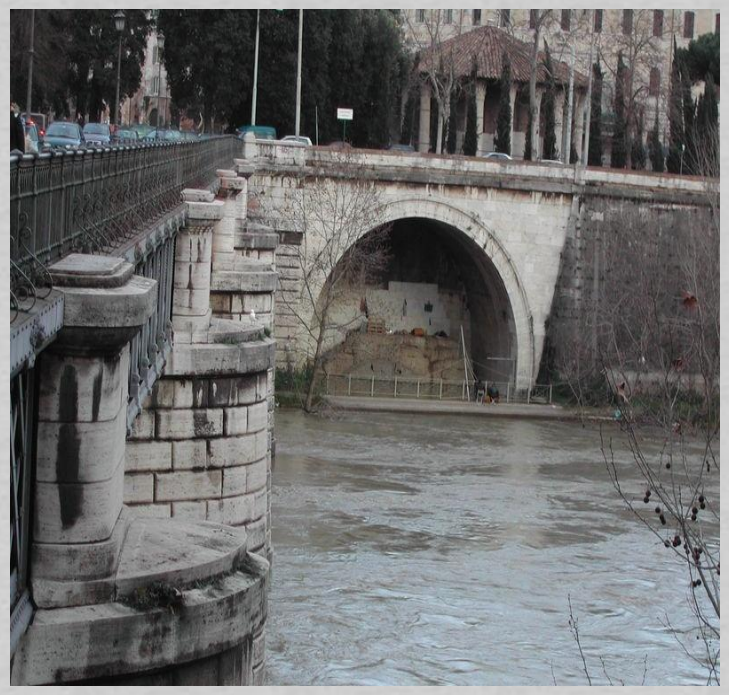
People in ancient societies were concerned about personal hygiene and sanitation for religious reasons. The Bible contains many rules for cleanliness, and describes public health measures still important today. These include quarantining the sick to prevent the spread of disease and avoiding contact with objects used by sick people.

The Greek physician Hippocrates first made the connection between disease and natural environmental factors in the 4th century bc. His treatise Airs, Waters, and Places described how diseases can result from way of life, climate, impure water, and other environmental factors. For the next 2000 years, it was the most widely used text on public health and epidemiology.

The water drain system of Rome, *Cloaca maxima*

The history of sewerage gives an account of luxurious toilets which served as places of meetings and conversations to the murmur of draining streams. Even the tax on latrines (public lavatories) approved in the first century by Emperor Vespasian could not prevent the toilet development.

It was the tax that enriched the world vocabulary with the expression “Money has no smell”



Outfall of Cloaca Maxima

Ancient Romans adopted Greek ideas about public health after colonizing Greece in the 1st century bc. Rome's greatest contributions to public health involved sanitary engineering. They built aqueducts to supply Rome with pure water and a public sewer system to carry away wastes, as well as public baths and hospitals. The Roman government also hired physicians and assigned them to villages to care for the poor.

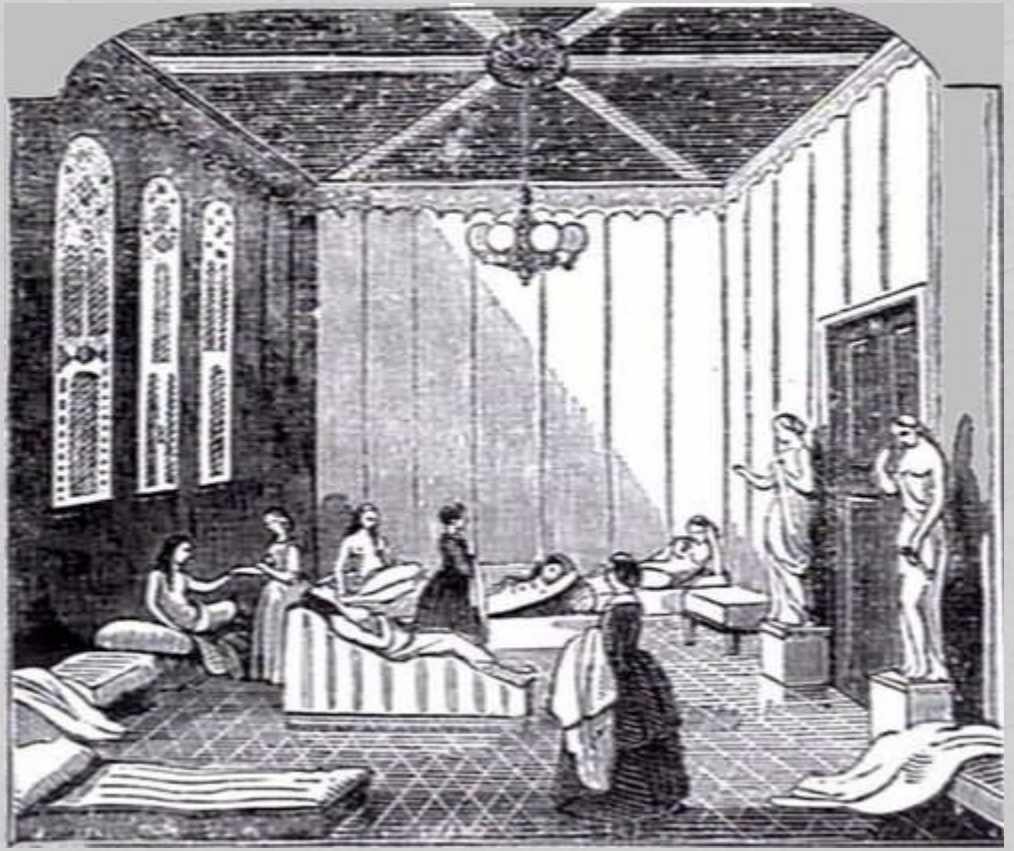
The Greek and Roman baths incorporated not only the more cleansing of the body, but also exercise and sports, socializing, lectures and entertainment, and even snacks.





