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A NEW TYPE OF FACTORY TECHNICAL SCHOOL

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Pravda (12 April 1961) gives some details on the progress made by the new "factory higher technical schools" which began work in the five major cities of the USSR in September last year. These vocational schools provide a four-year course, during which students learn the duties of fitter, lathe operator, milling-machine operator, electrician, etc. One factory involved (the Penza Computer Plant) has 300 students attending the first-year course, which is operated on a sandwich basis -- two weeks away from production, followed by two weeks of evening study while still working on the production lines.

The ultimate aim seems to be to train a number of high-grade technicians, without the present excessive strain on the students associated with evening classes of the orthodox or non-sandwich variety. The Kremlin has clearly decided that the loss of the students from the equivalent of two years of production time is a price worth paying for the prospect of a more highly skilled labor force in 1964.

At present the scheme appears to be operating on a modest experimental scale, but in the USSR a successful experiment of this type often becomes standard practice within a few years, and is sometimes widely imitated in other communist countries, as was the case with Khrushchev's educational reform. For all

those who are interested in the development of the communist economies, these new vocational schools may in time prove to have a bearing on the technical training programs of the bloc as a whole.

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**NOT TO BE MICROFICHED**

KHRUSHCHEV'S REFORMS FOUND TO STRENGTHEN RED EDUCATION

Report Sees No Weaknesses in System But Feels It Is Not Suitable For Americans

New York Herald Tribune, November 1960  
by James J. Morisseau

American Educators were startled two years ago when Premier Nikita S. Khrushchev prescribed drastic reforms for Soviet education.

This was the educational system that, a year earlier, had been credited with a major role in giving the Soviets a lead in the space race.

Did announcement of the reforms mean that the Russian school system was not so effective after all; that it was in trouble?

A number of American school men, including some who had visited the Soviet Union, chose to think so.

Dissatisfaction?

Had not Mr. Khrushchev proclaimed that some Soviet youth emerged from the school system with the wrong idea about education and with a reluctance to work in the factories or on the farms because such work was "degrading"?

Was it not true that many graduates of the ten-year school (the equivalent of our high schools) were dissatisfied because there was no room for them in the universities?

And did not the Soviets face a shortage of productive manpower because the low birth rates during World War II were about to be reflected in the number of youths leaving the schools to go to work?

The American observers were justified in raising these questions, which reflected basic problems facing the Soviet leadership. But they went a step further to conclude that the reforms seized upon to meet these problems would result in a watering-down of the curriculum.

Down-to-Earth Report

Dr. Lawrence G. Derthick, United States Education Commission, in a report a year ago of the first official United States education mission to the Soviet Union, tried to disabuse his colleagues of this kind of wishful thinking.

He found, Dr. Derthick said, that the changes brought about by the reforms were not going to alter the basic school program substantially. And he emphatically denied that there would be any watering down of the academic content in the Russian elementary and secondary school curriculum.

Now the Office of Education has released a report on its second official mission to the USSR. It has more bad news for those American educators who tend to deprecate the Soviet schools and who sometimes work overtime to find weaknesses in the Russian system.

The authors of the report, on "Soviet Education Programs: Foundations, Curriculums, Teacher Training," did not advocate adoption of Soviet methods here. On the contrary, they urged that the American system continue to develop along its traditional lines.

But they found that "building on modest but strong foundations, educators in the Soviet Union have erected, in a little more than one generation, a system of mass education. Soviet general education is a vigorous and dynamic institution... suited to the needs of the Soviet system."

The word "dynamic" crops up again and again in the author's description of their experiences during a month-long visit to the Soviet Union in the spring of 1959. It is particularly evident in their discussion of the new emphasis on "polytechnic" education.

Polytechnic education, in which youngsters are supposed to become familiar with manual labor as well as academic subject matter, is at the heart of the Khrushchev reforms.

The United States team found that it involved "understanding the various technics of industrial and agricultural production; the application of scientific principles to mass production; the organization and utilization of workers; the development of habits of work and technical abilities, and the planning of jobs involving self-discipline and initiative."

