

September 1966

Facts on Scientists

## A. Educational training in the U.S. and USSR (as of November 1965):

	<u>US</u>	<u>USSR</u>
1) Total number of persons with higher education (in millions)*	11.0	6.0
2) Of the above total, the number of persons educated in science, technology, and education**	5.5	5.4

B. Awards of Nobel Laureates in science:  
(percentages of total awards in science)

<u>Field</u>	<u>1901-25</u>		<u>1926-45</u>		<u>1946-65</u>	
	<u>US</u>	<u>Russia, USSR</u>	<u>US</u>	<u>USSR</u>	<u>US</u>	<u>USSR</u>
Physics	7%	0%	25%	0%	49%	17%
Chemistry	0	0	10	0	39	4
Medicine and Physiology	4	4	31	0	68	0

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\*Soviet data from USSR v Tsifrah

\*\*Breakdown of total assumed to be the same as in 1959, when 50% in the US and 90% in the USSR were educated in these 3 fields

THE CURRENT DIGEST  
OF THE SOVIET PRESS  
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Discussing G. Popov's Article "Efficiency Is the Line":\* ASSOCIATIONS ARE NEEDED. (By Candidate of Technology G. Mikheyev. Izvestia, June 14, p. 4. Complete text:) Everybody knows that saving time on the development and introduction of new technology is of great importance to the national economy. Under the present system of planning and organizing research, however, practically none of the researchers is morally or materially interested in finishing projects ahead of time. Any subject, therefore, is worked out strictly according to plan, taking two to three years and sometimes longer, though the planned schedules for the completion of research are, as a rule, established with considerable leeway.

Scientific research is still planned "in bulk"—in number of subjects, wage funds and total volume of financing. That is why the directors of institutes, departments and laboratories exert every effort year after year to obtain a greater number of subjects and more allocations, instead of tackling the intricate scientific-technical problems of industry and solving them with a minimal outlay of material and loss of time.

In the evaluations of the work of the branch research institutes no account is taken of such indices as the volume of expenditures on the elaboration of subjects and the effect gained from the introduction of new technology in the national economy. And this is regarded as normal. The point is that the branch institutes are usually financed from the state budget and bear no responsibility for the application of the finished projects. And after all, there is a long way to go from the completion of the project to its application in industry. Experimental models must be designed and prepared, the defects discovered must be removed, and technical documentation must be prepared for series production of the new product.

When passing through all these stages, the innovation often "knocks about" from one organization to the next. The situation is aggravated by the fact that the design bureaus at the plants are not too interested in finding applications for ideas born at the institutes, since their own (not always better) projects will bring them larger bonuses. The experimental plants are frequently under the jurisdiction of other departments and are very loath to accept orders "from outside."

The institute, design bureau and experimental plant cannot do without such a link as the industrial enterprise, i.e., without the consumer. And that consumer is drawn into the creation of new equipment at almost the last stage; when experimental models or new technology must undergo industrial tests.

All these links ought to be united in a single chain. How is this to be done? A good proposal was made on this score in the article by G. Popov, First Secretary of the Leningrad City Party Committee, headed "Efficiency Is the Line" (Izvestia No. 123, 1966). The article points out the necessity of the establishment of science-production associations capable of effecting a noticeable increase in labor productivity in the sphere of scientific research, of reducing the time needed for the incorporation of ideas in finished products and of eliminating parallelism in the work of the institutes.

That, I think, is the right way to consolidate the ties of science with production. I should also like to present my views on what these science-production associations ought to be like. They should be built on an economic-accountability basis within the frameworks of the branch ministries. These complexes

should encompass the branch research institutes, the specialized design bureaus, the experimental plants or shops, the services for adjustment, introduction of new equipment and guaranteed repairs, technical information bureaus and training courses to raise the qualifications of industrial workers.

It is important to think out properly the procedure for financing the research. Financing from the state budget is the prevailing procedure now, and every institute has been asking for more allocations from year to year, regardless of the needs of its subject plan. The reduction of allocations, on the other hand, is everywhere regarded as the curtailment of research. This view stems from the incorrect practice of financing: The money is paid out not for problems but for scientific institutions.

