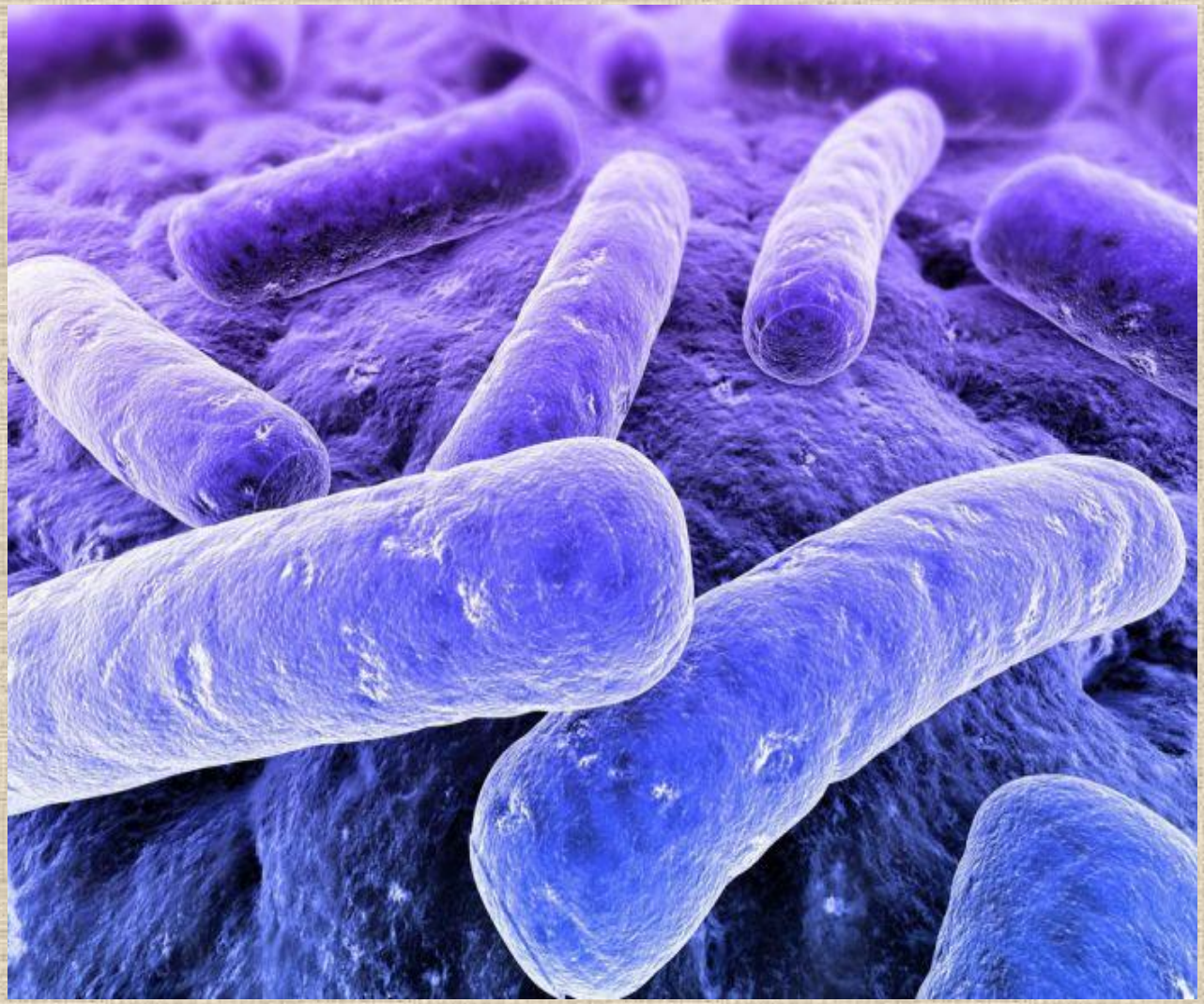
MEDICINE OF THE 20TH CENTURY

INFECTIOUS DISEASES AND CHEMOTHERAPY



EHRLICH AND ARSPHENAMINE

Paul Ehrlich In 1910, with his colleague Sahachiro Hata, conducted tests on arsphenamine, once sold under the commercial name Salvarsan.

Salvarsan, a synthetic preparation containing arsenic, is lethal to the microorganism responsible for syphilis.

Das neue **Ehrlich**'sche
Syphilis-Heilmittel
bringen wir Mitte Dezember 1910 unter der geschützten Marke

„SALVARSAN"

in den Handel.

Wegen Bezuges von „Salvarsan" bitten wir die Herren Apotheker, sich ausschliesslich an die Grossdrogen-Handlungen wenden zu wollen.

Farbwerke vorm. **Meister Lucius & Brüning,**
Hoechst a. M.

SULFONAMIDE DRUGS

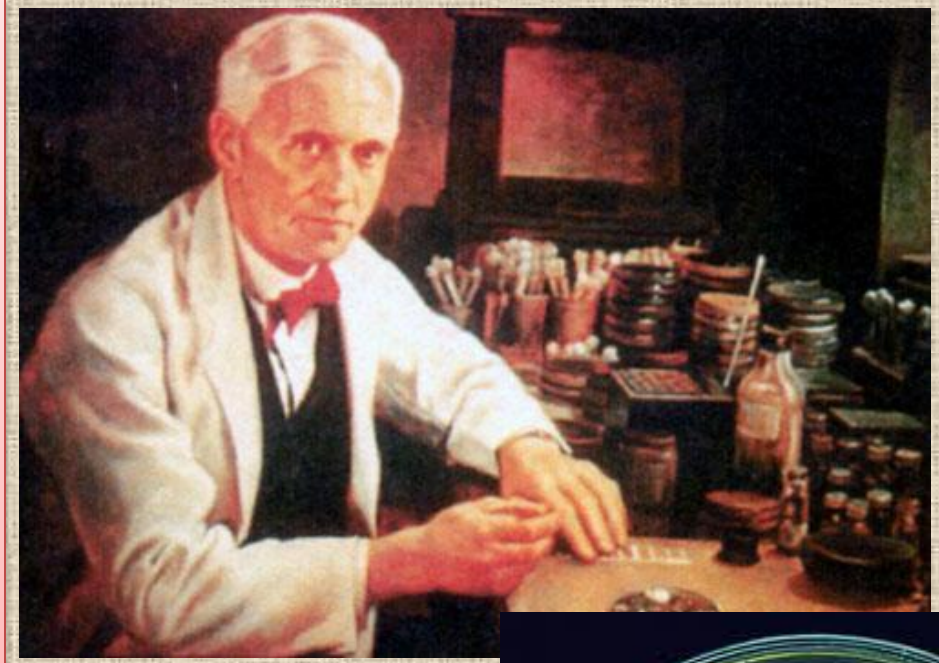
In 1932 the German bacteriologist Gerhard Domagk announced that the red dye Prontosil is active against streptococcal infections in mice and humans. Soon afterward French workers showed that its active antibacterial agent is sulfanilamide.

PENICILLIN

In 1928 **ALEXANDER FLEMING** noticed the inhibitory activity of a stray mold on a plate culture of staphylococcus bacteria.

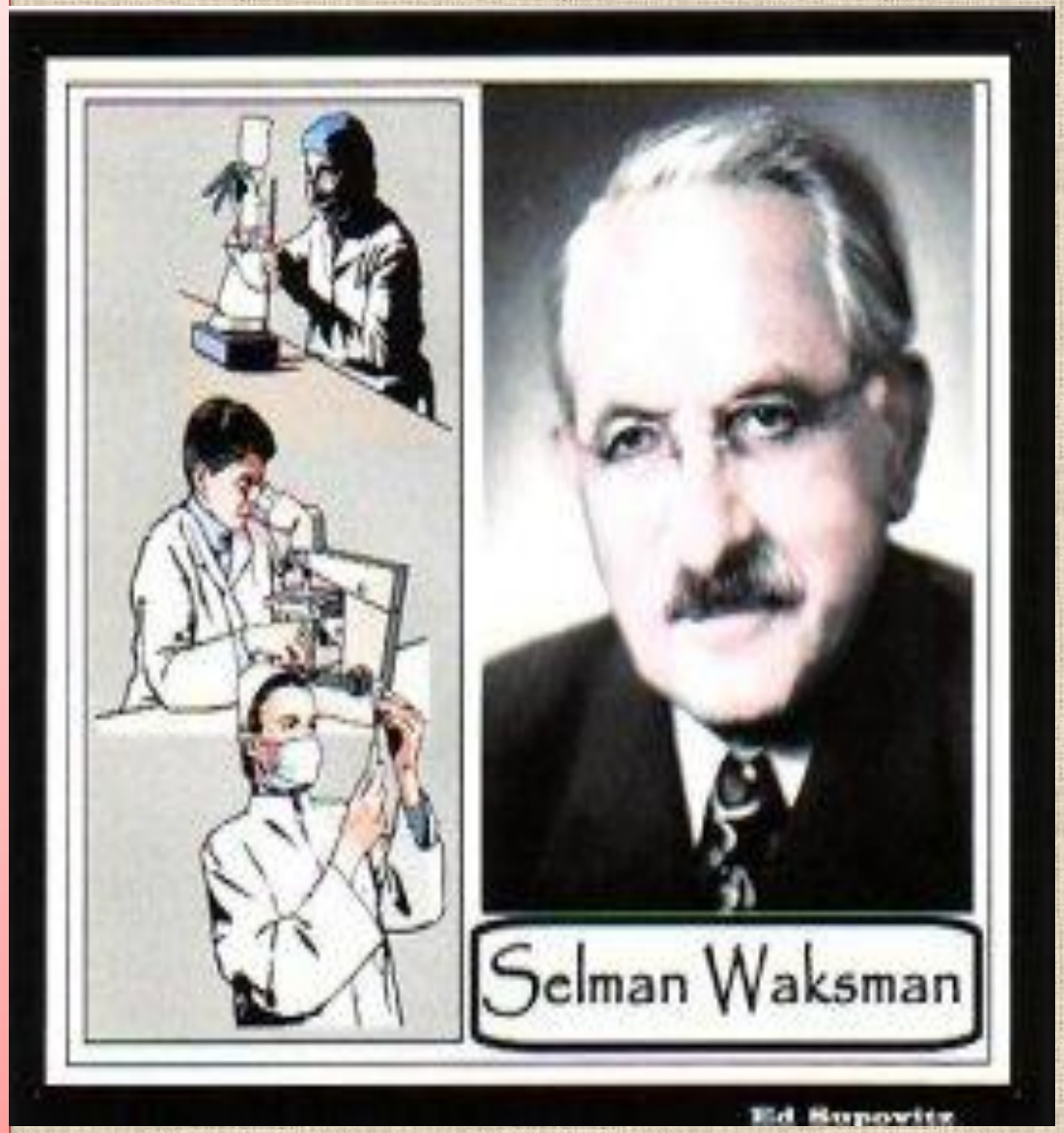
In 1938 **HOWARD FLORY, ERNEST CHAIN** received pure penicillin.

In 1945 **ALEXANDER FLEMING, HOWARD FLORY, ERNEST CHAIN** won the Noble Prize for the discovery of **penicillin** and its curative effect in various infectious diseases.



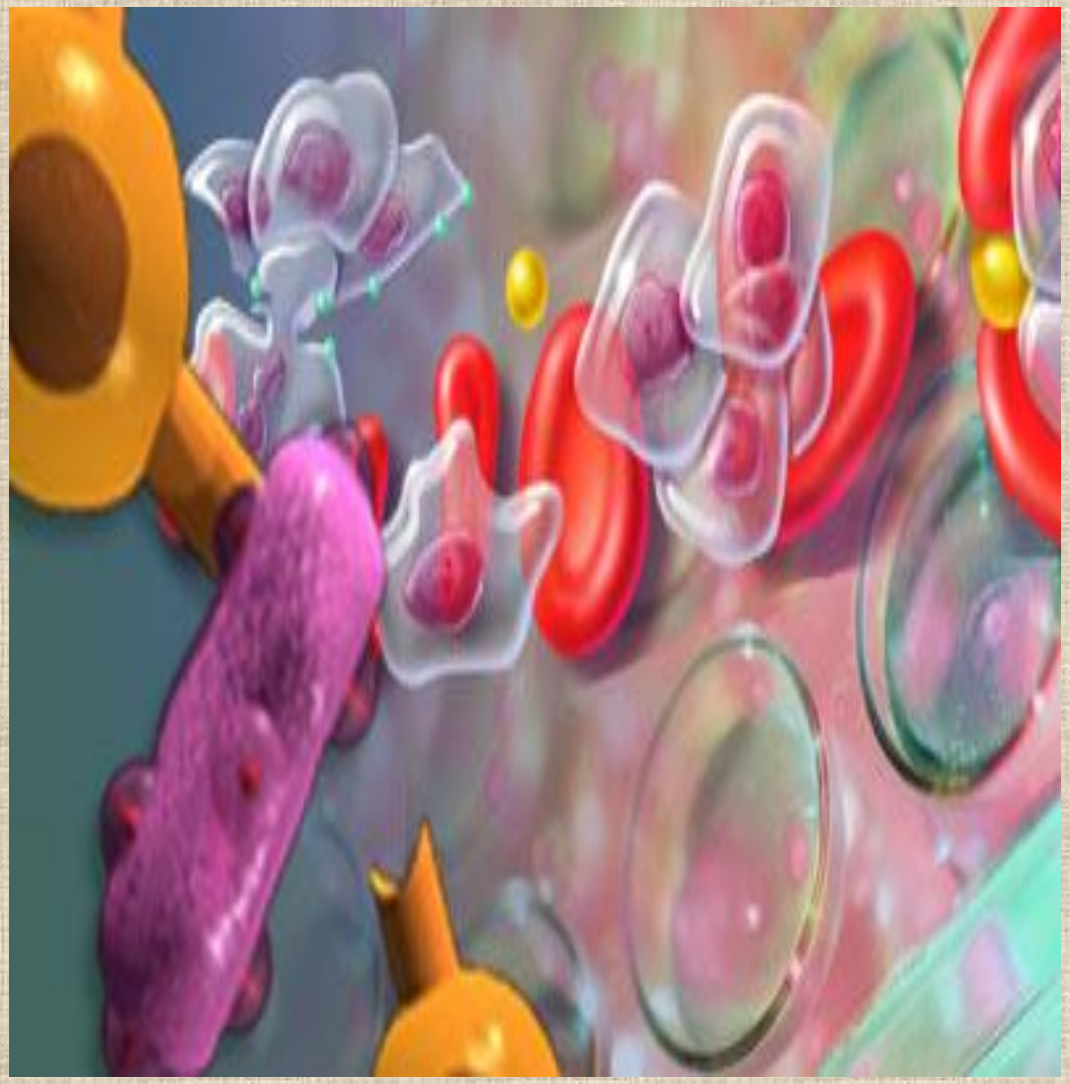
ANTITUBERCULOSIS DRUGS

- In 1944, **SELMAN WAXMAN** announced the discovery of **STREPTOMYCIN** from cultures of a soil organism *Streptomyces griseus,* and stated that it was active against *M. tuberculosis.*
- Clinincal trials confirmed this claim.
- The Nobel Prize in Medicine 1952 was awarded to Selman A. Waksman



