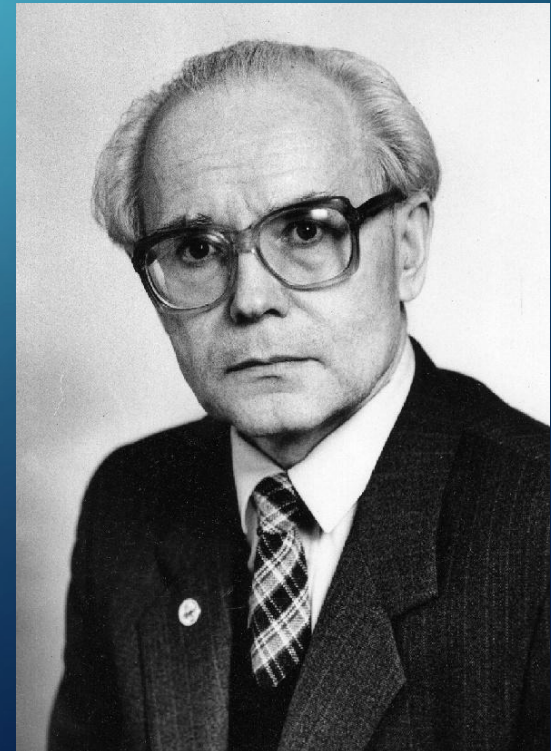
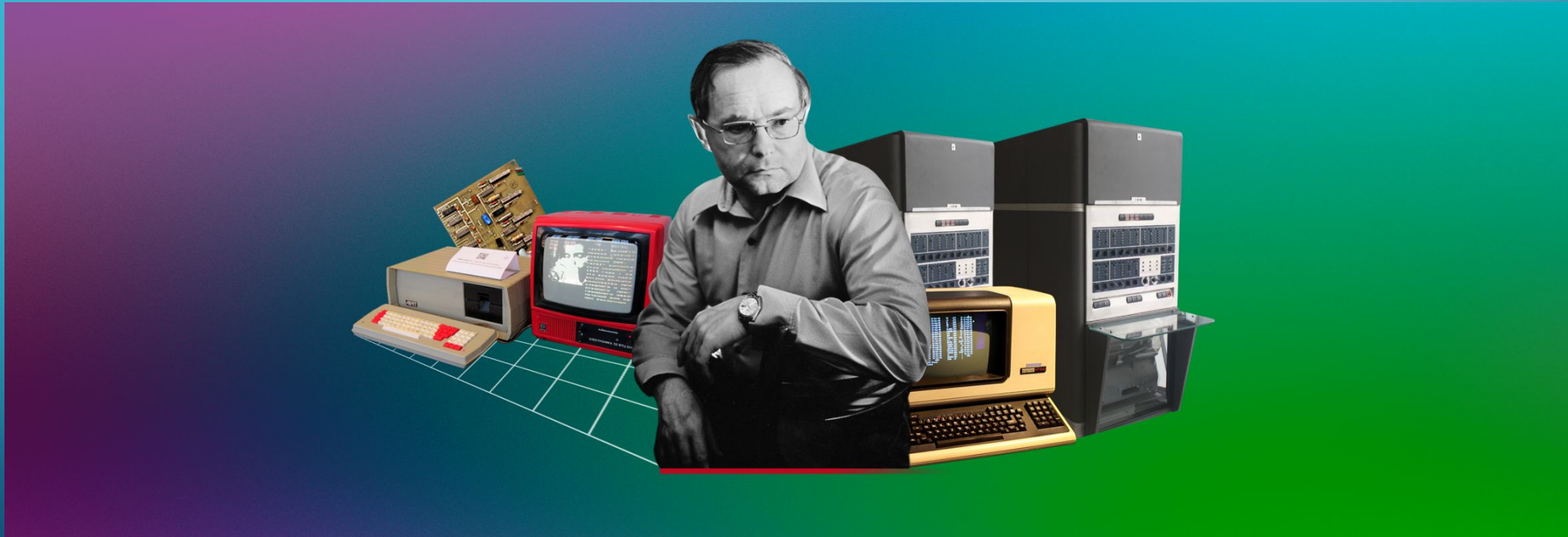


PRESENTATION ON THE TOPIC:

ANDREY ERSHOV: FATHER OF SOVIET "INFORMATICS" AND ONE OF THE FIRST PROGRAMMERS IN THE USSR



- He did not become a physicist because of Soviet prohibitions. But he invented a new science and predetermined the development of information technology for many years to come.