How should the budget allocations issued by the industrial-branch ministries for the development of science be distributed? I think only the part of the budget funds intended to finance exploratory, basic-research projects should be passed directly to the science-production association. The remaining funds would best be transferred to the industrial organizations that conclude economic contracts with the association for working out problems of importance to the entire branch or, at any rate, to a group of kindred enterprises. Then the science-production association will acquire a client who will control the course of its work and will be obligated upon its completion to apply the results of the research in his own enterprise.

A number of other economic measures should be carried out in addition to changing the financing procedure. In particular, the science-production association should have its own fixed assets and working capital. It must have the right to receive short-term credits for the development of its own production base.

Finally, there must be changes in the organization of the research itself and in the wage system. The beginning of work on a subject, hence the beginning of the financing of such work, now depends on the time limits fixed in the subject plan. In practice, half, and at times even more, of the period assigned for the completion of a subject is spent acquiring equipment, instruments, devices and materials—in short, deciding various organizational and economic questions. This can be avoided if credit is established ahead of time for "material outfitting" of forthcoming research (the researchers, as a rule, know what this will comprise long before it is officially included in the plans).

The further improvement of the wage system envisaged by the Directives of the 23rd Party Congress should be extended to scientific institutions as well. This should be a stimulus to attaining a higher level of research and high effectiveness, to shortening the schedules and expenditures on designing and introducing new equipment. This requirement would be met in large part by piecework payment for certain groups of staff workers, or for the entire collective engaged in the pursuit of the subject.

And another proposal: The science-production association should be covered by the Statute on the Socialist State Production Enterprise,\* ratified by the U.S.S.R. Council of Ministers.

The science-production associations could assume full responsibility for the high level of their scientific research, for the national-economic effectiveness of new technology and for the pace at which such technology is worked out and introduced.

The Current Digest of  
the Soviet Press  
June 15, 1966

## Proposals for Raising the Productivity of Science

**Life and Problems of Science: EFFICIENCY IS THE LINE.**  
(By G. Popov, First Secretary of Leningrad City Party Committee, *Izvestia*, May 27, p. 3. 2,200 words. Condensed text:)  
... It is particularly characteristic of modern science that it brings an ever increasing number of people into its orbit. In Leningrad, for example, the number of scientific workers has increased over the past seven years 11 times faster than the number of workers employed in industry. But whereas the volume of industrial production has increased 150% with an insignificant expansion of personnel, the increase in the number of workers in scientific and design organizations has not been accompanied by a significant increase in the effect of their labor.

What is the matter? One of the reasons for such a situation, speaking in general terms, are the serious shortcomings in the planning and the organization of labor itself in research and design institutions: The path of a scientific idea into production is often very difficult and long. Sometimes an idea conceived in our country is realized much faster abroad.

Another substantial reason is the not always proper staffing of cadres in scientific and design institutions. Profundity of thought, the talent of the workers and their selection and placement have more decisive significance in science than anywhere else. The problem of cadres for scientific institutions is complicated, not to be solved with the stroke of a pen, but it must nevertheless be solved. Institutes often are short of the necessary specialists, and getting rid of incompetent and poor workers is unusually difficult.

Every person is good in his place. A man, say, who does not have the abilities of a designer might be able to work successfully in a shop, but not everyone is conscientious enough to leave a well-paid position and go where he will be of more use. I am not even speaking of the dishonest workers who give nothing to society and only make a show of activity.

I think it is time to give the directors of scientific institutions the right, with the agreement of the public, to apply to such "tireless idlers," in the apt words of satirists, the strictest measures, right up to dismissal from work. It is also necessary to increase the significance of competitions and to hold them not formally but so that there will be real competitiveness, in which the most qualified will win. It would be highly useful to charge institutes and design bureaus with deciding their own personnel questions within the limits of the wage fund. Then the labor of scientists, engineers and technicians will be paid for more precisely, in accordance with quantity and quality. And why not, say, take away from scientific staff workers who over a specific period of time have not yielded the requisite benefit the monetary raise they receive for their rank?

It is not at all difficult to single out a negligent and incapable person. In the final analysis the collective always knows who works strenuously and who is marking time. Nevertheless, barren flowers are still often tolerated: It is realized, of course, that such a person is getting paid for nothing, people are angry inside but ashamed to say anything about it openly, it is awkward.