IMMUNOLOGY

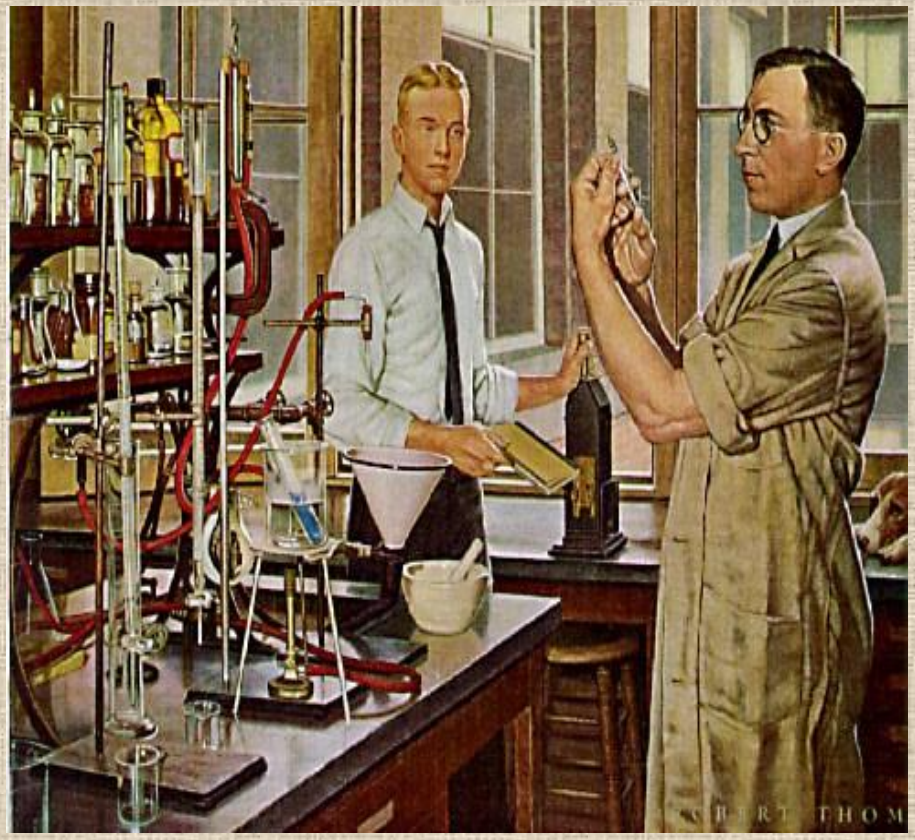
- In Paris, Élie Metchnikoff had already detected the role of white blood cells in the immune reaction,
- Jules Bordet had identified antibodies in the blood serum.
- The mechanisms of antibody activity were used to devise diagnostic tests for a number of diseases.
- In 1906 August von Wassermann gave his name to the blood test for syphilis, and in 1908 the tuberculin test—the skin test for tuberculosis—came into use.

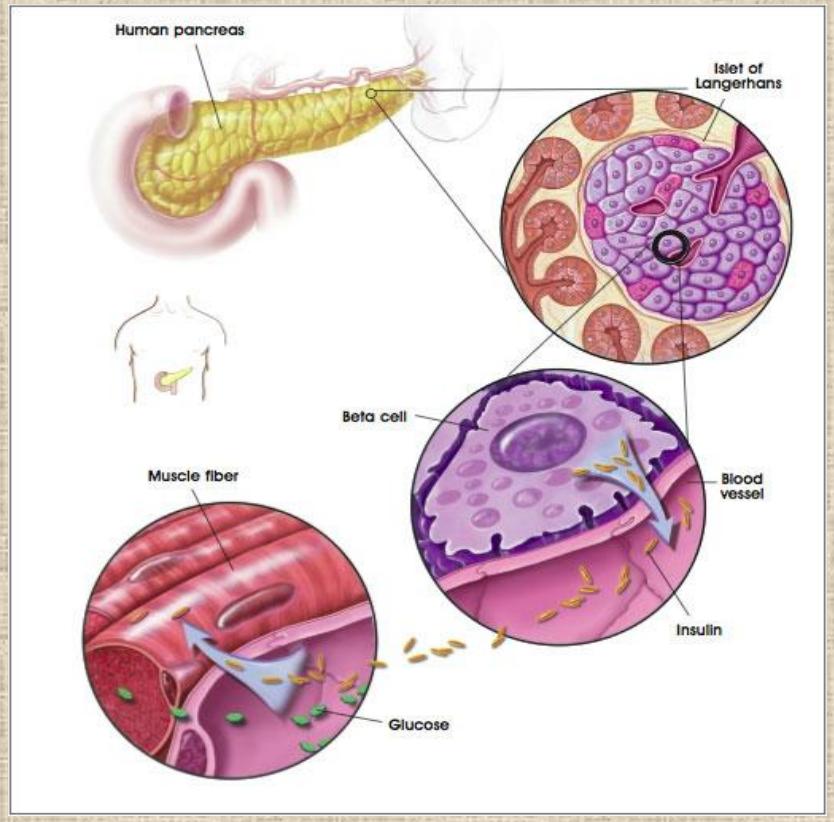


INSULIN

- In 1921, Frederick Banting and Charles H. Best isolated insulin. They then worked with Canadian chemist James B. Collip and Scottish physiologist J.J.R. Macleod to purify the substance.
- The following year a 14-year-old boy with severe diabetes was the first person to be treated successfully with the pancreatic extracts.

In 1923 Frederick G. Banting and John Macleod were awarded the Nobel Prize in Physiology or Medicine "**for the discovery of insulin**." Although insulin doesn't cure diabetes, it's one of the biggest discoveries in medicine. When it came, it was like a miracle. People with severe diabetes and only days left to live were saved. And as long as they kept getting their insulin, they could live an almost normal life.





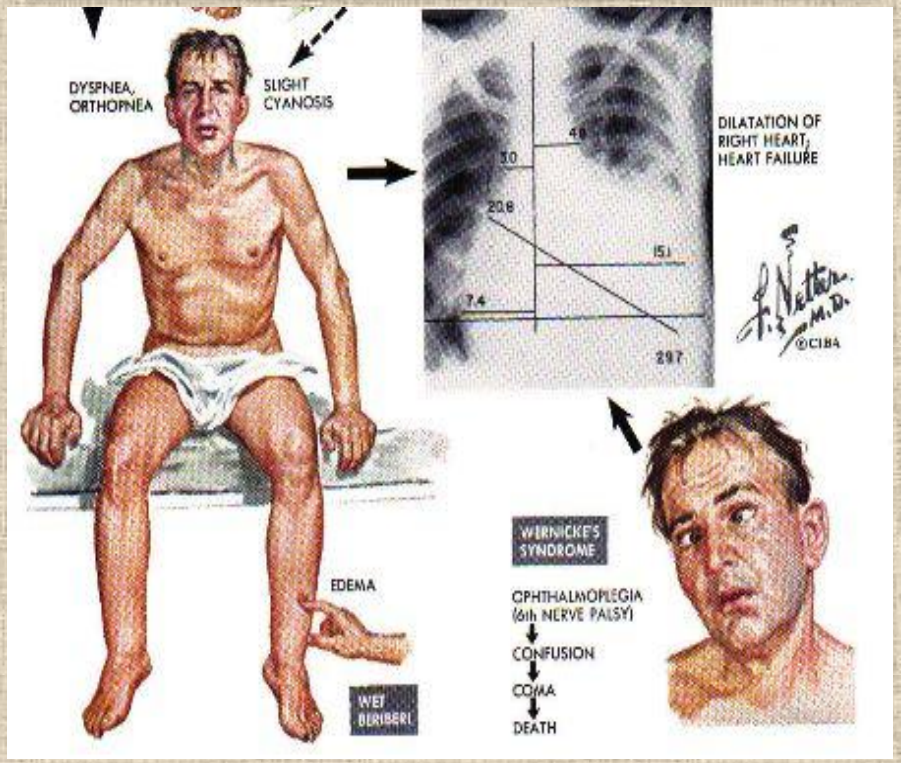
CORTISONE

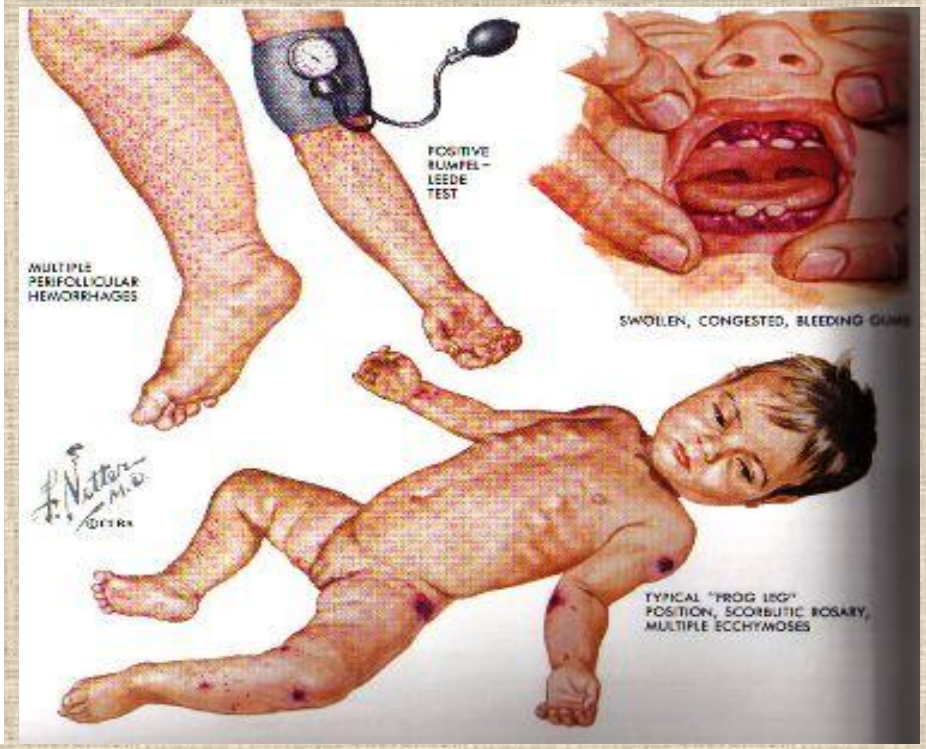
- In 1949 Philip S. Hench and his colleagues announced that a substance isolated from the cortex of the adrenal gland had a dramatic effect upon rheumatoid arthritis.
- This was compound E, or cortisone, as it came to be known, which had been isolated by Edward C. Kendall in 1935.

VITAMINS

Hopkins demonstrated the need for thiamine in the diet in publications done from 1906-1912, and was a co-recipient of the 1929 Nobel Prize in Medicine

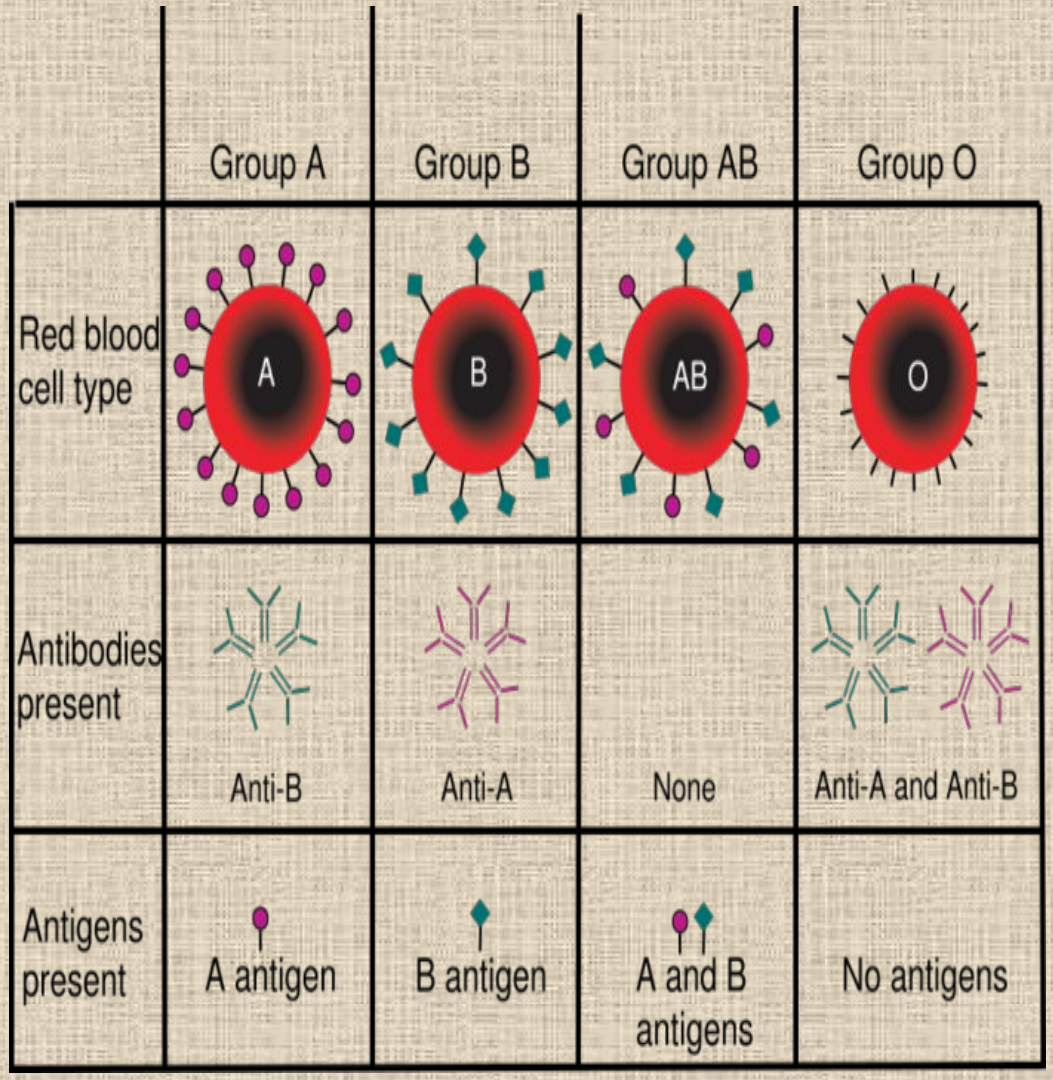
The name vitamin was suggested by Casimir Funk , in the belief that they were amines(then term was altered to vitamin). Now, by supplementing the diet with vitamins, deficiency diseases such as rickets, scurvey and beriberi practically disappeared.