### Broad Training

It is broad rather than narrow training, they concluded, and, in the view of Soviet educators, is "a better preparation for life", rather than a new vocational emphasis in schooling.

Polytechnic courses have long been required in the Soviet curriculum. But the Khrushchev reforms will mean that, instead of the 848 hours devoted to them during the old ten-year school curriculum, students will spend 2,820 hours in such courses in the new eleven-year curriculum - an increase of 232 per cent over the curriculum as it was organized in 1956.

But under the reforms, there will be no decrease in the number of hours devoted either to mathematics and science or to the humanities. Instead, they will increase, from 5,049 to 5,367 hours in the humanities and from 3,300 to 3,700 hours in science and math.

There will, however, be a greater effort to relate studies in these areas to polytechnic studies and to "life".

The American team of specialists watched children in the lower grades perform practical work with scissors and paste, older children in wood-working and metalworking shops in the upper elementary grades and secondary school youngsters actually at work in the factories.



They found, for example, a ninth-grade girl working in the central measurement laboratory in a Moscow machine-building plant. She demonstrated for them her competence in handling the intricate gauges used to check tolerances in gear teeth.

To develop their new programs, the Soviets have had to evolve new principles and methods of education, many of them after careful research. The results impressed the American team:

"These ideas," they wrote, "seem to be transforming the Soviet general school into a major educative instrument for upgrading the technical-scientific competence of the entire generation. The school thus becomes the base for readapting the population, and particularly the young generation, to the changing techniques of modern industrial society.

"In this process, it appears to us that polytechnic education, combined with the traditional academic program, is emerging as a dynamic element in the philosophy of education in the Soviet Union...(which) stands today as a dynamic movement among educational philosophies in the world."

Their praise was not unqualified. They found, as had earlier teams of American visitors, a certain "formalism" in Soviet education, induced by centralized state control, "which provided no indication that children develop skills to use knowledge."

The reforms, they felt, would tend to mean the end of education at the eighth year for many youngsters. Prior to the reforms, the Soviets had planned compulsory education for all through the tenth grade.

And there were a host of problems still to be solved before the new program could be adopted throughout the Soviet Union.

#### No Weakness Reflected

Nevertheless, there was no feeling in the report that the reforms reflected or presaged any serious weaknesses in the Soviet educational system.

Those American educators who rightly felt that the post-Sputnik tendency to hold up Soviet education as a glaring contrast to our weaknesses was invalid and unfair, but who fought back by seeking out weaknesses in the Soviet system, will find no comfort here.

The report was prepared by William K. Medlin, specialist in comparative education in the Office of Education's Division of International Education; Clarence B. Lindquist, chief for Natural Sciences, Division of Higher Education; and Marshall L. Schmitt, specialist for industrial arts, Division of State and Local School Systems.

MILLIONS IN RUSSIA STUDY ENGLISH

But in U. S., Only a Few Thousand Study Russian

By James J. Morisseau  
New York Herald Tribune  
October 23, 1960

It is fairly obvious that, if training in foreign languages were the determining factor in the cold war, Khrushchev would have "buried" us long ago.

Now, according to a report by three American language specialists, the Russians are preparing to widen the language gap and, more particularly, to increase vastly the teaching of English in their schools and universities.

It has been estimated that at any one time between 5,000,000 and 10,000,000 Russians of all ages are studying the English language.

In contrast, only 12,682 American high school and college students were studying Russian in 1958, according to a report by the Modern Language Association.

Preliminary figures gathered by M. L. A. for 1959 show a sharp increase in Russian studies. With only sixteen of the fifty states reporting, the 1959 totals for high schools -- 5,390 -- already have exceeded the forty-eight-state 1958 total. College returns, which are 95 per cent complete, show a total of 24,473 enrolled in Russian courses in 1959 as compared to 15,627 the year before.

But, clearly, we still have a long way to go to approximate the Soviet effort in English language study.

American Experts Report

In this context, the report by American experts that the Russians plan to step up their language training program, particularly in English, takes on real significance.