We have cases in which scientists avoid participation in competition, holding competitive positions only by appointment. For example, at the Research Institute for Lake, River and Fishing Resources, only one out of 14 laboratory directors was chosen by competition, and only two out of 68 senior scientific staff members.

This also happens: Some sneak who has wormed his way where he does not belong and wants to create the appearance of constructive labor will propose a string of outwardly profound but essentially "senseless" subjects for scientific development. Such were the circumstances under which the rascal and swindler Gendlin could flourish.\* Without having any education, he held the rank of doctor of sciences and "directed" two labora-

tories for almost two years. And he got away with it! His downfall was not his ignorance, but his elementary crookedness. Such incidents are the result of poor control over the scientific activity of workers on the part of the administration and public organizations. The obvious overstaffing at certain institutes and design bureaus also creates favorable conditions for scientific "barren flowers."

Needless to say, there is also a material side of the matter concealed behind these, so to speak, moral problems. The impulse of engineers who have defended their dissertations to leave the plant for the institute is dictated by considerations of a material nature. In production there are no increments offered for scholarly rank. Is this not the reason why in Leningrad only 70 people out of the large detachment of candidates and doctors of sciences work at enterprises? ...

In our opinion it would be expedient to create scientific-production complexes capable of noticeably increasing labor productivity in the sphere of scientific research, reducing the schedule for the incorporation of concepts in finished products and eliminating parallelism in the work of a number of institutes. For this it is necessary to transfer single-specialty design bureaus and institutes to large enterprises and production associations and to develop research in the future not at the expense of creating new institutes but by means of organizing scientific subdivisions directly at leading enterprises. Possibly, in certain instances it will be more correct to transfer industrial enterprises to scientific and design organizations and turn them into experimental production bases.

The question of increasing the efficiency of research activity at higher educational institutions has long been urgent. At present this powerful reserve of scientific progress is being utilized extremely poorly. Higher educational institutions must become important research centers with powerful laboratory, design and technological facilities and, in some places, an experimental production base. Higher educational institutions need direct contact with the existing branch ministries, which would give assignments, control the introduction of scientific developments in industry and help higher educational institutions in expanding their experimental production base.

Much is now being done in the Leningrad Party organization to increase the labor efficiency of scientists, engineers and technicians. But however intently local organizations deal with this problem, it is impossible to improve the administration of science and perfect its planning and economic incentives without special solutions on a country-wide scale.

Much of what has been said in this article is not new. I raised some of these questions in *Izvestia* nearly two years ago in the article "Labor, Science and Creativity"\* and received many letters from readers who ardently supported the propositions set forth. At the same time, no one objected to these proposals, neither the U.S.S.R. Ministry of Higher and Secondary Specialized Education nor the U.S.S.R. Academy of Sciences. However, no changes have ensued, although these very agencies, together with the newly created U.S.S.R. Council of Ministers' State Committee for Science and Technology, are called upon to struggle for the elimination of obstacles on the path of the further development of science.

What we need in order to get rid of cases of scientific barrenness is the introduction of scientific organization of labor not only at industrial enterprises but above all at research and design institutes. Moreover, control here must be no less strict than in industry. It is necessary to mechanize as much as possible the labor of the scientist and to reduce the expenditures of time on making calculations, compiling information material and correspondence. Nevertheless, at the scientific and draft institutions in Leningrad there is one technician for every two engineers, while the ratio should be the other way around. As a result, irrational use is made of many specialists.

\*[See Current Digest of the Soviet Press, Vol. XVII, No. 11, pp.

\*Current Digest of the Soviet Press, Vol. XVI, No. 31, pp.

More than 300 research organizations, determining the technical policy of a whole series of branches, are concentrated in Leningrad. The fate of dozens of plants, factories and construction projects depends on how efficiently they work. Meanwhile, many institutes and design institutions are characterized by a poor arrangement of economic work, an inability to count money or increase labor productivity. In some places workers are satisfied with publishing scientific notes and the defense of dissertations and are little concerned with the national-economic significance of what they have invented.