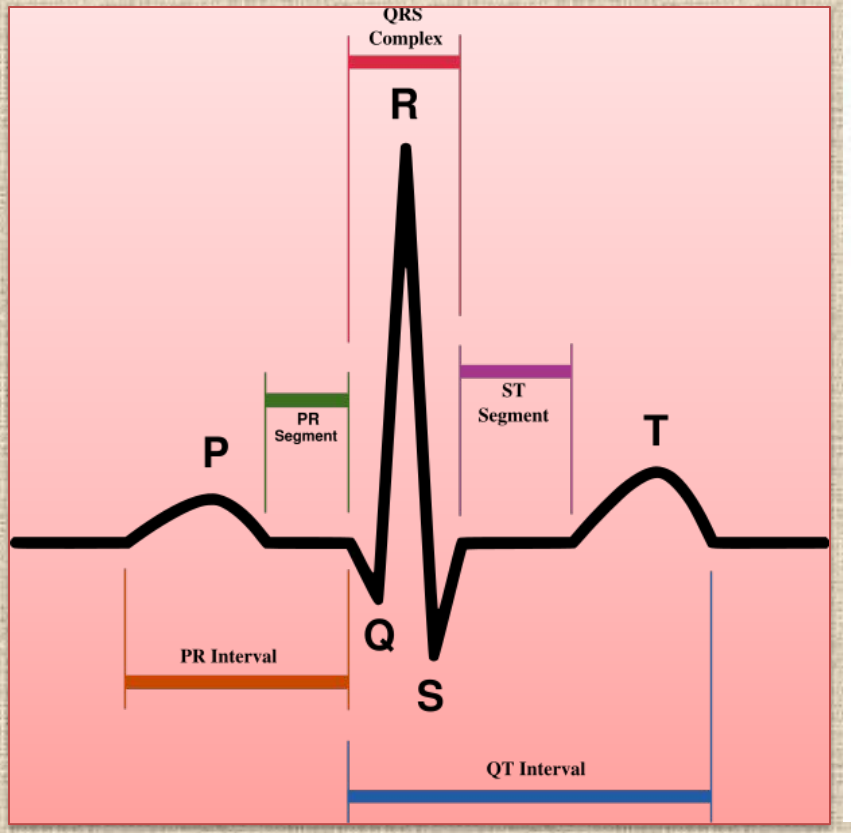
The human blood groups

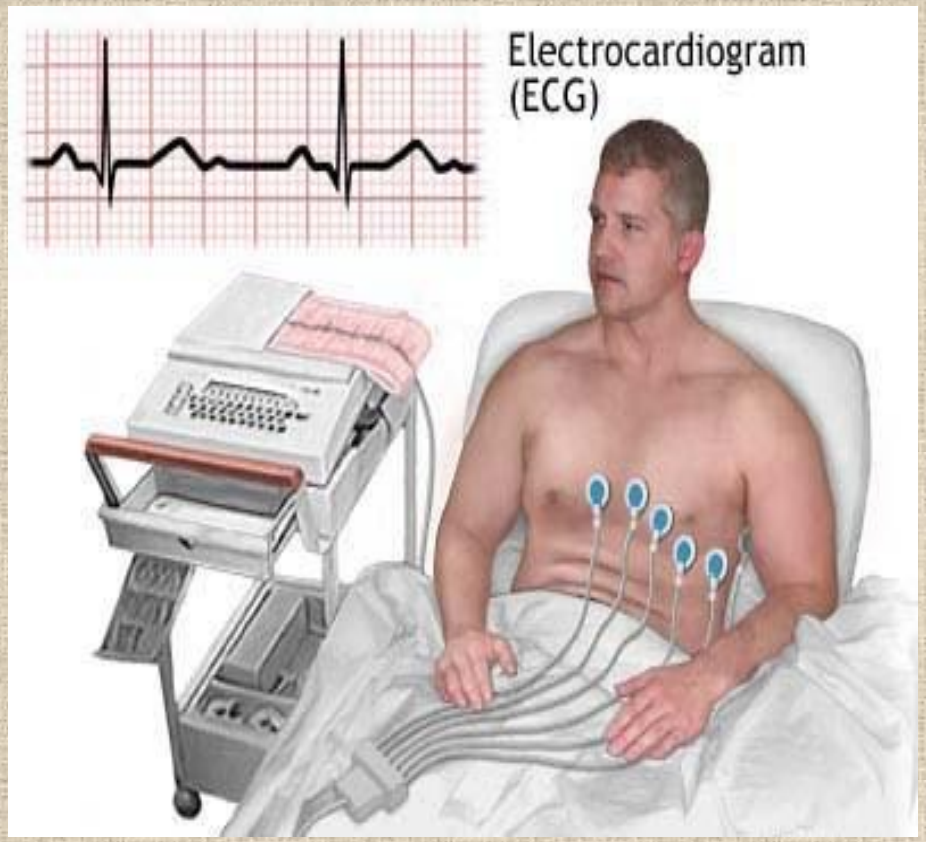
The discovery of human **blood groups** was made in 1901 by the famous Austrian scientist Dr. Karl Landsteiner. He who won the **Nobel Prize** for his discovery in 1930. He divided the blood group into four categories being A, B, AB, O .



ECG

The Nobel Prize in Physiology or Medicine 1924 was awarded to Willem Einthoven *"for his discovery of the mechanism of the electrocardiogram"* An electrocardiogram (EKG or ECG) is a test that checks for problems with the electrical activity of the heart. An EKG translates the heart's electrical activity into line tracings on paper. The spikes and dips in the line tracings are called waves.



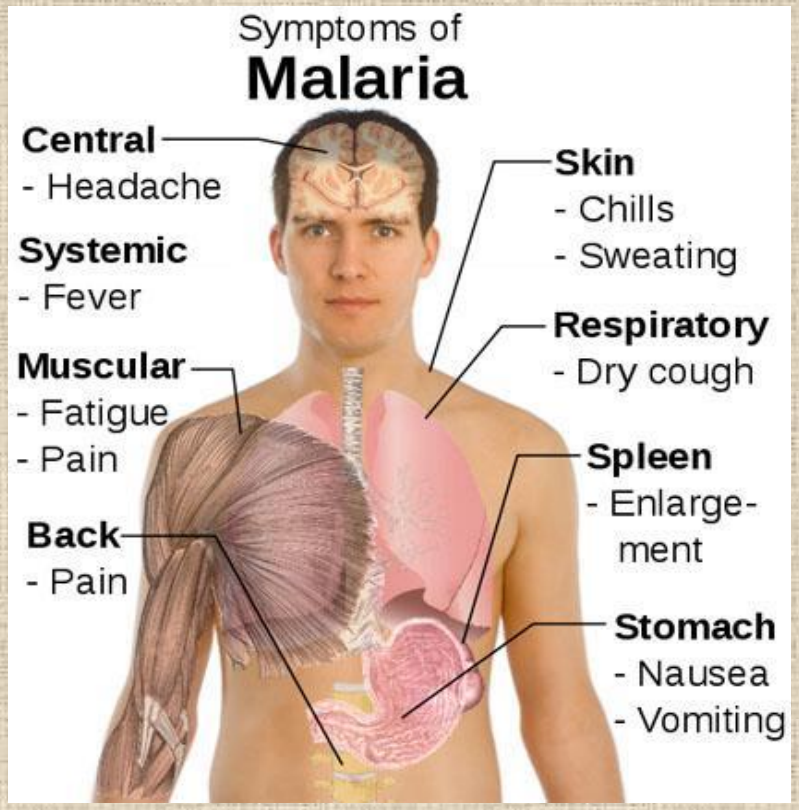


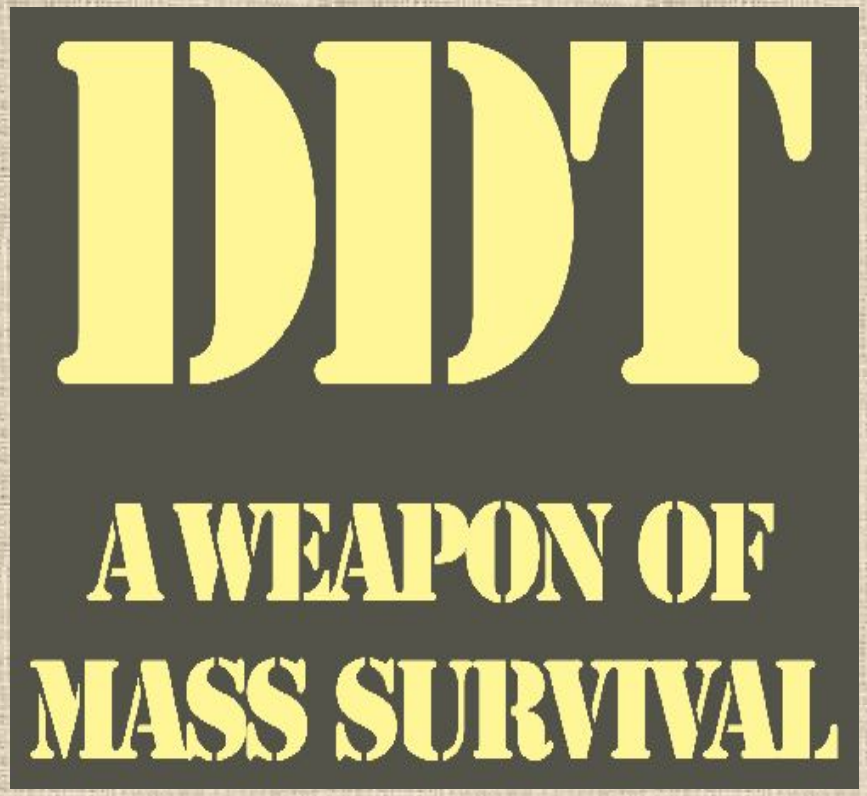
TROPICAL MEDICINE

The first half of the 20th century witnessed the virtual conquest of 3 of the major diseases of the tropics: malaria, yellow fever and leprosy.

The Nobel Prize in Physiology or Medicine 1948 was awarded to Paul Müller *"for his discovery of the high efficiency of DDT as a contact poison against several arthropods"*.

The major problem was that the mosquitoes were able to develop a resistance to DDT. Now DDT is strongly criticized by ecologists.





Medical ultrasonography

Ultrasonic energy was first applied to the human body for medical purposes by Dr. George Ludwig in the late 1940s.

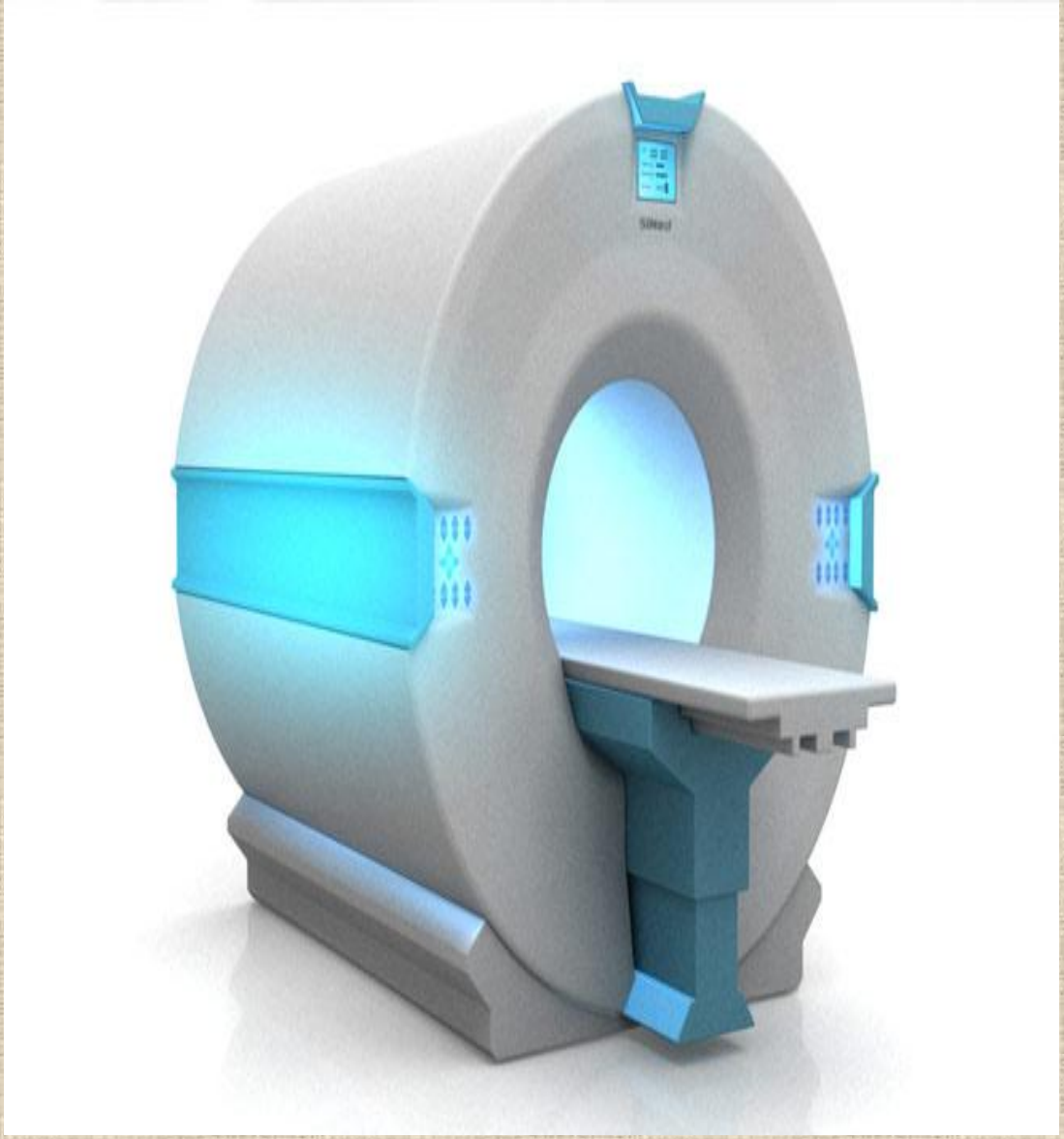
English born and educated John Wild (1914–2009) first used ultrasound to assess the thickness of bowel tissue as early as 1949: for his early work he has been described as the "father of medical ultrasound".[

Computerized axial tomography

The first commercially viable CT scanner was invented by Sir Godfrey Hounsfield at EMI Central Research Laboratories using X-rays.

Hounsfield conceived his idea in 1967 and the first patient brain-scan was done on 1 October 1971. It was publicly announced in 1972.

Hounsfield and Cormack shared the 1979 Nobel Prize in Medicine.



Surgery In The 20th Century

The problem of Shock

The first problem of the surgery in the 20th century was shock , that happens because of decrease in the effective volume of the circulation.

In 1901 Karl Landsteiner discovered the AB0 blood groups . In 1914 sodium citrate was added to freshly drawn blood to prevent clotting.

As blood transfusion increased in frequency and volume blood banks were required.

In 1933 S.S. Yudin used cadaver blood.

In 1937 B. Fantus used living donors.

Aseptic and antiseptic

Hermann Kümmell, of Hamburg, devised the routine of “scrubbing up.”

In 1890 William Stewart Halsted, of Johns Hopkins University, had rubber gloves specially made for operating.

In 1896 Johannes von Mikulicz-Radecki, a Pole working at Breslau, Ger., invented the gauze mask.