The report was prepared by Dr. Kenneth W. Mildenberger and Dr. Marjorie C. Johnston, both of the United States Office of Education, and Dr. Gordon H. Fairbanks, professor of linguistics at Cornell University, following a twenty-three-day visit to the Soviet Union last spring. It was published last week in "School Life," journal of the Office of Education.

Their prediction of a step-up in English studies in Soviet schools is based on an interview with the Deputy Minister of Higher Education for the U.S.S.R. They were told that, of the language students enrolled in pedagogical institutes, special foreign language institutes and the universities, 12,400



were training to become teachers, translators or interpreters of English.

This large number of potential English teachers was significant, they felt, because the U.S.S.R. maintains it has no teacher shortage and because training quotas for teachers are set by the ministries of education as part of a plan.

They noted that there were 230 English language majors in the Lenin State Pedagogical Institute in Moscow last spring, but that none were in the third or fourth years because, according to the staff, the ministry had no quota for freshman English majors in 1956-'57 and 1957-'58.

### Expansion Foreseen

Their conclusion was that the Soviets planned to expand the teaching of English, particularly in the lower grades, where they have been teaching it and other languages on a pilot basis in a few schools for some years.

Dr. Johnston said in a telephone interview last week that, increasingly, foreign languages, including English, are being offered beginning at the second grade, rather than at the fifth grade, the normal starting point in Soviet schools.

The report included the observation that English "is already the most popular language offered" in the Soviet schools, with reports in "recent Soviet publications" indicating 45 per cent of language pupils studying English, 35 per cent German, and 20 per cent French or Spanish.

But Dr. George Z. F. Bereday, professor of comparative education at Teachers College, Columbia University, said in an interview that German, not English, was the most popular language among Soviet pupils.

Dr. Bereday quoted the 1959 edition of "Narodnoe Khoz-yaistvo" (National Economy), published by the U.S.S.R.'s Central Statistical Office in Moscow. It showed that in the 1958-'59 school year, 6,758,000 or 60.4 per cent of the 11,186,000 pupils studying languages in grades five through ten were taking German.

In contrast, there were only 3,518,000 or 31.4 per cent studying English (8.1 per cent French and .0002 per cent "other languages.")

### Question of Quality

All of this, of course, deals only with quantity, not quality. Here, there was substantial agreement among the authors of the report, Dr. Bereday and even Soviet educators, that foreign language training in the Soviet secondary schools leaves a great deal to be desired.

The authors quoted the June, 1959, issue of "Inostrannye Yazyki v Shkole" (Foreign Languages in the School):

"It is well known that the teaching of foreign languages has up to now been suffering under serious inadequacies connected chiefly with abstractness in teaching and with insufficient attention to the practical training of students in foreign language and the inculcation of an ability to use their knowledge in practice."

Dr. Bereday added, however, that the secondary school language courses provided an "excellent" grounding for those students who later entered foreign language institutes, and that these institutes, in turn, produced graduates who were "really good" and "fascinating speakers."

Dr. Johnston and her colleagues found, in addition, that the Soviets had undertaken a drastic reform of language teaching methods, which promised to be successful.

They concluded that the United States and the Soviet Union are alike in that both recognize the importance of a strong language program in schools and colleges to national and international progress and both are supporting reform programs.

It would seem, in the light of the statistics, that the similarities stop there.



ZELENGO PROPOSES NIGHT VOCATIONAL SCHOOLS TO TRAIN WORKERS  
DISPLACED BY AUTOMATION AND MECHANIZATION

By G. Zelenko  
Chairman State Committee for Vocational  
and Technical Education, Council of Ministers USSR  
Pravda  
8 August 1960

...Automation and mechanization are raising the technical level of production higher and higher. Simultaneously, new reserves of labor resources are being created which are necessary for a continuously developing socialist national economy. There is not and cannot be unemployment in the Soviet Union. All persons released from a job will receive new skilled work. However, to put a laborer, for instance, onto an excavator, it is necessary to teach him the new trade....