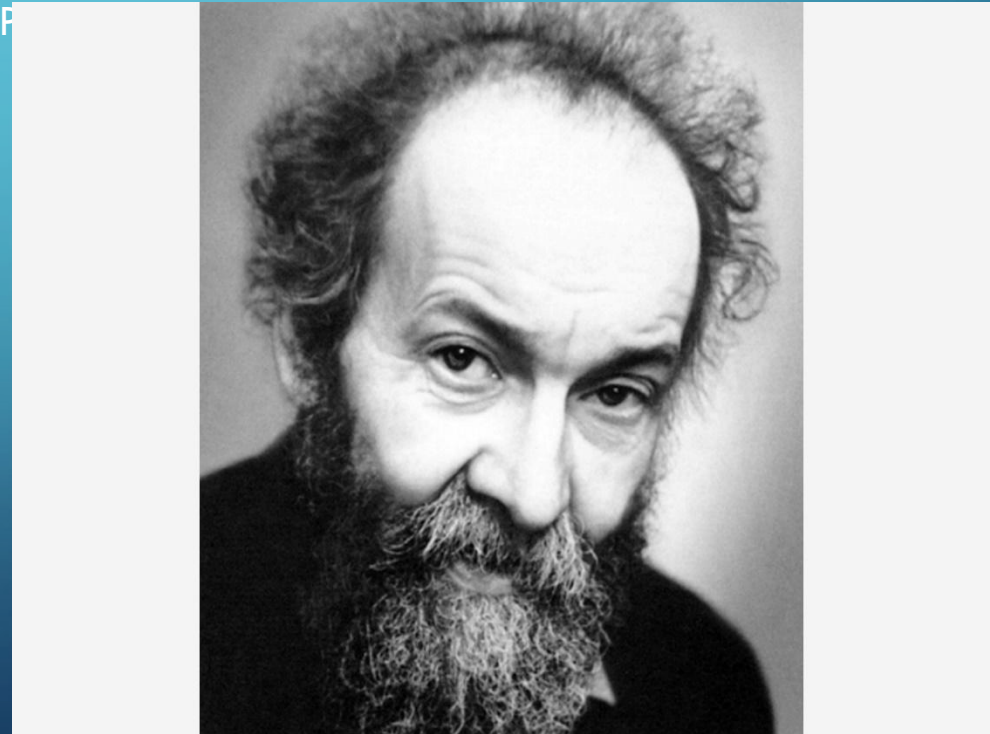


- Even as a child, Andrey set himself an incredible goal — to solve all the problems from school textbooks on algebra, geometry and physics. And he did it. Entering the physics department of Moscow State University in 1949, he dreamed of studying nuclear physics, exploring the laws of the universe — but fate decreed otherwise.



FROM PHYSICISTS TO IT SPECIALISTS

- There were no problems with admission to the university: despite the complexity of the entrance exams, which were held in three rounds, Ershov brilliantly passed them.
- But in the first year, an "undesirable" item of the questionnaire surfaced. It turned out that the future scientist spent his childhood in Rubezhnoye — during the war this city was occupied by Nazi Germany. Therefore, the path to physics, which was considered a science of national importance and increased secrecy, was closed.
- Then Ershov transferred to the Department of Programming, which was just being formed. However, the students of the department were mainly engaged in the maintenance of computers, and programming was out of the question.
- And then another twist happened in the fate of Andrei P. Ershov — he was assigned to teach a course with the legendary name "Principles of Programming".



The course was innovative: before that, no one knew how Soviet computers worked — they were classified. Fortunately, Lyapunov managed to go to Kiev, test the first European computer — MESM — and grasp the basic ideas and principles of its work. Lyapunov laid the foundations of the operator method, on the basis of which symbolic programming languages, translators and circuit theory were later created.

The professor quickly noticed the outstanding abilities of the student Ershov, became his mentor and inspired him to further work.

- Until the early 1950s, there was no profession of "programmer" in the USSR; Ershov was one of the first certified specialists.

In parallel with his studies, Andrey Petrovich intensively mastered English — he understood that soon this language would become international.



- After graduating with honors from university and later postgraduate studies, Ershov became a senior engineer at the programming laboratory, and a few years later — head of the department of theoretical programming at the Computing Center of the USSR Academy of Sciences. Thus began his scientific career.

FIRST SUCCESSES

- While still in graduate school, Ershov began working on a programming program (PP) for a Large Electronic Calculating Machine (BESM) and "Arrow"



These were bulky tube computers that required constant technical support. Even by the standards of the 1950s, they were quite weak: their computing abilities were not enough for the nuclear industry, rocket science and defense.

