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AD No. 408883

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JPRS: 19,331

OTS: 63-21885

22 May 1963

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USSR Industrial Development

SOVIET PRECISION EQUIPMENT

No. 73



U. S. DEPARTMENT OF COMMERCE

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Building T-30  
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Price: \$1.25

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USSR Industrial Development

## SOVIET PRECISION EQUIPMENT

No. 73

This serial publication contains translations of selected articles on precision equipment in the Soviet Union, on the specific subjects indicated in the table of contents. Complete bibliographic information accompanies each article.

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## INDUSTRIAL USES OF RADIOACTIVE ISOTOPES

Following is a translation of an article by Candidate of Economic Sciences V. Letenko and Candidate of Technical Sciences V. Postnikov in the Russian-language periodical Kommunist (Communist) Moscow, No. 2, January 1963, pp. 56-59.

The wonderful properties of radioactive isotopes were discovered recently, but they already widely are being used in industry, in scientific investigations, and in medicine. Isotopes rightly are being called one of the powerful weapons of technical progress.

How then are radioactive isotopes being used in the national economy?

Let us take for example the methods of measuring the thickness of materials, which is necessary at each step in the metallurgical, machine-building and metal-working industry. The process of measuring thickness is very simple if the thickness of a single sheet or strip of metal is determined. For this one must have a rule, sliding calipers or, still better, a micrometer. This process is made very difficult if we are dealing with a

constantly-moving strip of metal, for instance as in the operation of a rolling-mill. When the speed of rolling was slow, 3-4 kilometers per hour, the thickness of the rolled iron was measured by a workman, who walked along after the strip with a micrometer. This method turned out to be very inefficient, and dangerous for the man; but it was used because there was no other.

Rolling-mills have been perfected, speeds have been increased to 20 kilometers per hour, and the checker no longer can follow after the ribbon. Then rollers came into use; these ran along the strip and showed the thickness of the rolled iron. However, they quickly wore out, and gave inaccurate results; and the rolling-speed continued to increase until now it is approximately 100 kilometers per hour (up to 30 meters per second!). The problem of measuring the thickness of the rolled iron and thereby control over the operation of rolling-mills became extremely complex.

To the aid of rolling-mill operators came the newest techniques, which were connected with the use of atomic energy. By means of radioactive isotopes sealed into radioisotope apparatus it is possible to carry out measurement without contact, that is, measurement without

touching the metal being rolled. When this method is used the speed of rolling does not affect the measurements being carried out. More than this, high rolling-speeds now are unthinkable without automatic regulation of thickness of the metal being rolled. However, this problem too is being solved with those same radioisotope devices.

Let us take another example. In many branches of industry static electricity is a hindrance to production. There is almost no branch in which the problem of removal of static electrical charges would not be one of the most important, and solving of which would promote an increase in the productivity of labor, improvement of technological processes, a reduction in spoilage and, finally, a decrease in the number of injuries and an increase in fire-fighting safety. Static electricity crops up during the technological processes of the textile, paper, and other branches of industry, interferes with an increase in the productivity of labor, worsens the quality of the production output, but until recently there were no effective methods of dealing with it.

And now here we have radioactive isotopes, which successfully can be used to solve a problem so important to the national economy and at little expense.



Isotopes are variations in the atoms of the same chemical element, having different mass but like electrical charge of atomic nuclei and therefore occupying the same position in D. I. Mendeleev's Periodic System of elements.

Of what then do the peculiarities and the wonderful properties of isotopes which make it possible to attain a high effectiveness of their use in Industry consist?

The peculiarity of radioactive isotopes is to be found in the fact that the nuclei of their atoms are unstable, as a result of which they are continuously decomposing. This decay is accompanied by alpha-, beta-, and gamma-radiation. Scientists have investigated the properties of this radiation and put it into the service of man. Radioactive isotopes are used in various branches of science and technology for study, for control of the quality of products and the automation of industrial processes. Very effective use of isotopes in investigations of chemical processes, of the wear of instruments, machine parts and mechanisms, etc., in particular is being made. Radioactive methods are used widely in the control of the quality of castings, welded seams, and the thickness of coatings. The use of nuclear

radiation opens wide possibilities for the measurement of various technological parameters, for automatic regulation of industrial processes, for speedup of thermal-treatment processes, etc.