The July plenum of the Central Committee CPSU emphasized in its decree that, in forming plans to introduce new technical equipment, there ought to be a simultaneous working out and realization of measures for training personnel and increasing their skills, in order to secure fulfillment of these plans. The plenum said it was necessary to improve leadership in vocational and technical instruction. Therefore, the leadership in vocational and technical instruction for workers at enterprises and the responsibility for its status must be laid, in our opinion, on the chief engineers of factories, plants, mines, and construction jobs, since introduction of new equipment cannot be separated from raising the technical level and skills of workers using it....

The Central Committee plenum pledged to expand the system of night (shift) vocational and technical schools, in which workers could receive vocational and technical instruction at enterprises and transportation and construction organizations without interrupting production. It seems expedient for these schools to give its students in a number of cases the possibility to complete a secondary education. Then these schools will provide the worker with a high level of skill in his specialty and will give him the elements of engineering and technical preparation and a general secondary education. General education study programs in the evening vocational and technical schools should be differentiated depending on the peculiarities of the respective branch of production.

Workers with a 7-8-year education and a beginning production skill could be admitted to these branches of night vocational and technical schools.

The resolving of several other tasks ought to be laid on the night vocational and technical schools. Workers who will be released from their jobs by the plan for mechanization and automation in specified production sectors could be, for

example, in possession of a new trade in advance. Young persons who have received beginning vocational preparation in a 10-11-year general educational school could also increase their skill in the night vocational and technical schools. Workers who have received individual brigade instruction could in many cases receive theoretical preparation in them. It is now up to the organs of vocational and technical education, together with the sovnarkhozes and enterprises, to begin working out and drawing up plans for organizing and developing a system of night (shift) schools, at first using the buildings of the day vocational and technical schools and of educational combines at enterprises which are unoccupied at night.

In connection with the task of further development in vocational and technical education which the Central Committee plenum decreed, we cannot ignore the unwarranted decisions of certain organizations to liquidate active technical and trade schools. The decision of the Ministry of Higher, Secondary Specialized, and vocational Education Belorussian SSR, for example, regarding closing three schools which are preparing skilled workers in order to organize day technical schools in vacant buildings, can hardly be correct. Beyond doubt, it is necessary to expand preparation of technicians in Belorussia. But ought this to be done at the expense of schools which are preparing skilled working personnel?...



LET GALILEO BE BEWILDERED

Literaturnaya Gazeta

September 22, 1960

by I. Lyubavina

My fellow-conversationalist was a mathematics professor. His capacity for switching rapidly from one topic to another without losing the thread of a conversation always amazes me. That was how it was now. Our talk shifted unexpectedly from the realm of literature, art and education to the world of complex mathematical formulae.

"We were speaking of great people. Of mathematics, of integrals. Let's let our imaginations play a bit". Mischief gleamed in the professor's eye. "Let's imagine that a miracle occurred and a majestic, long-beared old man in doctor's robes came to visit us - Galileo. Imagine him among the people of the 1960s. Let's take him by the hand and lead him into one of our 11-year public schools. It is easy to picture his surprise if he wandered into a physics class. What devilry is this? Atoms, which used to be considered a figment of the minds of Lucretius and Democritus, have been measured, weighed and divided into the most minute particles. In the next classroom a pupil might be answering a question about the origins of animal and plant life.

"Only in the mathematics class would Galileo, astounded and agog at all he had seen and heard, find himself at home again. Everything here would be familiar and in its place, just as it was in his own time. The pupils would be solving quadratic equations and proving that the length of Pythagoras' pants was equal on both sides. Right?

The professor paced the room, looked at me - where had the mischievous gleam gone? and said gloomily:

"Devil take it, it's no joking matter. We were talking about youth, about schooling, about the roads open to young people, and here, if you please, is the mathematics course stopping at the scientific discoveries of the 17th century!"

So our conversation turned to a disturbing problem of today's Soviet education: mathematics and life - what a tremendous gap there is between them in the school curriculum! It is very alarming, and not only to my fellow-conversationalist, a man close to the world of mysterious equations.

In this world live creators of complex machines and devices, people of the new sciences that have appeared in our age of atoms, electronics, jet flight and satellites. The mathematicians' brilliant thinking has cast its glow upon the cradles of new sciences; their complex calculations underlie huge dams and the space rockets that enter assigned orbits with extraordinary accuracy. The world-historic revolution in technology - automation replacing man's labor - would be inconceivable without our bold penetration into the world of mathematical formulae. Those cybernetic machines that perform the functions of translators, technologists, engineers, economic planners and statisticians! Try to manufacture them with the mathematics of Galileo's time!