The collectives of certain design institutes deserve serious reproach. For example, the State Plastics Enterprise Design Institute so poorly fulfilled the design for the Okhta Chemical Combine that the pneumatic transport system built by its specifications proved completely unworkable. There are intolerable miscalculations in the designs and estimates of the Leningrad Design Institute for Housing and Civil Construction. In two years alone, builders have spent almost 2,000,000 rubles on correcting the mistakes made by this institute. The projects of the State Design Institute for Heavy Machine-Building Plants, the Leningrad branch of the State Design Institute for Gas Purification Installations, the State Design Institute for Rubber Industry Enterprises and the Leningrad State Design Institute for Chemical Combines evoke many reproaches. Obviously it would be expedient to extend the Statute on the Socialist Production Enterprise to research institutes and design bureaus, with consideration for the specific character of their work. This would make it possible to strengthen economic accountability, curtail the time periods for projects and their introduction in production, and increase the material interest of collectives in the results of their labor.

In a number of instances we consider it expedient to take the path of merging small research institutes, in which the number of people on the staff sometimes does not exceed 50, into larger scientific organizations. This would make it possible to unite scientific forces and to eliminate parallelism in work and would also bring a certain degree of economy in connection with reducing the payroll.

Up until now I have been speaking primarily of the research and organizational activity of scientific and design institutions. But we cannot forget about ideological work. It is no accident that in collectives where scientific yield is small and the amount of work is poor, we often come up against instances of apoliticism. Needless to say, in concrete scientific research, unlike, say, a literary work, there is no outright ideological element. But it should be within the person himself! To put it more simply, I am speaking of the political conviction of the researcher. Do we not know plenty of scientists who, even in times most difficult for them, when they were subjected to undeserved attacks, held onto their own convictions and continued to work consistently and honestly, thereby presenting young people with models of service to science?

I emphasize young people because many people are attracted to science by the depths to which it penetrates the processes of life, the harmony of logical conclusions, the romance of research and the democratism of human and creative interrelations. This process is natural. It has a certain tradition: It is well known that Mendeleev created the periodic system at the age of 35. Lobachevsky developed non-Euclidian geometry at 34. Galois, Einstein and Bohr put forth their basic ideas before they were even 30.

In our time young people are boldly and fruitfully storming the scientific heights; but however daring and constructive the ideas of young people are, their development and concrete realization are in many ways dependent on the personality of the researcher, on how he understands the responsibility for an assigned task, in a word, on fostering Marxist-Leninist conviction in every young scientist. Limiting our range of interests to specialized knowledge alone means robbing ourselves and our talent, which can develop successfully only if it is nurtured with ardent civic feeling.

In present conditions, as the Party is solving great political and economic problems, it is the duty of every Soviet scientist to walk in step with life, to develop in himself lofty Bolshevik principles, efficiency and the ability to take a revolutionary initiative in any matter.

## THE PARTY'S GUIDING ROLE

**Party Life: TURN TOWARD SCIENCE.**—The Province Party Committee and Scientific Institutions. (By Special Correspondents A. Navozov and V. Reut. Pravda, May 25, pp. 2-3. 2,800 words. Excerpts.) Rostov Province— ... In Rostov Province there are dozens of research institutes, higher educational institutions and drafting and design organizations. Each of these institutions needs the support and attention of the Party committees. ...

**The Scientists' Concerns.**—Party guidance of scientific collectives is not a simple matter, of course. It has its own special traits, its own peculiarities. It requires first of all a very good knowledge of the scientists' concerns and needs. ...

A group for modernizing the motor of the VL-80 electric locomotive reported to the Party committee of the Novochoerkassk Electric Locomotive Plant. Despite great efforts, it had not been able to ascertain the reasons for inconsistencies in the motor's operation and to put the machine into working order. Nor could the Party committee ascertain these reasons. Nevertheless, it punished the specialists who headed the modernization group "for inefficient solution of technical questions." V. P. Yanov, chief designer of the All-Union Electric Locomotive Research Institute, was reprimanded. Yu. V. Romanov, chief technologist of the Novochoerkassk Electric Locomotive Plant, was warned. It was decided to discuss the question of the responsibility of A. L. Kurochka, assistant director for the scientific sector of the institute, who was ill at that time, after his recovery. (It should be explained here that the institute and the plant are located on the same production site and that their Party organizations, being related, are headed by the plant Party committee.)