The properties of radioactive isotopes make it possible to use them for the most varied purposes, among them technological processes, the processes of control and of investigation are accelerated and made more economical; often processes can be brought about through the use of radioactive isotopes which otherwise would be impossible.

The ability of radioactive radiation to penetrate through metal, liquids and other materials, undergoing a number of changes, makes it possible to judge the quality of casting and welding, to control the thickness, for instance, of rolling, to observe the level of a substance, to determine density, etc.

Apparatus which has been developed makes it possible to carry out all measurements and observations in conformity with the requirements of industry.

In recent years the scientific attainments of nuclear physics actively have begun to be introduced into industry. However, radioactive isotopes can be used in geological exploration, mining of useful deposits, in

construction, metallurgy, in the chemical, light, and food industries and in a number of other branches of the national economy as well as in medicine to a much greater extent than at present.

The industrial use of radioactive isotopes is practically unlimited, but thorough technological and economic analysis is necessary in order to determine ways and means of using them. This will make it possible to establish more effective methods of realization of scientific attainments, to avoid erroneous and accidental decisions which result in losses in the national economy.

Any technological improvement is carried out for the purpose of increasing the economic effectiveness of industry. Therefore the economic bases of technical decisions are of exceptional importance. However, as was noted at the November (1962) Plenum of the Central Committee CPSU some project-design organizations still do not attribute the necessary importance to economic bases. The economic bases and industrial use of atomic energy in particular have not been worked out sufficiently.

In the process of planning economic activity it is necessary to take into consideration that "the peaceful atom" promises colossal economic prospects to our

national economy. Everyone understands that the industrial use of atomic energy will become an important factor in the development of the economy only when, for instance, electric power generated by atomic stations will be cheaper than power from heat- and hydro stations. As regards the industrial use of radioactive isotopes, their high economic effectiveness has been proven already.

The first data concerning the economic expediency of industrial use of isotopes already is making it possible to reach conclusions of the necessity of a considerable expansion of the work in this field. As early as the 22nd Party Congress Academician I. V. Kurchatov was saying that if radioactive isotopes are approached in a masterful way, if their use is widely developed, then the economy would have to be measured in billions of rubles (on the old scale of prices). As early as 1957 the use of isotopes in Industry saved approximately 150 million rubles. An examination of 60 enterprises of the metallurgical, steel-rolling, machine-building, petroleum-processing, food- and other branches of industry showed that radioisotopic instruments control and automation brought about a saving of approximately 60 million rubles in 1958. According to rough calculations the use of isotopes will save several

hundred million rubles per year in the last years of the Seven-Year Plan.

Wide use of radioactive isotopes is a matter of great importance to the State. Comrade N. S. Khrushchev, in his report to the 21st Party Congress especially called attention to the necessity of creating a new technology by the use of radioactive isotopes. The June (1959) Plenum of the Central Committee CPSU pointed out that it is necessary to introduce a new technology by the use of radioactive isotopes for the control and guidance of industrial processes.

Science develops all new ways for using radioactive isotopes. However, together with the broadening of scientific investigations which determine the technical possibilities of using radioactive isotopes it is also necessary to carry out economic investigations in order that the most progressive, that is the most effective economically, directions of science and technology be given the most rapid development.

The most important part in the planning at the present stage, as was emphasized at the November Plenum of the Central Committee CPSU is this; the most rational and effective utilization of material, labor, and

financial resources, of natural riches, the development and introduction of new technology, the elimination of excessive expense and losses in industry.