ANESTHESIA

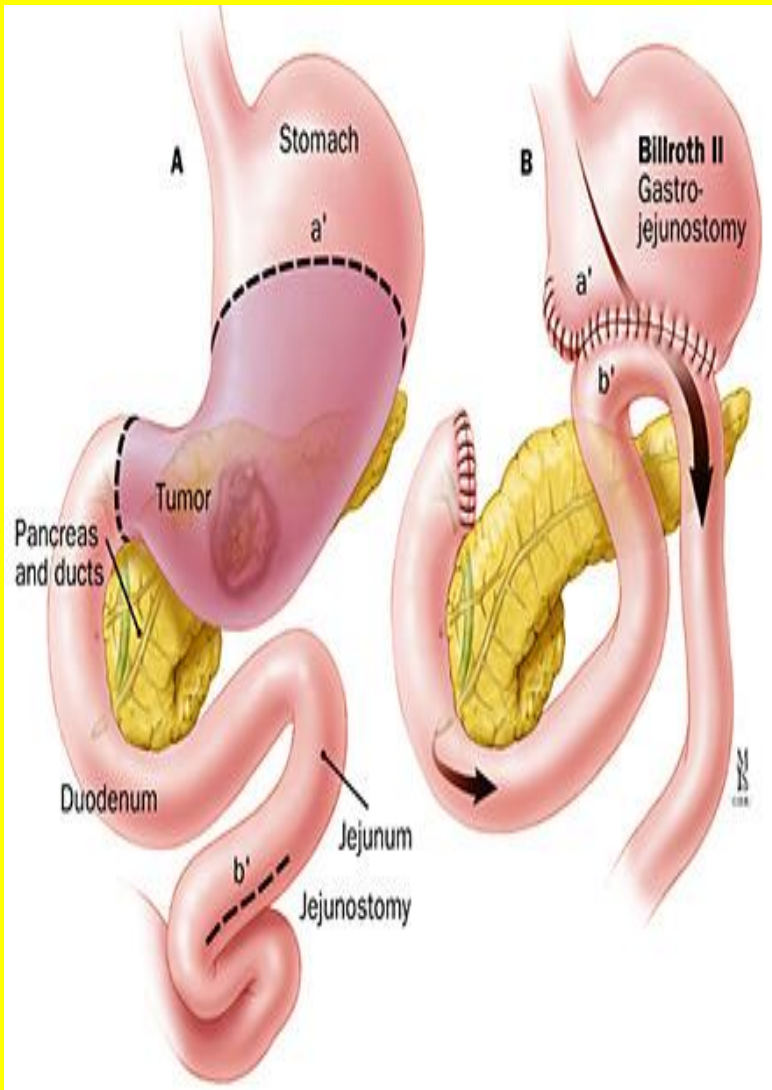
IN 1933 – INTRODUCTION OF THE GENERAL ANESTHTIC **CYCLOPROPANE** BY RALPH WATERS

IN 1937 – INTRAVENOSUS ANESTHESIA WAS INTRODUCED – JOHN LUNDY USED **PENTOTHAL** FOR FIRST

IN 1942 GRIFFITH AND JOHNSON PRODUCED MUSCULAR PARALYSIS BY THE INJECTION OF **CURARE**

ABDOMINAL SURGERY

- In 1881 Billroth had performed the first successful removal of part of the stomach for cancer.
- By 1891 had carried out 41 more of these operations with 16 deaths—a remarkable achievement for that era.



HEART SURGERY

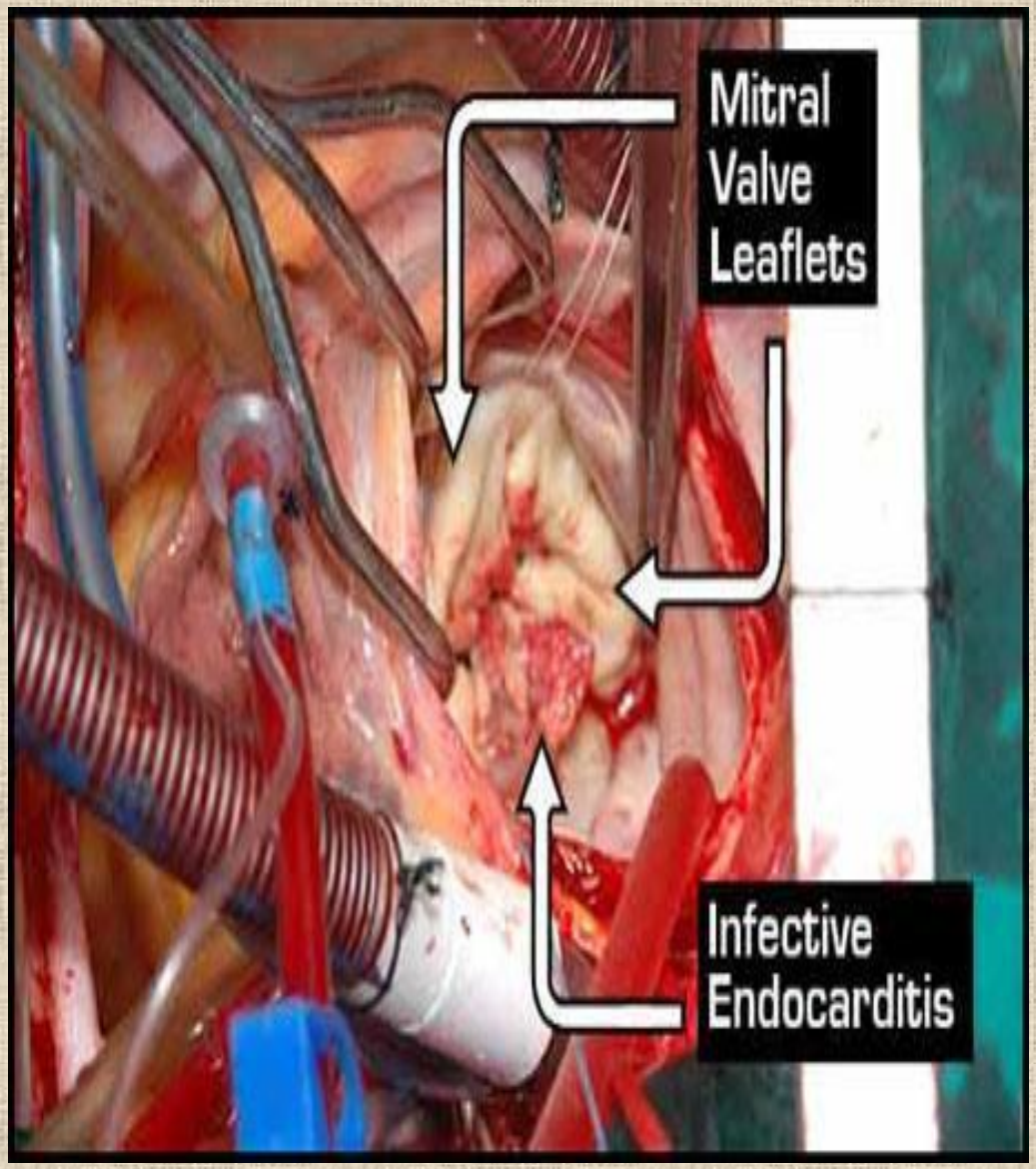
1912 – OPERATION ON THE AORTIC VALVE (TUFFIER)

1923 – CUTLER OPERATED MITRAL STENOSIS

1938 - GROSS SUCCESSFULLY TIED OFF A PERSISTENT DUCTUS ARTERIOSUS

1953 – JOHN GIBBON USED THE HEART- LUNG MACHINE TO SUPPLY OXYGEN WHILE HE CLOSED A HOLE IN THE SEPTUM BETWEEN THE ATRIA

A NEW FORM OF HEART SURGERY IS VERY POPULAR NOW – ROBOT-ASSISTED SURGERY.



ORGAN TRANSPLANTATION

1905: First successful cornea transplant by Eduard Zirm

1954: First successful kidney transplant by J. Hartwell Harrison and Joseph Murray

1967: First successful liver transplant

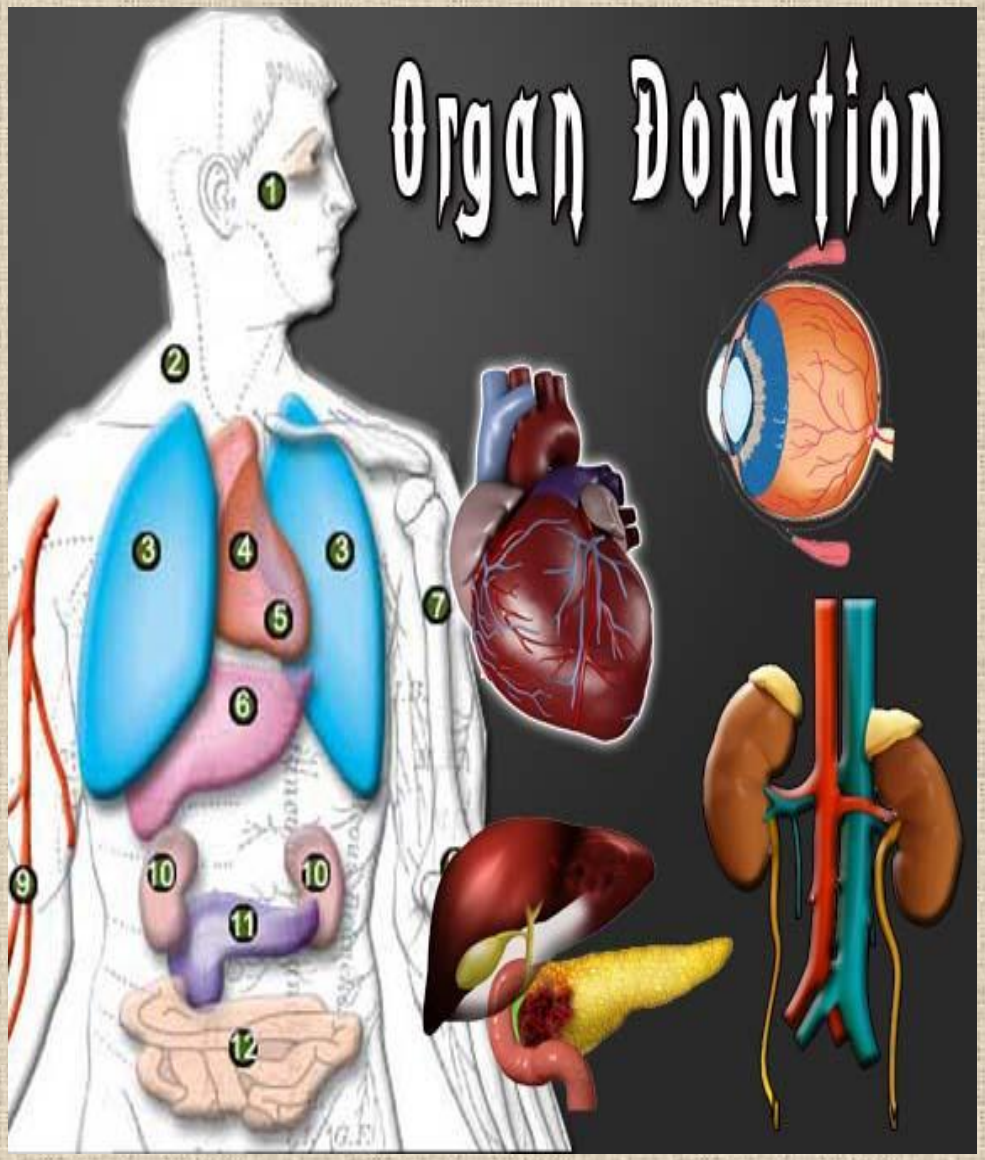
1967: First successful heart transplant by Christian Barnard