To cover the lack of capacity, scientists decided to automate programming. Ershov became the project manager. He proposed approaches and methods that later became classical in compilation theory.:

- combine the scheme and specifications of operators in the PP for BESM in one text, and also enter the loop operator;
- apply a tabular approach to syntactic analysis in the PP for "Arrow-3";
- optimize the programming of arithmetic expressions, use a new, more economical method of their arrangement.

TRIUMPH ABROAD

- The path to world fame turned out to be more thorny: the development of Soviet programmers was kept secret. At the same time, the interest in them all over the world was huge, because the successes of the USSR in space exploration were well known to everyone.
- "There are fears in the West that the USSR will seize the primacy in the field of computer technology," wrote the well-known researcher of Soviet and post-Soviet information technologies, sociologist Ksenia Tatarchenko in her monograph *Cold War Origins of the International Federation*.
- Since 1959, Ershov became the scientific secretary of the Commission on International Relations of the Central Committee of the USSR Academy of Sciences. This made it possible to communicate with foreign colleagues, exchange experience and knowledge with them. In particular, Ershov met Professor Perlis of Carnegie University of Technology, who opened Algol to him.

```
BEGIN
FILE F (KIND=REMOTE);
EBCDIC ARRAY E [0:11];
REPLACE E BY "HELLO WORLD!";
WHILE TRUE DO
  BEGIN
    WRITE (F, *, E);
  END;
END.
```

- In addition, the Soviet scientist attended the symposium "Mechanization of thinking Processes" in England — the first international meeting dedicated to artificial intelligence.
- Ershov became one of the few "connected" between programmers of the USSR and the rest of the world. For this, he was appreciated both there and there — invited as a lecturer to various seminars, sent Western literature on programming, which could not be obtained in the USSR.

ALPHA AND BETA OF SOVIET PROGRAMMING

- In 1957, Yershov was offered to head the department of the theory of algorithms and programming of the Institute of Mathematics with a computing center in Novosibirsk Akademgorodok. There he spent the rest of his life.
- It was in Novosibirsk that the scientist began work on the Alpha programming language, something similar to Algol 60. The Alpha language made it possible to implement multidimensional values and operations with them, including construction. It also developed loops and the ability to set initial values to expressions.
- Naturally, Alpha required a translator to run the program code on the M-20 computer, which since 1959 has become the main computer in the USSR. The process of creating a translator was documented by Yershov's team in the books "The Birth of an alpha translator", "The Childhood of an alpha translator" and "The Adolescence of an alpha translator". They describe all the work on the project: technical problems, the course of their solution and the results. And all in order



ha.

FROM LEXICON TO STORK

- Analyzing Alpha and Beta, Ershov thought: why not create a language that will become a common environment for the development and justification of programs? This is how the idea of a unified programming lexicon, or systems linguistics, was born.
- The lexicon was to become a universal system for people and machines. At the same time, people would think outside of the program text, leaving the subject area of the task to the computer.
- The main difference between the Lexicon and programming languages was to be its openness to other developers. He did not need to be translated into a machine program, but at the same time any machine program could be expressed in a Lexicon.
- Unfortunately, the idea remained to come.



other scientists for decades

TEACHING AND CONFERENCES

- Since the 1970s, Andrey Petrovich began to actively engage in teaching. An informal team of researchers from academic institutions has formed around him. Together they developed university and school computer science programs. By the way, the term "computer science" was invented by Ershov.
- In parallel, the scientist spoke at Soviet and international conferences. In 1981, at the joint conference of the International Federation for Information Processing (IFIP) and UNESCO on the use of computers in education, Ershov made a report "Programming is the second literacy". This name quickly became a meme and a slogan on Soviet posters.
- Soon, as part of an experiment in Novosibirsk, they began teaching programming in universities, and then computer science in schools. Scientists have developed the Alcatraz system, the Schoolgirl training system and the Rapier language.