Practice shows that the expeditious use of radioactive isotopes in manufacturing, in the first degree in industry, answers to precisely these tasks. First of all their utilization in industry considerably reduces the cost of production. For instance gamma detection of defects in comparison with the destructive method of technical control such as cutting out metal, curtails expense in control operations, reduces <sup>labor consuming</sup> work, avoids disbursements of metal for cutouts, the expense of subsequent welding up of the sections cut out, decreases spoilage and improves the quality of goods. Gamma detection of defects in comparison with such a method as X-ray detection of defects for control of the quality of welded seams and heavy castings makes a considerable saving possible.

As regards the one-time expenditure on the radioactive methods, it might be said that they are relatively inconsequential and pay for themselves rather quickly, in the first 1-2 years of use. For instance, the Type "RIU-1" and "IURP-1" transmission level meter and others costs 150-400 rubles, but in a year it saves at least

12,000 rubles.

The use of radioactive isotopes in studying the wear of a cutting-instrument, of stamps, the rollers in rolling-mills, the rubbing parts of internal combustion engines, and metal-cutting lathes is of great interest in the field of industrial investigations. The study of wear by the old methods, which still are widely used today, requires large expenditures, since it involves stopping moving parts, a loss of time and materials. Isotopes eliminate these deficiencies. Thus the wear of a medium-power engine is determined by running for 500 hours, subsequent disassembly, measurements, etc. Isotopes curtail the time required for study of wear to 50 hours. If it is assumed that up to 10,000 tests are made annually, then the saving will be tens of millions of rubles. This study of wear by using isotopes makes possible effective and timely action to decrease wear, which gives an even greater saving in exploitation of the machines.

Introduction of radioactive methods in investigation of the wear of a cutting-instrument solves two problems simultaneously: it determines optimal regimes of cutting and reduces the consumption of cutting-instrument and metal during investigation to one-fiftieth.

As regards the saving involved in the use of radioactive isotopes in the machine-building and metal-working Industry, such directions as the control of castings and welded seams by the method of gamma detection of defects, the control of the thickness of rolled iron and of coatings, automation of control of delivering stores, counting of finished goods, etc., are of primary interest at the present time. According to the data of the MVTU imeni Bauman, after introduction of gamma detection of defects the percent of reclamations in respect of defects in welded seams at the Krasnyy kotel'shchik Plant was reduced from 60 to 10, at the Plant imeni Frunze from 45 to 5, at the Papovozoremont (Steam Engine Overhaul) Plant from 35 to 2, etc. The Orgsnovoyektmontazh Trust calculated that gamma detection of defects in one meter of welded seam costs 7 rubles, whereas processing one cutout costs 50 rubles. Gamma detection of defects in 10 kilometers of welded seam saves approximately 180,000 rubles, since by the old methods it would have been necessary to cut out 5,000 samples, thereby spending a great deal of time and material. About the Industry as a whole the actual saving from the use of radioactive isotopes in gamma detection of defects alone attains tens of millions of rubles.



Radioisotope instruments in rolling-mill practice are replacing hand micrometers, pneumatic and electrical contact micrometers, increase the productivity of the mills due to an increase of the average speed of rolling, a decrease in time necessary for control, a decrease in the amount of spoilage, a decrease in tolerances, etc. Control of rolling by emitters widely has been introduced into industry but for the time being it is being used without automatic regulation of thickness of the strip being rolled. Only replacement of hand micrometers by radioisotope instruments will increase, according to the data of the MVTU imeni Bauman, the productivity of a six-high mill by 16.5% (the Krasnyy Vyborzhets Plant), and in isolated cases by 40% (a plant for processing ferrous metals in Kirov).

In tin-plate manufacture the control of the quality of coating the plate with tin was done by chemical methods previously. This required a great deal of time (a half hour per test) and of metal. Radioisotope instruments are changing the organization of control radically. With this system the time spent for control does not exceed 3-4 minutes, and no tin is consumed. And a considerable saving has resulted. Working from the average saving calculated

by the Magnitogorsk Metallurgical Combine it may be reckoned that if every plant manufacturing tin plate were to use radioisotope instruments, they would save at least 9-10 million rubles annually.