There were reasons for all the uneasiness. As far back as a year before, the Novochoerkassk Electric Locomotive Plant was swamped with countless complaints: The motors of the new eight-axle VL-80 electric locomotives were going out of commission quickly. The trouble was that the plant had produced a large quantity of new electric locomotives without proper testing of the pilot model. These locomotives were equipped with light, high-speed motors of a new design, which certainly demanded the most critical and comprehensive testing and reworking.

As often happens, the rigors of the difficult technical search had an unexpected and simple denouement, which occurred literally a few days after the session of the Party committee. Someone among the workers in the shop expressed a very simple idea. The designers and researchers of the institute clarified the proposal, made some calculations, tested them on the motor's commutator, and it worked. The first corrected electric locomotives were sent to the railroads for testing, although the motors as a whole, of course, need further improvement.

What did the Party committee achieve by its decision? V. P. Yanov, the chief designer of the institute, submitted a statement of resignation, citing his poor health. Nor could the Party committee's decision serve as an inspiration to Yu. V. Romanov, the chief technologist of the plant, or A. L. Kurochka, the assistant director for the scientific section of the institute.

The most dangerous thing is this: The comrades in the Party committee have not grasped the fact that such methods for guiding science are condemned by the Party. You cannot influence the development of science and technology with shouting and fist waving.

This does not mean that scientific organizations and their workers should be above criticism. As in any sphere of activity, high exactingness is in place here, as well as strict Party control and direct and blunt criticism of shortcomings. After all, there still are workers in science whose actions do not justify their high calling, and there are scientific institutions that fulfill their tasks poorly. But before criticizing, let alone issuing reprimands, you must make a most thorough study of

the situation and be convinced as to why people did not fulfill their assignment. And it is completely inadmissible to punish a Communist scientist for having failed to produce a discovery or invention at exactly the desired moment.

We had a long and detailed talk about all this with B. I. Golovets, former secretary of the plant Party committee (now Secretary of the Novochoerkassk Industrial District Party Committee), and his successor, G. P. Korostovol. It was strange to hear them say:

"But somebody must answer for it if the Party committee's assignment is not fulfilled."

How are such instances of a wrong attitude toward scientific institutions and their cadres possible? First of all, the Rostov Province Party Committee does not teach the secretaries and officials of city and borough Party committees the correct Party style of guiding scientific institutions and their primary Party organizations. ...

**State Interest Is the Chief Criterion.**— ... We had an extensive discussion with M. S. Solomentsev, First Secretary of the Rostov Province Party Committee, about problems of the development of science, strengthening its ties with practice and the role of the Party organizations in this matter. He believes that the Party committees, including the province Party committee, still do not utilize all their opportunities for raising the level of Party guidance of scientific institutions.

Moreover, there are questions, in particular problems of experimental facilities, whose decision depends not only, and not even so much, on the province Party committee. What is needed here is a firm line of conduct for economic organizations: If you build a new plant or create a new institute, begin with the experimental base.

Much can be decided on the spot. But in order to strengthen Party control over the activity of scientific institutions, the Party committees must delve thoroughly into the researchers' work and visualize its importance for the corresponding branches of science and technology. It is not enough to take an interest in the institutes' communiques and reports or to listen to the scientists' addresses at the major conferences. The above, of course, plays a positive role. But the main thing is to make a profound study of research activity directly on the spot: in laboratories and at testing enterprises. After all, sometimes a simple talk with a scientist, what is called a heart to heart talk, at his place of work makes you understand the situation far better than lengthy conferences.

How often do Party officials attend, say, experiments with new machines, aggregates or machine tools? And these are the times when the good and bad aspects of sometimes long searches are revealed. It then becomes especially clear where attention should be focused to improve the organization of scientific work and where the Party committee's help is needed.

Of course, this requires time and additional efforts. But only in the first phase. Subsequently, a profound knowledge of the situation and of the essence of the matter will greatly facilitate the Party committees' tasks.

Finally, it is very important constantly to raise the level of ideological and educational work among scientists. We are talking about further improvements in the forms of Marxist-Leninist education and the study of philosophy, political economy and applied economics. It is also necessary that the content of ideological and theoretical studies be more closely linked with the specific features of this or that branch of science and technology, with its specific nature and trends of development. Therein lies the complexity but also the promise of ideological and theoretical education.

It is the general opinion of the workers of science and the leaders of Party organizations that the Party committees must seriously turn toward science, as is demanded by the decisions of the 23rd Party Congress.