1986: First successful double-lung transplant

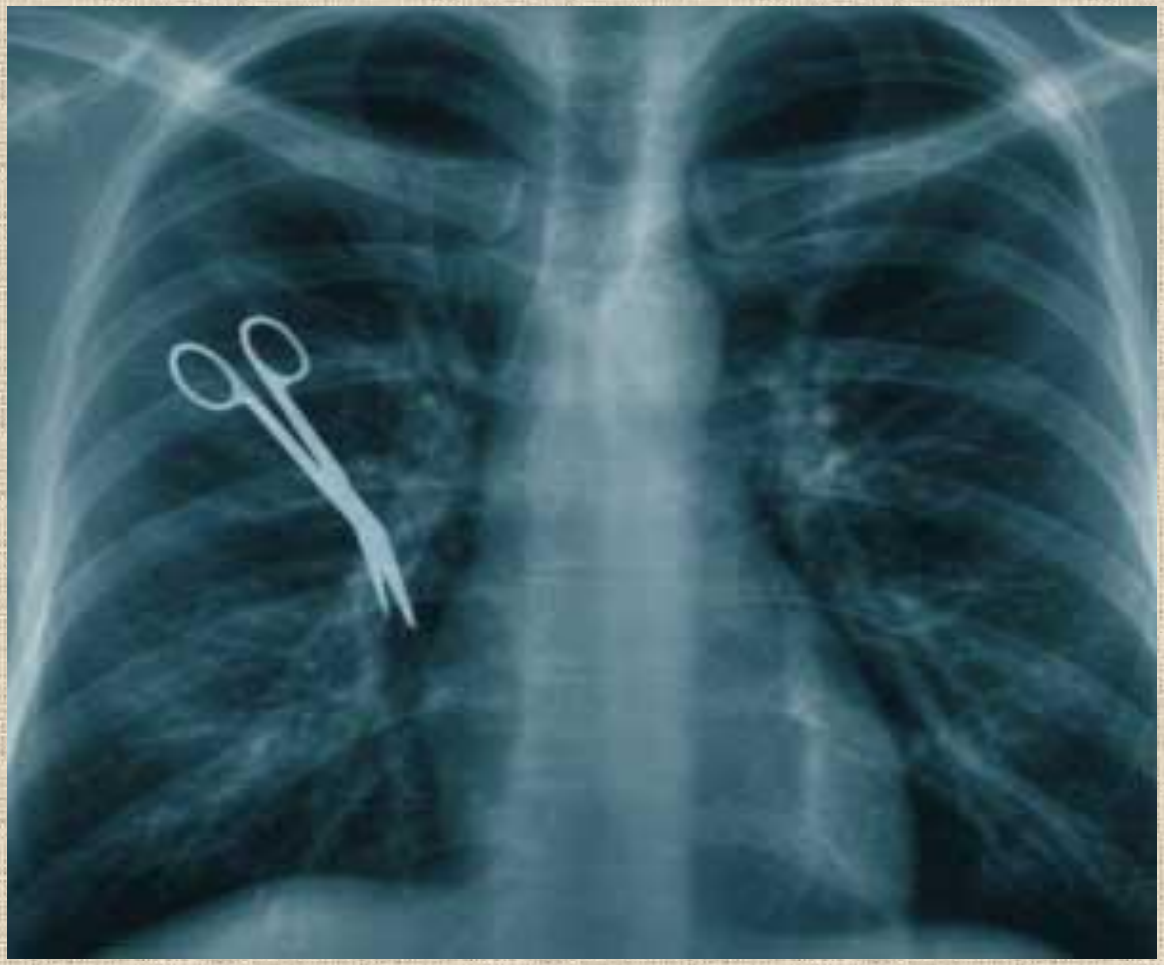
1998: First successful hand transplant

2010: First full facial transplant

2011: First double leg transplant

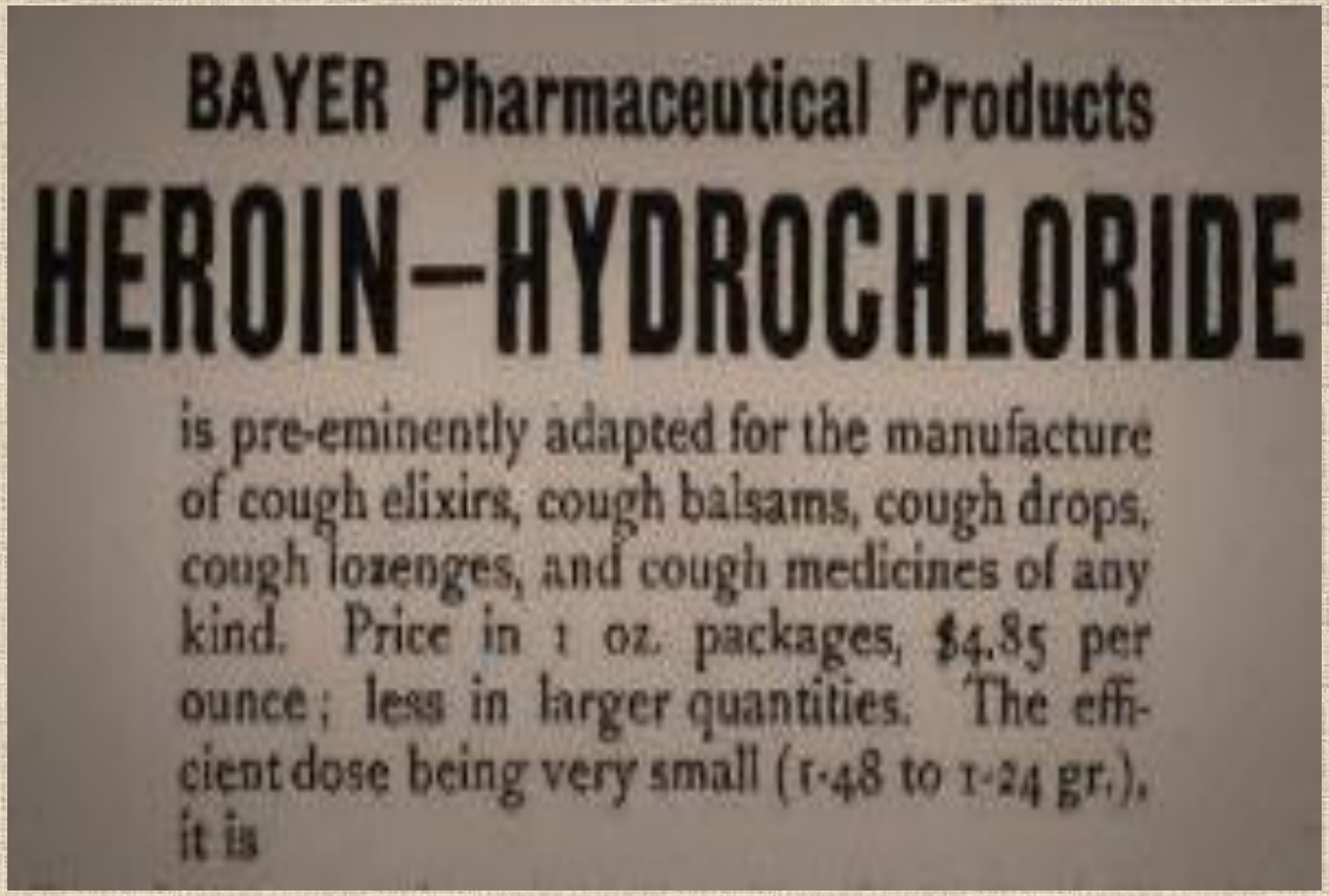


THE MISTAKES OF MEDICINE



THE SOOTHING SYRUP FOR THE CHILDREN

In 19th century this soothing syrup for the children was very popular. It was considered to be absolutely safe. In fact, this small bottle with magic medicine contains 65 mg of pure morphine, chloroforme, heroine etc. So, no wonder that a lot of children died because of such treatment.



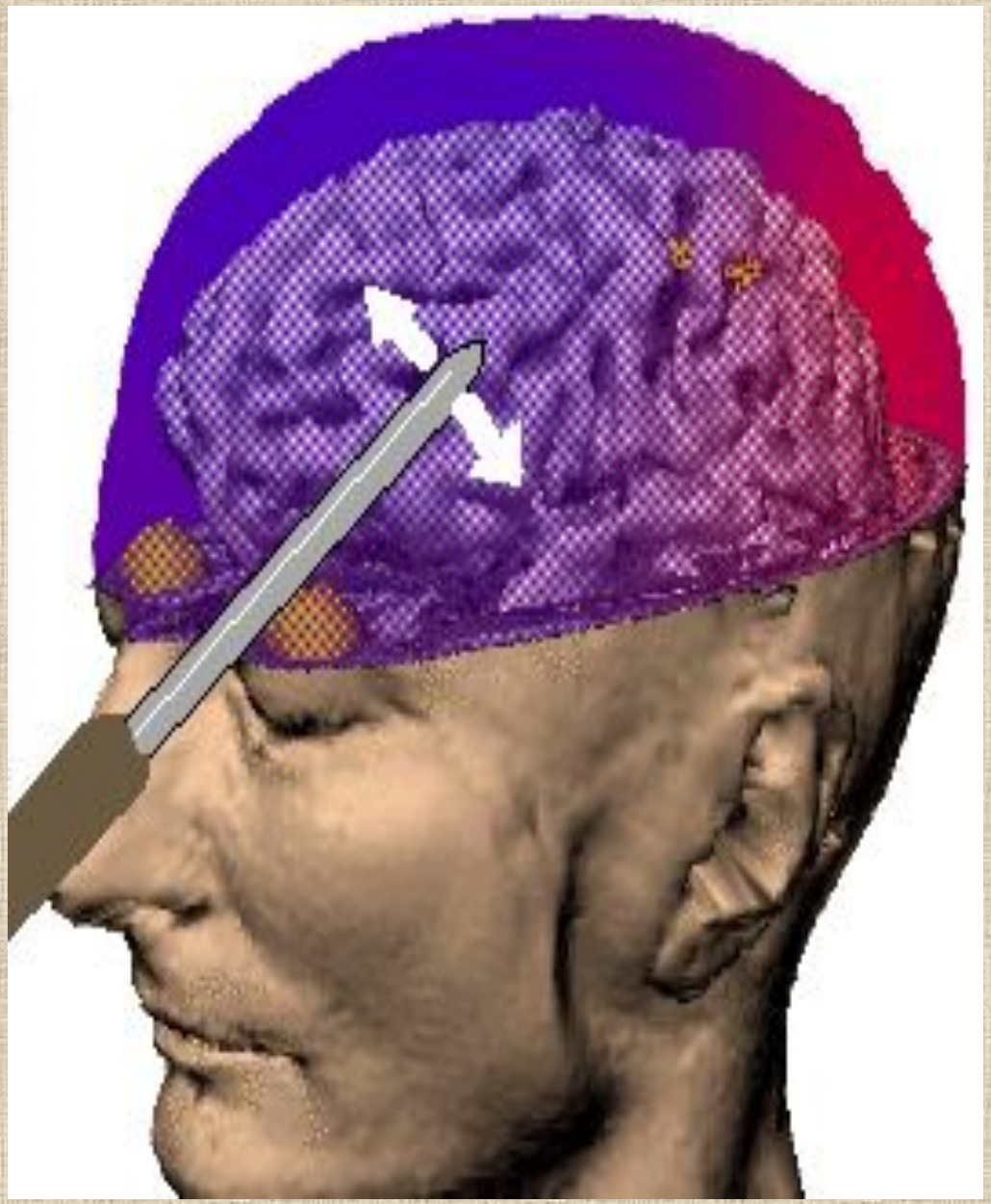
IT IS ALMOST IMPOSSIBLE, BUT IN 19TH CENTURY PEOPLE TREATED COUGH , USING HEROIN, WITHOUT KNOWING HOW DANGEROUS IT IS.

THE MERCURY

A physician Robert Patric promised to cure almost all diseases with the mercury (Hg). Despite terrible symptoms of overdose – heartache, cough, hallucinations and disturbance of consciousness – this treatment was very popular.

THE LOBOTOMY

The dissection of the brain was very popular in the 1st half of the 20th century. It was considered the best of treating of depression and insanity. The author of this method Monish even received the Nobel prize. Now this inhuman and dreadful method is out of use.



THE URINOTHERAPY

It is difficult to imagine, but throughout many centuries a lot of people believed into the magic properties of the urine – despite that no one serious proof of the therapeutic activity of the urine exist- still this method is rather popular in many countries.

THE PHLEBOTOMY

THE METHOD OF PHLEBOOTOMY (BLOODLETTING) WAS VERY POPULAR DURING 20 CENTURIES. EVEN IN ANCIENT GREECE IT WAS CONSIDERED TO BE THE MOST EFFECTIVE WAY OF TREATMENT OF ALMOST ALL DISEASES.

THE PILLS FOR WEIGHT LOSS

IN 20TH CENTURY OBSSESION OF MANY WOMEN WAS DESIRE TO LOOSE WEIGHT. SO A LOT OF “MAGIC” WEIGHT LOSS PILLSN APPEARED. IN FACT THIS PILLS CAUSED ADDICTION AND GREAT PROBLEMS WITH HEALTH. AND IN THE MIDDLE OF THE 20TH CENTURY SOME PILLS CONTAINED HELMINTH EGGS AND AMPHETAMINES.

THE CEPHALOTRYPESIS

This inhuman method was very popular way of treating of migraine headache – hemicrania. And in some countries the hole in the head was made to open “the third eye”

THE TRAGEDY OF THALIDOMIDE

Thalidomide was a drug, which after years of extensive animal tests, was first marketed as an over-the-counter sedative: it came to be used by pregnant women in many countries during the late 1950s and early 1960s as a treatment for morning sickness. By the time the drug was banned, more than 10,000 children had been born with major thalidomide-related problems. A common pattern of limb deformities, termed phocomelia from the Greek word for 'seal limbs', emerged including shortening or missing arms with hands extending from the shoulders, absence of the thumb and the adjoining bone in the lower arm and similar problems with the lower extremities. The drug also caused abnormalities in the eyes, ears, heart, genitals, kidneys, digestive tract (including the lips and mouth), and nervous system

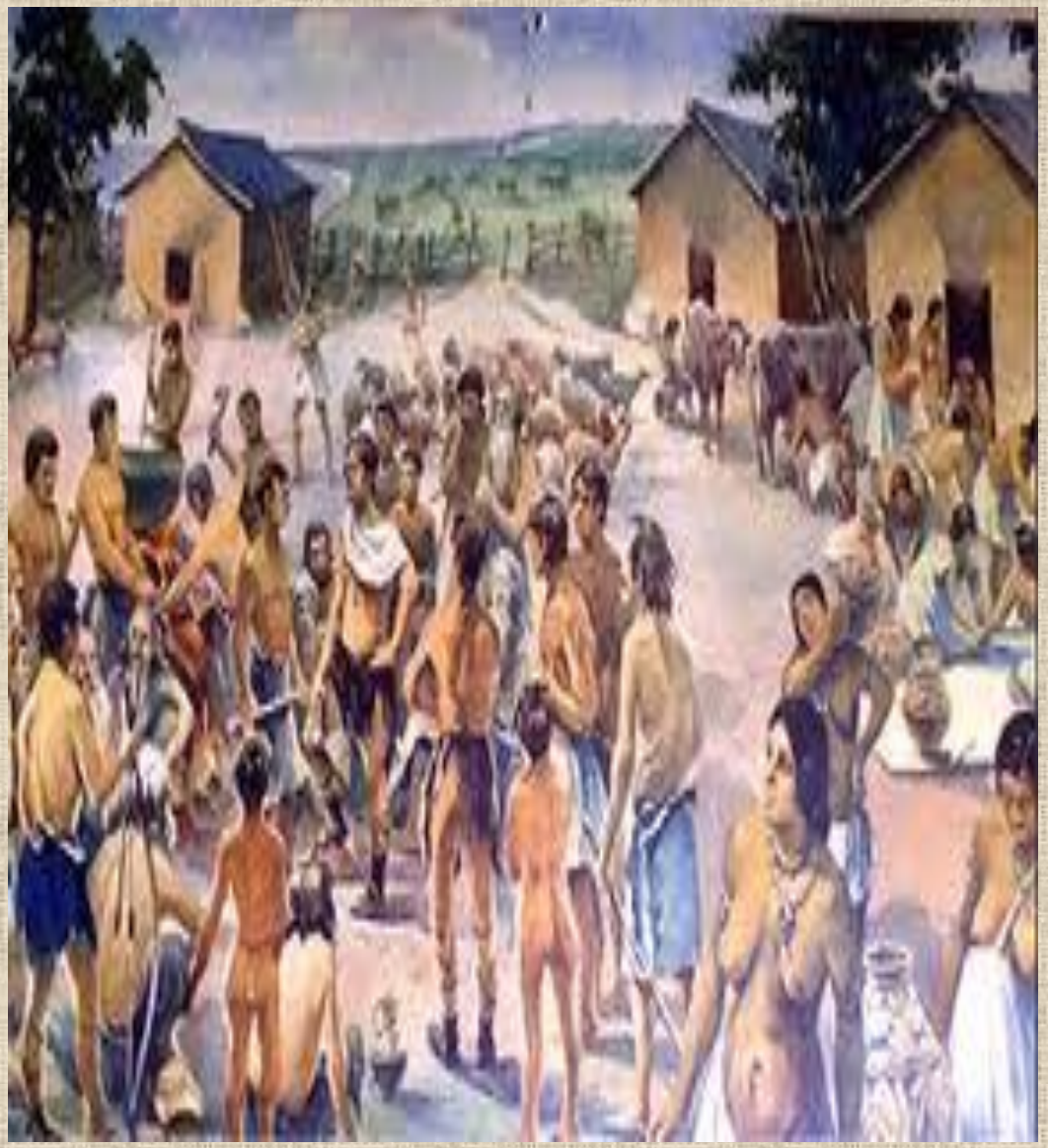
Need To Transform Medicine in the 21st Century

20th Century	21st Century
Treat disease when symptoms appear and normal function is lost	Intervene before symptoms appear and preserve normal function for as long as possible
We did not understand the molecular and cellular events leading to disease	Understanding of preclinical molecular events and ability to detect patients at risk
Expensive in financial and disability costs	Orders of magnitude more effective

HISTORY OF UKRAINIAN MEDICINE.

Medicine of Scythia

Opening of tripolska civilization which attained the bloom for 3 thousands years B.C. certifies that our ancestors knew about medical properties of some plants and used them for treatment of many diseases. Consequent development of salving is attained during scythian and cherniahivska cultures. Slavs had a settlement near the rivers of Dnipro, Dnister from ancient times.



Scythians in VII c B.C. populated Crimea and territory between Dniper and Danube.

Scythians, as well as any peoples, had certain knowledge in the relation of treatment of different deseases and damages. Gold vases were found with the representation of scythians which render a medical help (bandaging of extremities, extrfction of teeth) during excavations of Chertomlinskij burial mound (near Nikopol)

«Father of botany» Feofrast in his texts (370-285 B.C.) mentions «Sweet scythian root», about absinth and poisonous matter of aconite. Pliniy and Dioskorid also mentioned a «sweet root». This enigmatic plant - modern liquorice. Already in those times people knew about its coughings up properties, applying at a cough, cold diseases; juice was mixed up with honey and put to the abscesses. Generally sweet scythians was very valued. Warriors appeased thirst twith his plant during 12 days

Facilities of animal origin had wide application in scythian medicine (beaver stream, fats, brain).