Isotopes are being used in metallurgy as well to carry out such work as the investigation, control, and automation of metallurgical processes including investigation of the movement of charge materials, control of refractory linings for metallurgical aggregates, determination of charge-levels and control of them, etc. Such enterprises as the Kuznetsk and Magnitogorsk Metallurgical Combines successfully are using isotopes for systematic control of wear in refractory linings. Isotopes (cobalt-60 in the majority of cases) are placed at various depths in the refractory lining of blast-furnaces undergoing construction or capital repair. The easily-observed presence of activity indicates the state of preservation of the lining. Isotopes under similar circumstances prevent possible accidents and make it possible to save hundreds of thousands of rubles as a result of repairs carried out in a timely manner as well. As the investigations have shown, the use of radioactive isotopes in blast-furnace smelting will make it possible to increase the

smelting of cast iron by 2.5-3%, to reduce fuel-consumption by 3-3.5% and increase the service-life of the blast-furnace, which in turn promises a saving of tens of millions of rubles annually.

Isotopes also are irreplaceable in the mining of mineral resources, particularly in the search, exploration and development of petroleum and gas-deposits, of coal, and in recent years of various ore-deposits as well. The method of using tracer-atoms, for instance, successfully has been used in the search for and mining of mineral resources. From the movement of the isotopes introduced into the material being investigated it is possible to judge the state of the boring and the processes taking place there. One of the very difficult tasks connected with rift-boring is the removal of samples (core-boring). Thus the removal of samples from a depth of 1 kilometer requires no less than 6 hours. As a result of the introduction of so-called coreless boring the productivity of labor nearly has been quadrupled. According to data obtained by the Institute of Economics, Academy of Sciences USSR, the annual saving here might well attain the imposing sum of 40 million rubles.

Radioactive isotopes are being used more

and more in the light- and food industries. In light industry they are used for determining the weight of the material, the weight of substances applied to the fabric, they control the level of filling of different capacities and apparatus, remove static electric charges, etc. From data obtained by the Lithuanian Sovnarkhoz the introduction of instruments for measuring the thickness of paper strip in only three enterprises will result in an annual saving of no less than 250,000 rubles.

From the economic point of view it is even difficult to evaluate the importance of isotopes in radiochemistry, a new branch of industry. Powerful emitters intensify a large number of processes to increase the yield of products necessary to the national economy. Great possibilities are being discovered in the use of by-products from atomic power-installations. Isotopes not only accelerate processes but in a number of instances they help to obtain new products quantitatively; these are extremely important for speeding up technical progress.

Today industry has dozens of different instruments in which radioactive isotopes "work". Even now units for gamma detection of defects, instruments for control of the thickness of rolled iron, etc. are being

produced in series in specialized plants. However, these instruments are being introduced into production too slowly still; often they simply lie and rust in the warehouses of many sovmarkhozes. Many designs need more work done on them; unification of separate assemblies is needed; an improvement in sensitivity and in speed of operation are required. Creation of the State Committee of the Council of Ministers USSR on the use of atomic energy made it possible significantly to expand and to improve the use of radioactive instruments and their introduction into production. However, the exchange of experience so far has not been good. There is no printed organ, and this is necessary to the industrial enterprises and scientific organizations which are doing the research in this field.

It is important to activate the scientific research and project-design work on the further perfection of radioisotope instruments and methods which may be used in manufacturing enterprises. The decisions of the November Plenum of the CC CPSU concerning strengthening of the leading role of branch State Committees will play an important role in this matter.

The Plenum contemplated a number of organizational measures directed toward a guarantee of a single

technical policy and toward overcoming disunity in the work of research and planning organizations. The creation of basic laboratories charged with coordination of the work on utilization of radioactive isotopes is very important to the realization of these measures. This will make it possible significantly to improve investigation and to accelerate introduction of results into industry.