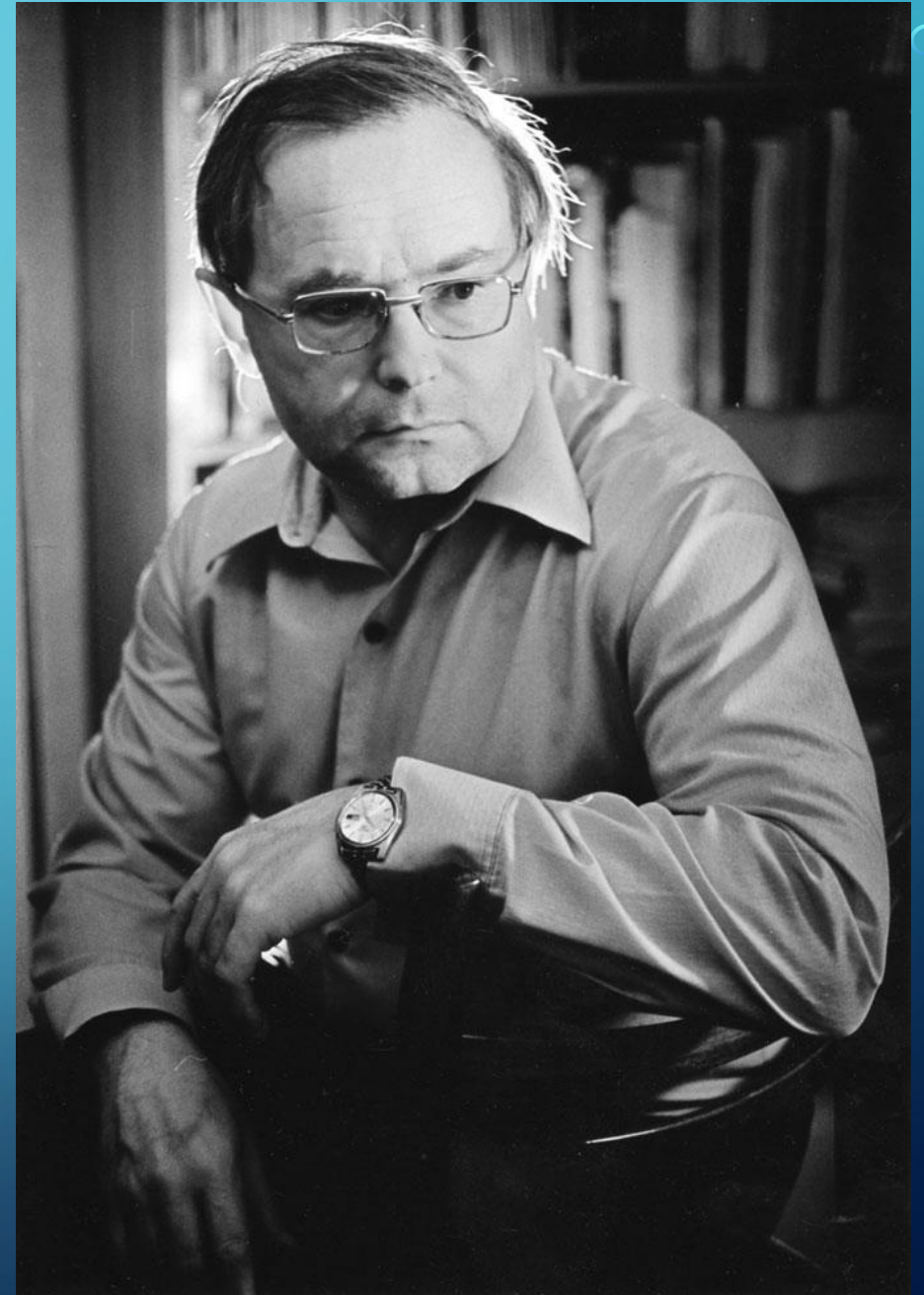


- In 1985, Ershov and a group of co—authors wrote the first school textbook - "Fundamentals of Computer Science and Computer Technology". To write algorithms in the book, they used an Algol-like Russian algorithmic language, which is jokingly called "Yershol".
- Ershov took part in six IFIP congresses as a speaker and organizer. In 1987, he became Chairman of the Scientific Council of the USSR Academy of Sciences on the problem of cybernetics, actively participated in the creation of the journal "Microprocessor tools and Systems".
- For his significant contribution to Academician A. N. Krylov Prize.



CREATIVITY AS A SECOND LIFE

- Ershov was not only a scientist: he played the guitar perfectly, sang, wrote poetry and even translated English poets into Russian — for example, Rudyard Kipling.
- Many colleagues remembered Ershov for his apt and imaginative statements. For example: "Siberia saves Russian literature, as the Siberian divisions in the forty—first year - Moscow."
- He felt the word well — this is noticeable even in his scientific works. All the more impressive are the poems that confirm Feuchtwanger's words: a talented person is talented in all fields.



THANK YOU FOR YOUR ATTENTION