It is here necessary to underline the special importance of steam „scythian bath-house” in relation tosanitary – hygienical measuresof scythian population

Known greek writer Plutarkh (46-120 ð.ð. A.D.) mentions, that on stream of the river of Tanais (Don) there is a plant of alinda, which leaves reminds a cabbage.

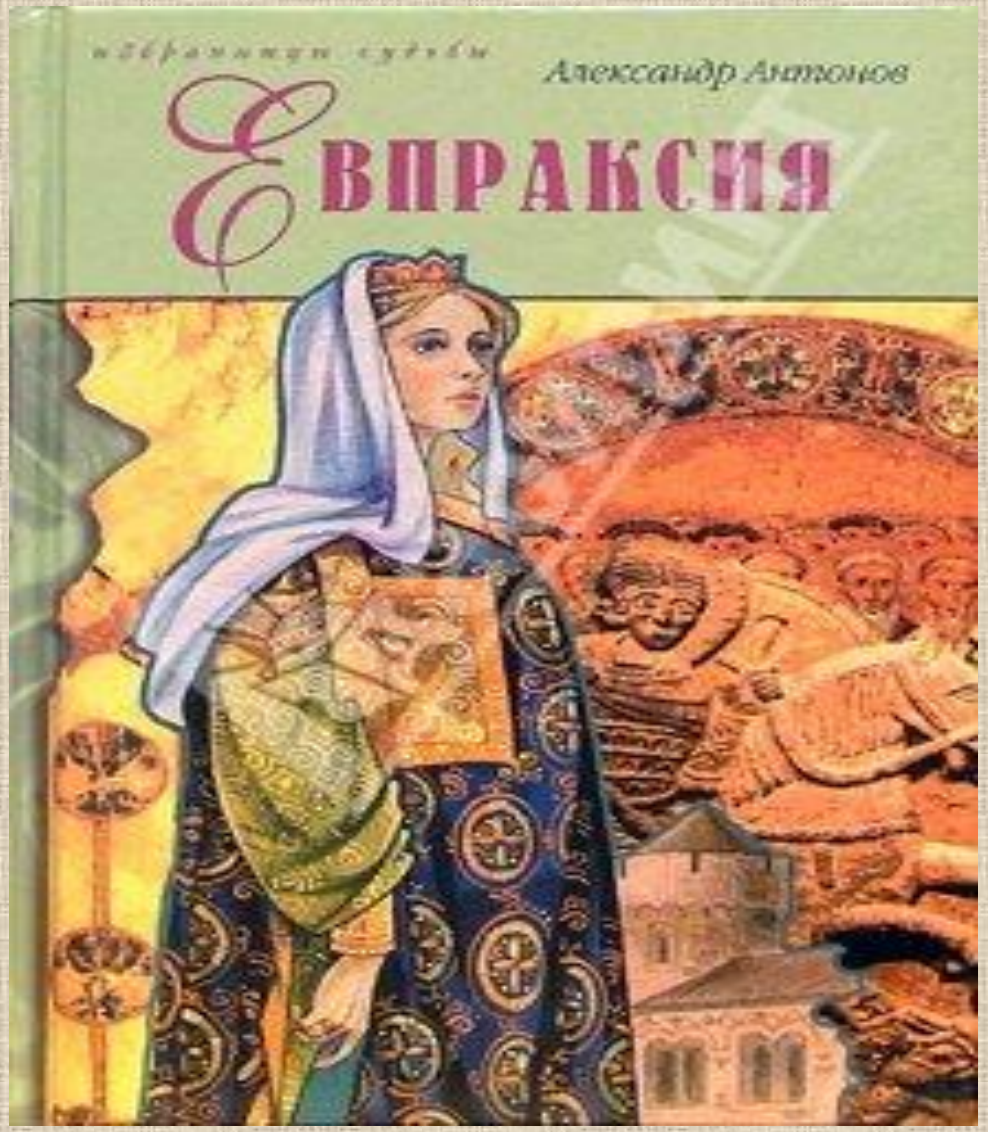
Scythians used juice of this plant for rubbing of surface of body which guarded them from a chill and cold. For scythians hemp juice, extract of root of mandrake, opium served as anesthetics at surgical intervention. Scythian women, on the certificate of Gerodota, were able to make cosmetic ointments for a skin. They «grind by rough stone cypress, cedar and lavender tree and topping up water to them».

A treatise of Evpraksiya about „Ointments”

History of Evpraksija is such. From childhood she was interested in the secrets of national medicine, studied| properties of vulnerary plants and ointments.

Then she began to treat poor people.

Consisting of medicine of Kievan Rus is well shown in the work of Evpraksija Kievan (Zoy) - the grandchild of Vladimir Monomakh, which is written by her in Byzantium



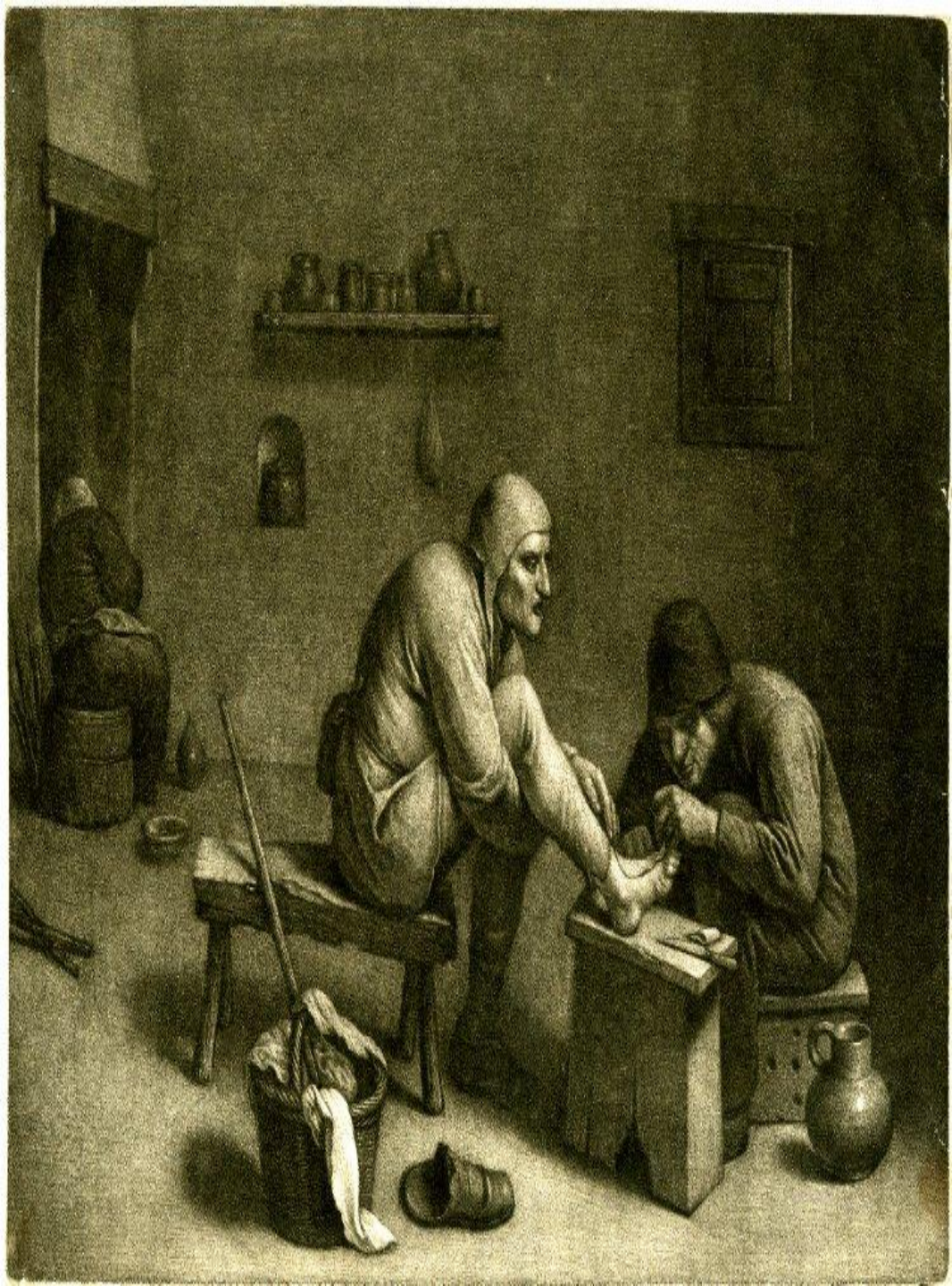
This treatise consists of 5 parts. In the first part is a general review of views on hygiene. In the second are advices in relation tothe observance of hygiene of marriage, during pregnancy and care of child. In the third part is positio about the hygiene of nourishment. In fourth is information about external diseases and recipes of treatment of dental and skin illnesses. The fifth part is about cardiac and gastric diseases and advices for their prophylaxis.

It is known from history, that in XI century there were doctors among the monks of the Kievo-pecherskyj monastery. In a hospital which was opened at a monastery, were rendered a surgical, therapeutic help. The monks of the Kievo-pecherskyj monastery with experience of treatment went to nearby earths, founded new monasteries, the same assists in distribution of medical knowledges.

So *there* was *monasterial medicine*.

The basic competitors of monasterial doctors at that time were *barbers* which belonged to city gentlefolks. Their services were very expencive.

National medicine received wide distribution, but these knowledges was obviously not enough to resist an infectious disease of that time

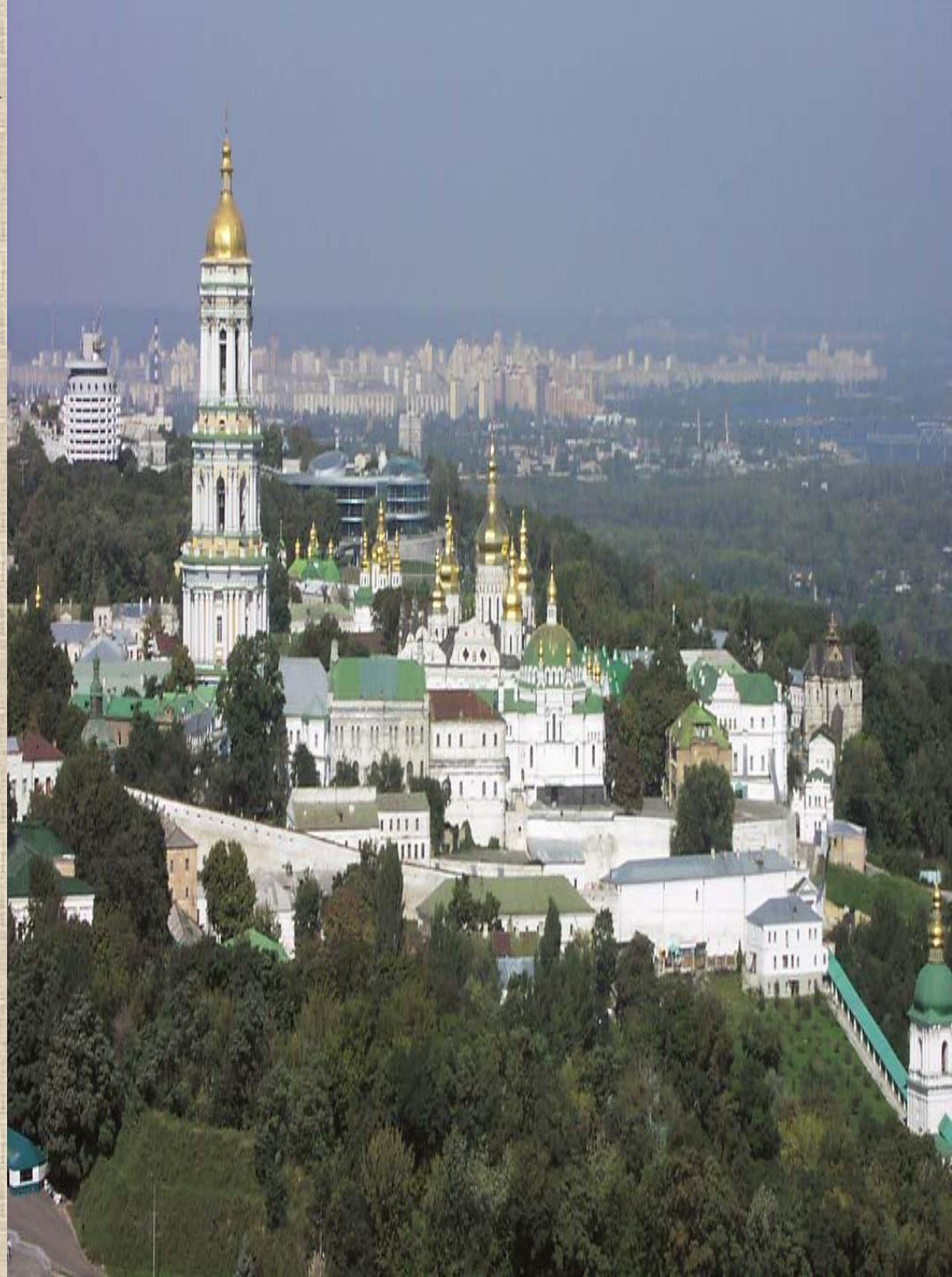


Serious monastic medicine did not begin to develop in the west until the monastery of Montecassino was founded by St. Benedict of Nursia in 529. From here the Benedictines spread the medical texts and teachings to other monasteries, most notably Fulda in Germany. And Irish missionary monks founded centers in Switzerland (St. Gall and Reichenau) and in Italy (Bobbio).

In contrast, in the East, the monastic movement had already become less isolationist in the 4th century and, with the work of St. Basil the Great, it became more dedicated to Christian charity and thus more involved with the community. This outreach, of course, included the care of the sick and aging and so monastic medicine in the East developed more than that in the West. Already in 375, St. Basil the Great included a hospital and leprosarium in the institutions he founded in Caesarea, Syria.

As Christianity took root in Kievan Rus' in the time from the 11th to the 13th centuries, some 70 monasteries were founded, generally after the model of Athos. Their early history is sketchy. The Primary Chronicle makes it clear that there were monasteries before 1051, but no further details are available about this earliest stage. The founding of the Pecherski Monastery near Kiev has a lengthy 1051 entry in the Primary Chronicle about its founding, and numerous other entries in the Primary Chronicle and also the very valuable Kievo-Pecherskij Paterik, a collection/synthesis of written and oral works attributed to 3 Pecherskij monks, Nestor, Simon and Polikarp. It is the single most important source on monastic medicine in Kievan Rus'.

Care for the sick was an important virtue in Kievan Rus' following the culture of its Byzantine exemplar. There were special legal protections under the Church for the sick and those caring for them. And Efrem, bishop of Pereyslavl establish a number of hospitals in 1091 to provide free care for his flock, patterned after those in Byzantium where Efrem had lived for 18 years. Thus care for the sick was an important mission for Pecherskij Monastery from its beginning.



Early in the history of Pecherskij Monastery, a separate facility had to be built to handle the need. It's description makes it seem comparable to the hospice-hospitals prevalent in the West. Like in the West, there was also a separate facility for the sick monks. In the 12th century, the facilities were expanded. Prince Svyatopolk Davidovich of Chernigov took vows there in 1106 (becoming Nikolai Svytosha) and then founded a hospital which became the nucleus of the Bol'nichnij Monastery, part of the Pecherskij complex but with its own abbot until the 18th cent. Further details are not known.