"I hear the voices of the skeptics: 'What are you talking about, what are you driving at? It's all as you say, but when the boy or girl who aspires to become an engineer enters a higher educational institution, he or she will get a mathematical training; that is where he or she will make the jump from the 17th into the 20th century. But you are talking about grade school.'"

The mathematics professor was speaking with two voices: He was stating the case for the opposition and answering it.

"Yes, yes, it is about the grade schools that we must talk. They are taking a new direction. Polytechnical instruction. But we forget about polytechnical education where mathematics is concerned.

"How can we forget about the mathematical thinking of those young people who will go from the school bench to the factory, where they will find extremely complex automatic machines and machine tools with program control? What should we be doing about the young people who after grade school will choose a specialty such as work in the computing center of a factory, economic council or statistical administration, work that generally does not require a university diploma but does demand broad mathematical knowledge and deeper acquaintance with mathematics than could be acquired in Galileo's day?

"Something is wrong here. Not everything has been thought out. Children are being taught without regard for the future. They are being taught as they were a century ago, they are being taught quadratic equations and Newton's binomial theorem."

Again he spoke for the opposition:

"So you want to overburden the school child, eh? You want to dump higher mathematics on his shoulders, too, is that it?"

No, farsighted people don't want to overload the curriculum. All of higher mathematics need not be included in the school curriculum, but a schoolboy of the 1960s should get to know its main ideas. How, in what sequence? This needs to be thought through, with due regard for the fact that mathematics is an orderly edifice that must be built up step by step.

Many persons, disturbed by the way mathematics is taught in the public schools, are already giving this matter earnest thought.

We were informed at the Teaching Methods Institute of the Academy of Pedagogical Sciences that a new mathematics curriculum has already been drawn up. Drawn up, but not introduced. Meanwhile, the teaching remains on the level of the 17th century.

The voices of the scholars in the Moscow Mathematics Society ring forth. In the journal Matematicheskoye prosveshcheniye (Mathematics Education) and in the Academy of Pedagogical Sciences the scholars demand that elements of higher mathematics and the basic concepts of the theory of probability be introduced in secondary schooling. But the answer they get is that this is beyond the scope of the schools. It is a matter for higher education.



But what about those who will not go on to higher education, those who will be responsible for advancing the country's technical progress while possessed solely of a secondary school diploma? How will they cope with the complicated computer equipment that has already made its appearance in the factories and at construction projects?

Today technology is already putting complicated general-purpose and specialized computers into production. The operation of these machines, machine tools with electronic programming, and the invention and introduction of new technology call for workers familiar with mathematics, who will not boggle at integrals and differentials and will have no difficulty reading technical journals bestrewn with complicated formulae.

It is workers, then that are wanted, workers specifically, and not engineers; graduates of secondary and not of higher schools. Have they been giving thought to this at the Ministry of Education?

Possibly they have. But here are rank-and-file fighters on the cultural front, the teachers, already beginning to act without waiting for a "command", for a directive from above. In an article by Prof. Markushevich, Russian Republic First Deputy Minister of Education, in a May issue of Uchitelskaya gazeta, we read the following: "One must not overlook the first experiment in teaching school children a specifically mathematical vocation, that of programming technician."

I decided to follow this advice.

Moscow Public School No. 425 is at first glance in no way remarkable. But let us listen to what Sofya Mikhailovna Kashchenik, the principal, and S.I. Shvartsburd, a mathematics teacher, have to relate.

Interesting things are going on! Polytechnical instruction is being introduced here with the following thought in mind: The country, after all, needs not only lathe operators and metal-workers, carpenters and fitters; it also needs mathematicians who after graduating from 11-year schools can handle programming and operate electronic machines.

S.I. Shvartsburd led the class. He led it along untrod paths. No study programs and no teaching methods had been drawn up for the new subjects of approximate computing, machine mathematics, programming, practice work on machines. There were no textbooks. Everything was being done for the first time.