Tepidarium or warm bath

It would include a warm pool where they would lie around, in or out of the water, chatting with their friends, or new acquaintances.



Frigidarium or cold bath

Caldarium or hot bath

The caldarium (hot room) had a suspended floor supported by 200 small brick pillars. Hot air from an adjacent furnace was blown under the floor and through a network of clay pipes built into the walls to allow the room to be heated to the desired temperature.

Avicenna (Ali Abu Ibn Seena)

«Canon of medical science»

«About the quality of water»

«About good air»

After the Roman Empire collapsed public health efforts were forgotten and unsanitary conditions returned. Millions of people died when great epidemics of smallpox, leprosy, bubonic plague, tuberculosis, and other diseases swept across Europe **in the Middle Ages** (5th to 15th centuries ad).

The environment must be hygienic, with supply of fresh air, safe potable water and balanced diet. This aspect of preventive medicine started gaining more importance from 18th century onwards with the discovery of various vaccines and sera for the protection against various diseases like smallpox, cholera, plague, whooping cough, tetanus, tuberculosis, poliomyelitis etc.

- The discovery of causative agents of the diseases by Louis Pasteur (1822-1895) and Robert Koch (1843-1910) gave a great fillip to the science of preventive medicine.
- Von Behring (1854-1917) brought up the principle of serum treatment and use of anti-sera in various diseases.

The work of the Italian doctor Ramatsini «Thoughts on the diseases of craftsmen» which included the characteristics of the working conditions and occupational diseases of workers was a breakthrough in the development of hygiene.

2. Scientific and experimental hygiene.

- In the fourteens and fifties of the 19th century the first works on hygiene were written.
- These include a nine-volume code of rules «The system of general medical policy» by Franc who in 1805 – 1808 headed the Medical & Surgical Academy in St. Petersburg.
- The great German scientist Max Petenkofer who set up the first hygiene department at the Munich university played a significant role in the formation of scientific and experimental hygiene.
- He developed and introduced the methods of researching the environment.

The development of hygiene in Russia

The development of hygiene in Russia

The 1st period dates back to the 10th century

National hygiene

means customs and traditions aimed at the promotion of public health

Professor Golovin studied the prevalence of some eye diseases

The Russian used to wash with a running water from a wash-stand

The German used to wash from a porcelain wash-basin

The 2nd period is the period of empirical hygiene

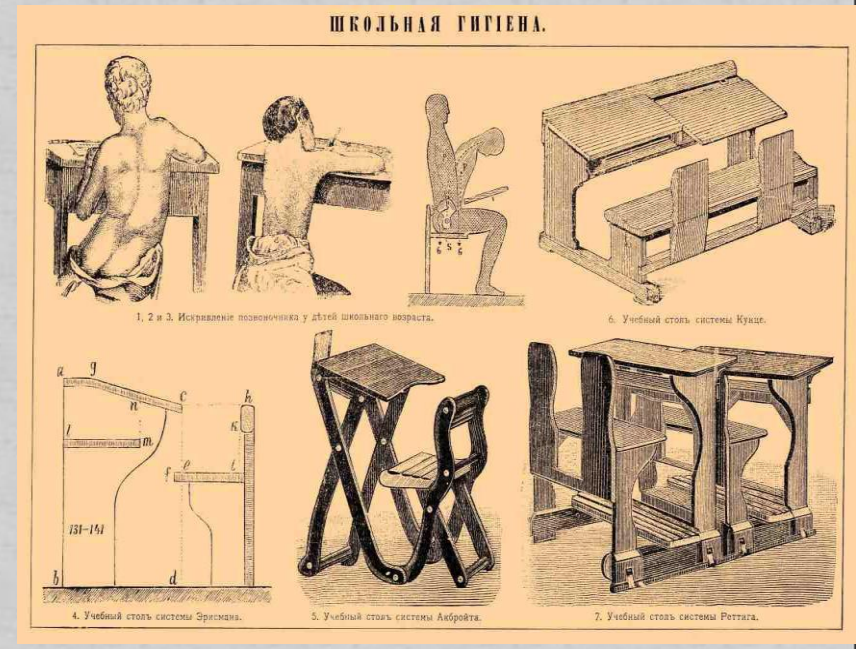
Observation as one of the main methods of knowledge is typical of this period

The 3rd period is the period of experimental hygiene

The first hygiene departments were set up at the St. Petersburg Military Medical Academy.

It was headed by professor Dobroslavin.

The first hygiene department was set up at the Moscow University. The department was headed by professor Erisman.



The 4th period is the period of profound research and exact rules

- maximum permissible concentrations of chemical substance content in the air, water, land, food were developed
- maximum permissible levels for physical environmental factors, such as noise, vibration, etc. were worked out
- maximum permissible amounts for ionizing radiation were developed.

Hygiene department at the VolGMU was set up in 1938.

The main research themes of the department are as follows:

1.The health of the population in Volgograd and in the Volgograd region in relation to environment

2.Hygiene of people employed in different branches of industry.

3.Hygiene of children and teenagers

Ecology:

The term "ecology" is composed of two Greek words:

oikes - which means *house* and

logos - which means *science*

Ecology: biological science that studies the relationships between living organisms and their environment

Ecology of a person:

is a complex multidisciplinary science which studies the effects of natural, anthropogenic and social factors of the environment on a person as a certain social and biological species.