The Pecherskij Paterik indicates a tremendous rivalry between secular court physicians, the monk-physicians and folk healers (volxvy). Not surprisingly, the secular physicians and the folk healers tended to come in last in the contests narrated in the

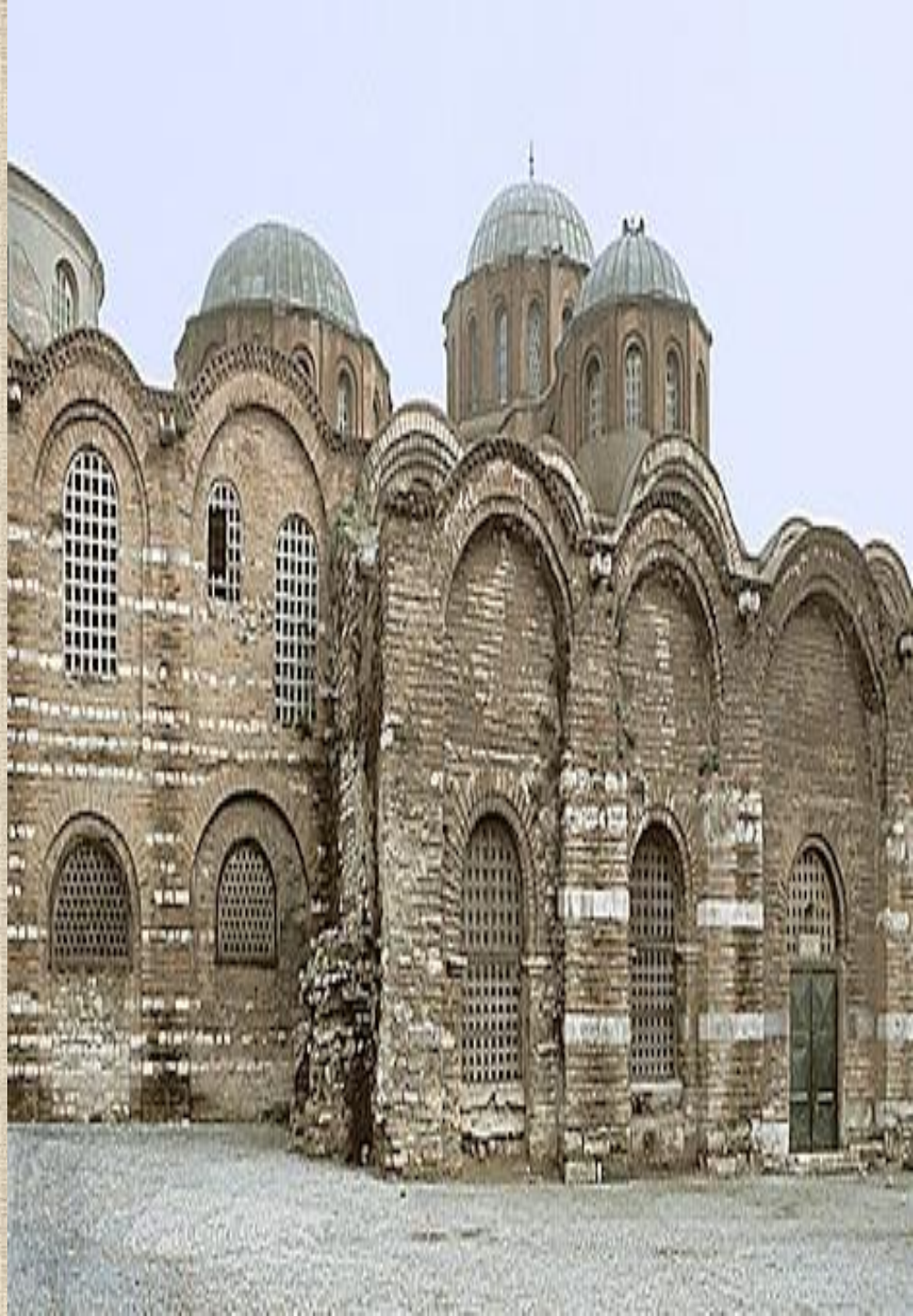
The Pecherskij Paterik mentions the treatment of leprosy, several unspecified illnesses, epilepsy fever, urinary obstruction and kidney dysfunction. The prevailing therapy was herbal, accompanied by a liberal dose of prayer. Hydrotherapy, the steam bath (banya), was also common, especially for gout and arthritic conditions. There are no references to phlebotomy or surgery.

Medical texts that would have been available to the Pecherskij monks would have included the Izbornik Svyatoslava (1073), a encyclopedic work covering hygiene, diet and medical botany. Another source was the "Theology of Saint John Damascene" which gained in popularity from the 10th century on and included astronomy, the four elements and the four humors. John, the Exarch of Bulgaria, who had translated the "Theology" also wrote the Shestodnev with sections on anatomy, physiology and materia medica, in addition to its primarily theological contents. It drew extensively from Aristotle, Dioscorides, Theophrasots, Hippocrates and Galen. A 4th Byzantine source was the Fiziolog, popular from the early 11th century, which contained fantastic animal stories with a generous amount of medicobiological information.

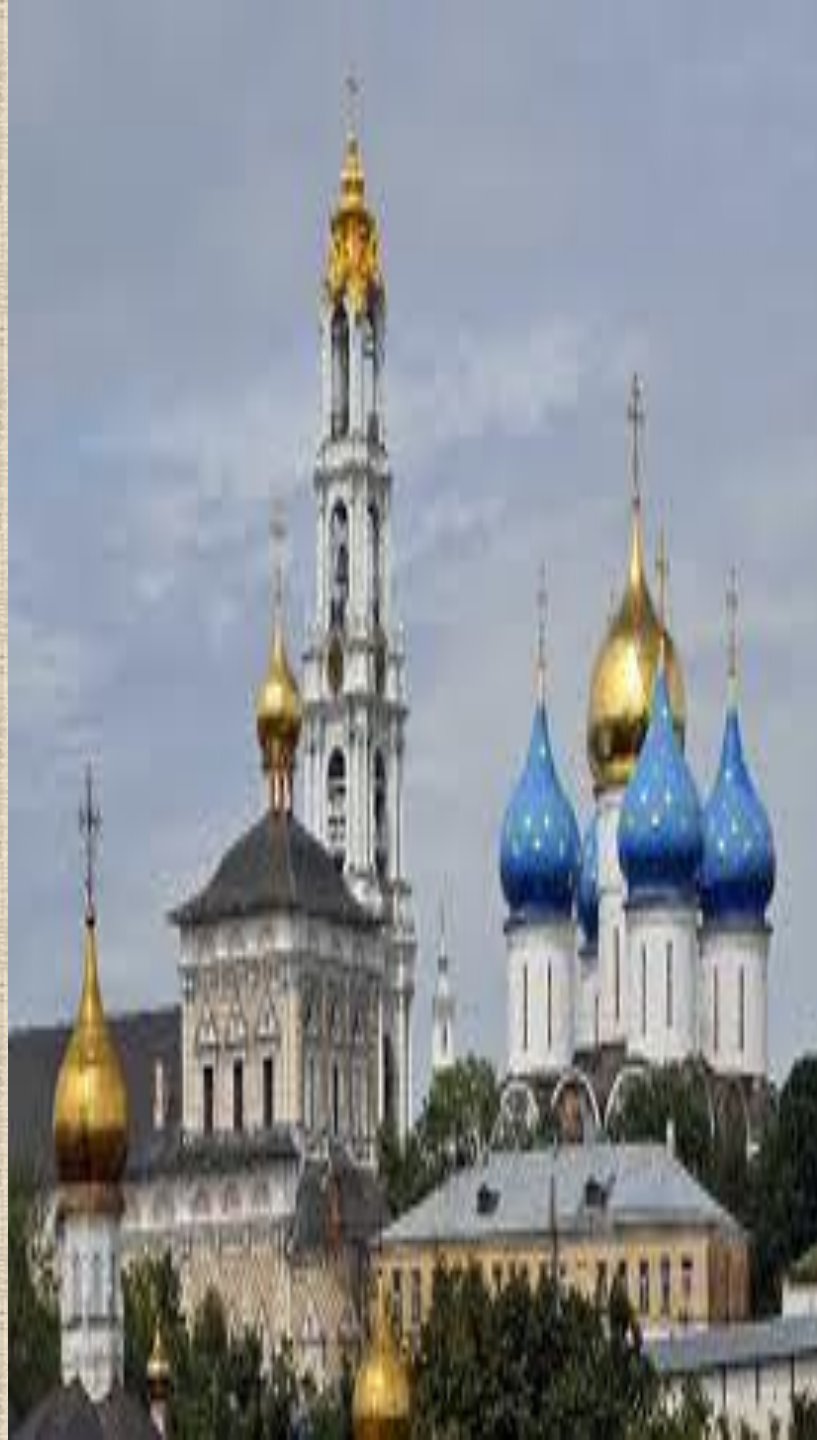
During the Mongol period, as power shifted to the north, medicine was largely in the hands of monks (and folk healers). No secular physicians are named in contemporary sources. The clergy was held in high esteem for its medical expertise, even by the royalty of the Mongol Golden Horde, if the chronicles are to be believed.

Since many Russian clergy spent significant periods of time in Constantinople, it is reasonable to assume that many of them also studied medicine there, at the Pantocrator monastery.

Many new monasteries were founded during the Mongol period, serving as spiritual and intellectual centers. The most illustrius were the Trinity-Sergius Monastery (45 miles NE of Moscow) and the Kirillo-Belozerskij (forests around Beloopzero, 300 miles N of Moscow), which actively practiced medicine and served as modest repositories of medical knowledge.



Information is lacking about the actual medical activities at Trinity-Sergius, but inferences may be made from the contents of its library. It was supposedly founded by St. Sergij himself (mid 14th cent). It grew the most significantly in the fifteenth century and many of the texts came from Mt. Athos where they were translated. The oldest of medical interest is the late 12th/early 13th century sbornik which contains part of an early herbal. There are five copies of the Paleja (oldest dated 1406) which is a biblical history, but also includes unusual explanation of nature, human embryology, anatomy and information from various herbals and lapidaries. The Shestodnev, mentioned earlier, was well represented. There was also a copy of the Pchela, in which 4 of the 70 chapters are devoted to hygiene and medicine including a chapter titled "On Physicians." There are other important sborniki with secular tracts. One, a 15th century anthology of selected writings by John Damascene, includes short essays on bloodletting, the zodiac, moon phases, illness and astrology, "Galen on Hippocrates", an brief overview of Galen's physiology, and the classic humoral theory of disease. Another 15th century sbornik contains medical and astrological information identical to the Damascene anothology, plus an exerpt from a 6th century Byzantine historian, and the Gromnik, an astrological tract. A 16th century sbornik discusses thunder and lightning, meteors, the oceans and animals. It is impossible to determine to what extent these texts were used in actual medical practice, but the fact that there were several copies of the texts on bloodletting, disease theory and critical days, indicates some demand for them.



In summary, the Russian monastic hospitals followed closely the Byzantine model of charity, built their hospitals after the Byzantine models and read some Greek medical texts in translation, but also relied on native materia medica and the banja to create an amalgamated medical tradition which endured into the 17th century and beyond. The monastic medical tradition dating from Kievan Rus' is well-documented and although it was not as sophisticated or "scientific" as the Byzantine tradition, it compares favorably to that available in the West. In addition, it is quite certain that monastic intellectual life was not as sterile or one-dimensional as it has often been supposed.

St. Agapit of the Kiev Caves

St. Agapit of the Kiev Caves - Commemorated on June 1

"This holy Unmercenary Physician was born at Kiev. He was a novice and disciple of St Anthony of the Caves, and lived during the eleventh century. If any of the monastic brethren fell ill, St Agapitus came to him and selflessly attended to the sick one. He fed his patient boiled herbs which he himself prepared, and the person recovered through the prayers of the saint. Many laymen also turned to the monastic physician with the gift of healing.

In Kiev at this time was an experienced Armenian physician, who was able to diagnose the nature of the illness and even accurately determine the day of death just by looking at a patient. When one of these doomed patients turned to St Agapitus, the grace-bearing healer gave him some food from the monastery trapeza (dining area), and the patient became well. Enflamed with envy, the physician wanted to poison St Agapitus, but the Lord preserved him, and the poison had no effect.

St Agapitus healed Prince Vladimir Monomakh of Chernigov, the future Great Prince of Kiev (1114-1125), by sending him boiled herbs. The grateful prince went to the monastery and wanted to see his healer, but the humble ascetic hid himself and would not accept gifts.

When the holy healer himself became sick, that same Armenian physician came to him and after examining him, he said that he would die in three days. He swore to became an Orthodox monk if his prediction were not fulfilled. The saint said that the Lord had revealed to him that He would summon him only after three months.

St Agapitus died after three months (on June 1, not later than 1095), and the Armenian went to the igumen of the Caves monastery and received monastic tonsure. "It is certain that Agapitus was a saint of God," he said. "I well knew, that it was impossible for him to last three days in his sickness, but the Lord gave him three months." Thus did the monk heal sickness of the soul and guide to the way of salvation."

In XV century preparation of physician began in Poland in the university of Krakiv.). Some graduating students of academy became famous. Among them - George Drogobich-Kotermak (1450-1494) got a baccalaureate, master's degree. In 1478 he received the rank of Ph.D., at 1482 - doctor of medicine. Two years he was elected a rector of Bologna university.

In age-old physician simultaneously were chemists. The division of medicine and farmacy passed then, when making of medications was substantially complicated and required the special knowledges. The first mentions about pharmacists belong to XV century

Already in 1337 in the city acts of Lvov there is information about creation in town of the hospital for patients and poor. The first record about a pharmacy is dated by 1445.

Experience of looking after patients, information about medical herbages, medicinal matters of natural origin passed from a generation in a generation from times of Kievan Rus. In those old times on markets, in «green rows» witch-doctors sold medicinal herbages, extracts, amulets, rendered medicare, gave advices and foresaw the future.

Powders, ointments— «smear», «pets», extracts and decoctions - «drink», «potion» were widely known. Doctors prepared «peas» — pills, appointed baths from medical herbages. Medicinal preparations kept in the special pigs which are considered the prototype of pharmacies. It was advised to accept most medications « on an empty stomach heart» — on an empty stomach 2-3 times per a day — «morning», «in a day», «supper».

In 1490 one of the first official public pharmacies of the general use was opened in Lviv. Earlier pharmacies satisfied the requirements of monasteries in medications.

For preparation of medications primitive adaptations and tableware: tin jugs, cauldrons for melting of beeswax, copper mortars, frying pans, spatulas and others like that were used Chemists also made cakes, marchpanes, liqueur. A pharmacy of that time anymore reminded a pastry shop than medical establishment.

The first steps towards modern Ukrainian medicine as a science were made in 1898-1910, when the first scientific associations of Ukrainian doctors were established, (the Ukrainian Scientific Society in Kyiv and the Shevchenko Scientific Society in Lviv), the first works on medicine in Ukrainian were published, (by Yevhen Ozarkevych, Martyriy Halyn, Oleksander Cherniakhivskyi and others) and the first disease prevention and treatment institution of clearly Ukrainian orientation, Narodna Lichnytsia (People's Clinic) was established. At the same time, Ukrainian doctors made themselves heard at European medical forums in Paris, Madrid, Prague and Belgrade and the formations of Ukrainian Sichovi Stril'tsi and the Ukrainian Halyts'ka army health service established the new Ukrainian military

medicine.