But persons who realized the full significance of the initiative support - persons such as A.I. Morozova, a docent of Moscow State university; L.G. Solkolova, head of the borough department of public education; senior scientific assistants A.A. Abramov and Ye. N. Karamzina; V.G. Ashkinuze, a senior staff member of the Teaching Methods Institute of the Academy of Pedagogical Sciences. There is no counting all of the sincere and ardent friends of the new experiment.

They helped in drawing up the course and devising the teaching methods. Now classes had already begun, and everything was coming along splendidly. But where were the children to do their practicing? A patron plant would be of no help here. The USSR Academy of Sciences' Computing Center responded. Academician Dorodnitsyn, director of the center, opened the doors wide to the children: "Send the class here for practice." Practice supervisors were assigned - T.M. Kopulova, senior laboratory assistant, and K.V. Kim, junior scientific worker.

Timidly the school children crossed the threshold of the temple of science. How formidable it sounded: "Computer Center"! But now they feel perfectly at home there, and they are working unassisted on the calculators and carrying out practical assignments.

Don't think that in this school you will find wonder children who have rejected the world and set themselves only to the solution of difficult mathematical problems. By no means! We were surrounded by a mob of cheerful, mischievous boys and girls interested in all the things that concern their age group. But their greatest love is the world of mathematical formulae. This love the school has implanted in them.

Here is the class in which programming workers are being trained. What strict selection went into the formation of this class? Ordinary pupils with good grades in math entered the class after the eight grade. I repeat: They are not wonder children; they are simply diligent, hard-working boys and girls.

The class follows the usual program; they have merely added hours for the new subjects and somewhat increased the number of hours for physics. But by and large the work load on the pupils is the same as in any school. The time spent on the new subjects and on practice corresponds to hours that in other classes go on to the mastering of some other vocational specialty.

To master a new trade does not require special talent. It requires diligence and an interest in mathematics and physics. The pupils in this class write math compositions, "polishing their mathematical language", as the teachers put it, developing mathematical thinking and the ability to express it. Here the pupils work with books and calculating tools. Evening talks are given for them on the history of mathematics and on great mathematicians.

The leaders of School No. 425 have a clear visualization of their pupils' futures. "Everyone is now well aware of the place computers will hold in science, technology, agriculture, biology and medicine," S.M. Kashchenik says. "Work with these machines will call for a large number of specialists, including programmers. It is these that our school will be training; the programmers used to be drawn from among graduates of the mathematics department of Moscow State University. Is it wise to spend so much time and money training people for what are by and large narrow specialities? I think not. Yet the need for such mathematical technicians, as I would call them, is very great.



According to some estimates, thousands of programmers are needed right now, and with every passing day, this need will grow as new computers are put into operation."

The task that was undertaken at Moscow Public School No. 425 is very interesting and promising. It seems to us that classes along the same lines should be opened at a number of other schools in Moscow and other cities of the country where there are computing centers.

Naturally, such schools will need help, in the first place from scientists and mathematicians.

But the schools themselves should march more boldly into tomorrow.

And what about the training of computer maintenance specialists? Mathematics cannot be done without here, either. What if a whole school oriented itself toward mathematics and became a kind of experimental laboratory, to which teachers would come from other schools where it had been decided to link mathematics more closely with life? Isn't it time the economic council interested itself in the experience of the modest comrades at School No. 425? As we know, computer centers are being set up at a number of major Moscow enterprises. But where will the people in the economic council get the personnel needed to operate them? From Moscow State University's graduates? But isn't this too wasteful? Drop in at School No. 425, and then press the city public education department to have other schools train children for computer work. Press for this, and extend them help. What help? Oh a great deal is needed - equipment, practice facilities.

It is to be hoped that the enthusiasts at Moscow Public School No. 425 will find warm support in the city department of public education and the Ministry of Education.

Let old Galileo get a surprise when he enters a mathematics class, too - let him be bewildered as he hears a young man, in reply to a question from the teacher, describe the structure of a mathematical machine that replaces the translator.