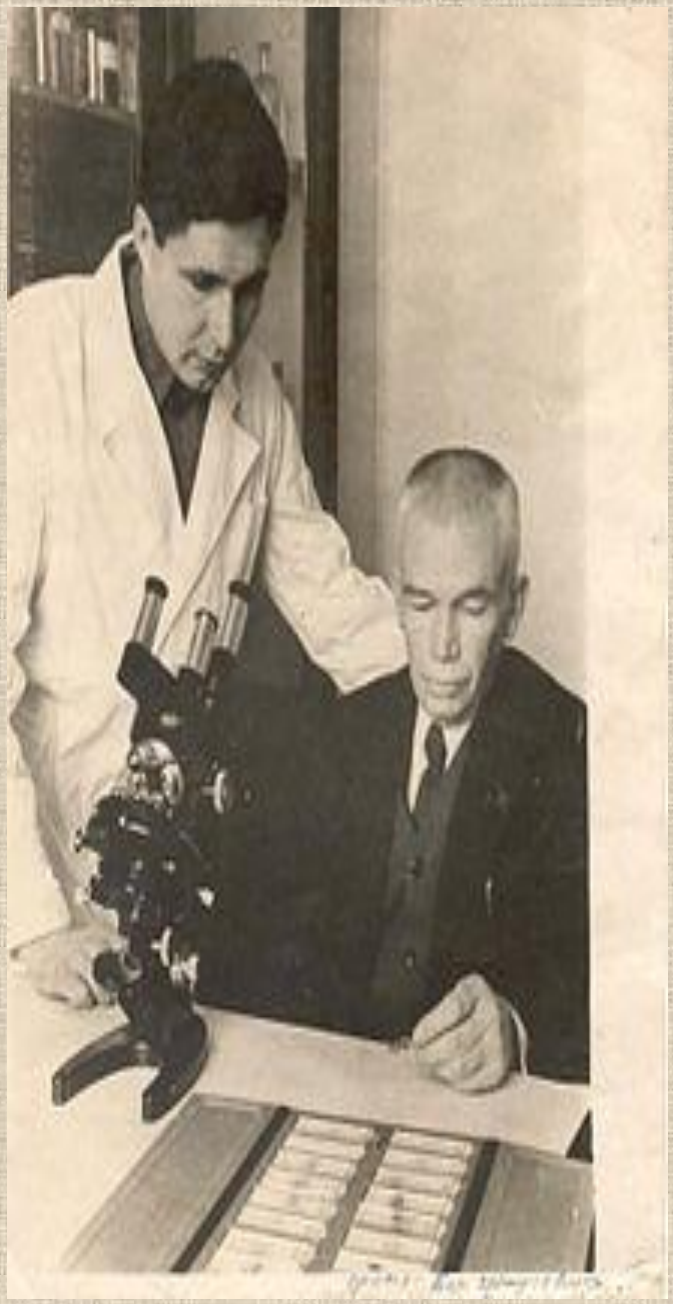
The term Ukrainian medicine, or the equivalent Ukrainian national medicine, came into use only after the collapse of the Russian empire and the creation of the Ukrainian People's Republic. In January 1918, the first medical journal in Eastern Ukraine, "Ukrains'ki Medychni Visti" was published. In its editorial " Our Tasks Today" Ovsentiy Korchak-Chepurkivskyi, the oldest Ukrainian professorhygienist, the founder of social hygiene, w r o t e the following; "Our main task is to develop Ukrainian national medicine as a science and a practical field of knowledge“.

Korchak-Chepurkivskyi organised and headed the first Ukrainian medical university department. He was one of the founders of the All-Ukrainian Academy of Science, where he established a medical section to serve the functions of a centre of Ukrainian medical science development, and organised a health research department, a prototype of later academic institutes. He also researched Ukrainian medical terminology as well as the health and demography of the Ukrainian population.

At the same time, the Ministry of People's Health and Care of the Ukrainian State, the Medical Department of the Ukrainian Army, the Ukrainian Red Cross and a number of clinics were established.

Ukrainian scholars began lecturing at medical schools in Ukraine and took an active part in organising scientific and medical institutions. Medical educational establishments created in the following years were clearly Ukrainian in their form and content. These were the Pathologoanatomical Institute headed by Professor Pavlo Kucherenko, Kyiv Bacteriological Institute headed by Professor Marko Neshchadymenko, the Institute of Microbiology of the All-Ukrainian Academy of Science headed by Professor F. Omelchenko, the Kharkiv Institute of Experimental Medicine, the Kharkiv Psychoneurological Institute and others. Centres of Ukrainian scientific medicine also developed in this period. These were scientific schools of major medical specialties that researched problems of medicine, educated doctors, post-graduate students and scholars, published Ukrainian dictionaries, textbooks, scientific monographs and collections with w o r k that was of a European standard.

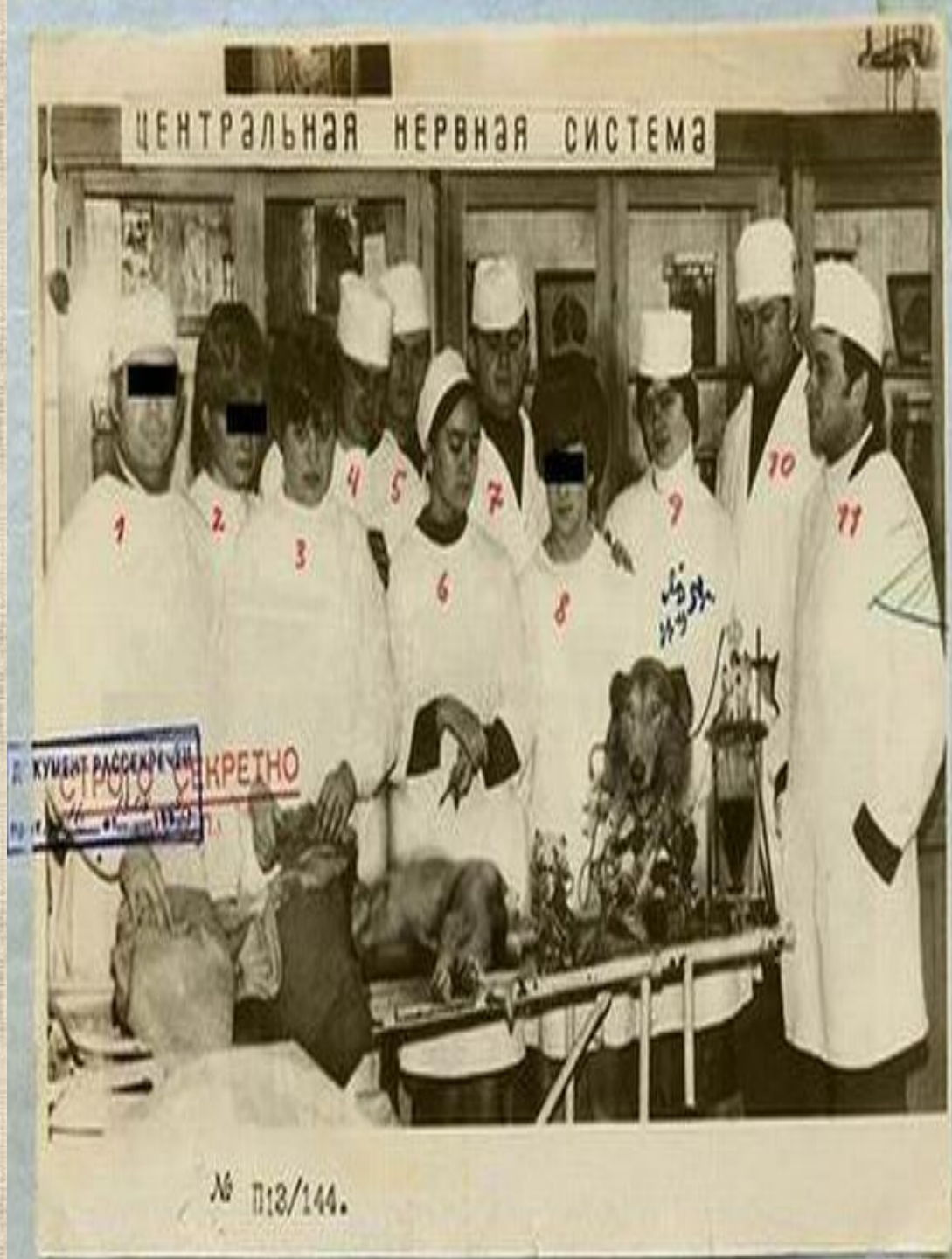
Among the first national scientific schools were those of surgeons (by Yevhen Cherniakhivskyi), obstetrician-gynaecologists (by Oleksandr Krupskyi), physician-gerontologists (by Ivan Bazylevych), otolaryngologists (by Oleksandr Puchkivskyi), ophthalmologists (by Mykola Levitskyi, pathologists (by Pavlo Kucherenko), microbiologists (by Marko Neschadymenko), physiologists and biochemists (by Valentyna Radyzmovska) and pathophysiologists (by Mykola Vashetko). Surgeons Borys Andriyevskyi, Hryhoriy Ivanytskyi, Petro Shydlovskyi, psychoneurologist Mykhaylo Mishchenko, phthisiatricians Vasyl Plushch and Antin Sobkevych, radiologist O Bohayevskyi, clinical physiologist and physician-gerontologist Ivan Bazylevych, histologist Oleksandr Cherniakhivskyi, sanitarians Ovksentiy Korchak-Chepurkivskyi and Volodymyr Udovenko, also began developing their schools. These scientists prepared dozens of specialist textbooks, monographs, collections of scientific articles and brought up many specialists.



In the 1930s, when there was severe suppression of Ukrainian resistance by the totalitarian regime, with Ukrainian villages wiped out by famine and Ukrainian intellectuals exiled to Gulags, the founders of the Ukrainian scientific schools were done away with or dismissed from their work, pro-Ukrainian tendencies were hindered by administrative means and scientific and educational establishments, as well as health care institutions, became Russian orientated.

Ukrainian officials were replaced by international specialists and works by Ukrainian scholars were seized and it was forbidden to mention them. This was all an attempt to erase the period of the development of Ukrainian medical science, medical schools and health care establishments from our history.

In their place Soviet higher schools, (universities absolutely deprived of world tradition) and Soviet scientific institutions and health care establishments, based almost exclusively on the traditions of Russian imperial medicine, began to develop under the leadership of the Communist party. This was a period of russified and ideological Soviet medicine in the Ukrainian SSR. A time when it blew its own trumpet, while hushing up or neglecting achievements of medicine elsewhere in the world. Party leaders rudely interfered in the development of medicine, sometimes preventing, by their decisions, the establishment of whole branches of medical science such as social medicine or genetics.



Ukraine's declaration of independence marked the beginning of a new stage in Ukraine's medical revival. The 20th century proved especially fruitful for the development of medical education and science in Ukraine. In that period, Ukrainian research schools gained international recognition. In particular, developing the most intensively were areas such as microbiology (I. Mechnikov, D. Zabolotny), biology (O. Bohomolets), and medicine (O. Bohomolets, M. Amosov), just to name a few.

In the mid-20th century, Oleksandr Bohomolets, a world-famous doctor and pathological physiology researcher, created his own research school in Kyiv, the capital of Ukraine. He studied and described many diseases in the field of endocrinology, metabolism and immunity disfunctions, allergy, cancer, blood circulation pathology (in particular, high blood pressure), shock pathogenesis, blood transfusion effects, the system aging mechanism, and so on. A lot of his works set the grounds for entire areas in modern medical research. Today, the name of Oleksandr Bohomolets is given to the Kyiv National Medical University, and his granddaughter, Olha Bohomolets-Sheremetieva, a fourth-generation doctor, holds the titles of Doctor of Medicine and Professor and heads one of Kyiv's well-known clinics.

Ukrainian heart surgeons are known all over the world. In 1963, Mykola Amosov, a doctor from Kyiv, was the first in the USSR to perform a mitral valve protheses, and in 1965, he was the first in the world to create and introduce into practice anti-thrombus heart valve protheses. Mykola Amosov was among the initiators of the large-scale introduction of surgical treatment of lung diseases in the USSR. His works substantially lowered the level of tuberculosis cases and improved the treatment effectiveness of lung diseases. In 1955, he was the first in Ukraine to surgically treat heart diseases and one of the first in the USSR to introduce the artificial blood circulation method in 1958 on a large scale. The Institute of Cardiovascular Surgery founded by Amosov and now bearing his name is quite justifiably regarded as one of the world's best centers of heart surgery.

Last year, Ukrainian children's heart surgeon Illia Yemets made a revolutionary breakthrough. He proposed that when operating on newborn babies with heart problems, to use their own umbilical blood in the blood transfusion. Of the first ten babies operated on with the transfusion of their own blood, all ten have survived. Ukrainian heart surgeons were the world's first regarding this invention.

Earlier, when ultrasonic diagnostics showed heart problems in the embryo, the expectant mothers were advised to abort the baby, as such a child would live a month at most after its birth. The only alternative was a heart operation. However, a 2-3-day-old baby's system often refuses to accept a donor's blood, which results in this baby's death. According to the method proposed by doctor Yemets, the umbilical blood is collected at the moment of this baby's birth, in which case this baby becomes his or her own donor. As a result, the operation goes much smoother and the patient recovers much faster. Illia Yemets is proud of his team for such a great invention. Now they use this new method with confidence, and have developed a medical procedure to handle such cases for doctors the world over. Illia Yemets is surprised by the fact that no one in the world has yet come up with this method. In the meantime, the global medical community borrows the experience of Ukrainian doctors while the staff of the Kyiv Center of Heart Surgery continues to study umbilical blood to determine its usefulness for adult patients as well.

Another promising invention of Ukrainian medical specialists is the stem cell treatment. For many people, this method is the only rescue from amputation. Now researchers study the possibility of growing new human tissues and organs in the future. Currently, this research effort involves more than 300 patients, and the preliminary results have already shocked the world's medical community: an old man scheduled for the amputation of both legs began walking and even working like an able-bodied person after an experiment under which he received a few shots under local narcosis. There are already positive results in experimental stem cell treatment of infertile couples, patients suffering diabetes, cirrhosis, and even multiple sclerosis.

Ukraine is the leader in many areas of stem cell transplantation. Often, speeches of Ukrainian specialists gather larger audiences than those gathered by their counterparts from the USA and Western Europe. Women in labor from all over Ukraine nobly donate umbilical blood as a source of stem cells, the Criobank of Ukraine reports.

Modern Ukrainian medicine is progressing rapidly. Ukrainian clinics have chairs of higher medical educational institutions, and Ukrainian doctors often combine professional practice with teaching. This is the reason why Ukrainian medical students receive the latest information from the first hands. Students at Ukrainian medical universities acquire not only theoretical knowledge but also hands-on skills in real-life situations. The shift toward hands-on experience is a specific feature and an indisputable competitive advantage of Ukrainian medical education. This is probably the reason why, for example, most foreign students in European and North American countries study economics, whereas in Ukraine, they prefer medicine. Currently there are 15 universities and academies preparing doctors and pharmacists in Ukraine. They invite you to come and study.

Thank you very much for your attention