The work of studying the experience of using radioactive isotopes still is not being carried out on a sufficiently broad scope.

Determination of the most effective ways of developing radioactive methods likewise suggests a substantial improvement in the methods and practices of economic bases. In spite of serious advances in this field, some problems have not been solved yet: these include the problem of cost-price on economic bases, the methods and practices of price-fixing, the effect of prices on the results of economic analysis, the method of calculating the return of investment-period, the general principles for calculating cost-price in the pre-planning and planning-stages of the economic bases (the method of consolidation of indexes), etc. These problems of economic science must be worked out more decisively.

The combined efforts of physicists to work out methods of industrial use of atomic energy, of engineers to develop and introduce its techniques, and economists toward the determination of the most effective ways of development all make it possible widely to utilize this very economic direction of scientific and technical progress.

However, all of our efforts must be coordinated and wholly directed first of all in the process of planning the new techniques, the scientific nature of which is the basis of the correct definition of the most effective directions of technical policy.

2584

CSO: 1830-N

FROM "MIZ-56" TO "REPORTER-5" TAPE RECORDER

Following is a translation of an article by A. Grigor'yev in the Russian-language periodical Sovetskaya Pechat' (The Soviet Press) No. 12, 1962, pp. 13-14.

In our view a modernization of small radio-technical and television apparatus, as used by journalists, is taking place.

Let us commence with the design-changes in the most important apparatus used in operational work, the reporters' tape-recorder. In the 1950s the All-Union Scientific Research Sound-Recording Institute created the first reporters' tape-recorder, the "MIZ-56", intended for recording speech and simple musical compositions. The aggregate weighed 35 kilograms, and together with the batteries used as power-source it totaled 55 kilograms. Such an apparatus was not distinguished by its mobility; it was carried about in an automobile.

Immediately after this machine the Institute created a small-sized reporters' sound-recording apparatus with a spring motor and operating on miniature tubes.



The device weighed 4 kilograms and was intended exclusively for voice-recording. However the quality of the new model of that time nevertheless satisfied neither the designers nor the reporters. The new device, the "Reporter 2", was designed in 1955 by B. Chernyayev, P. Zon, and M. Onatsevich, associates of the Institute. A miniature electric motor which was powered by dry-batteries was especially developed for this device. The tape-recorder weighed six kilograms and provided high-quality recordings of ordinary voice as well as voice over a music-background. In 1958 the "Reporter-2" was changed over from miniature tubes to transistors, and its weight was reduced to four kilograms without any loss in recording-quality. The perfected model was called "Reporter-3".

During N. S. Khrushchev's official visit to England correspondents of the London radio companies showed a great deal of interest in our tape-recorder, with which the special Moscow Radio correspondents were "armed." BBC engineers were interested in it as well. Several of them visited our radio journalists in their London hotel to get a detailed acquaintance with the design and external appearance of the reporters' tape-recorder.

"Reporter-3", which was distributed widely,

was honored with a Second-Degree Diploma at the Exhibition of Achievements of the National Economy. Models of this device successfully were exhibited at Soviet exhibitions in New York and a number of Latin-American Countries. The tape-recorder won popularity and was exhibited in 25 foreign countries.

The designers' concept continues to work even further to reduce the dimensions and weight of the reporters' tape-recorder. This year the Institute completed development-work on the "Reporter-5" model. From the point of view of dimensions it resembles a small book, and it weighs 2.2 kilograms. The "Reporter-5" is undergoing experimental operation in radio editorial-offices. Negotiations are under way with representatives of domestic and Hungarian industry in connection with series production of the device.

2584

CSO: 1830-N

### PROJECTION-SCREEN MAKERS' PROBLEMS

Following is a translation of an article by V. Vladimirov (Deputy Director, "Kinap" Plant) and S. Galitskiy (Engineer and Member of the Public Correspondents' Post, Rabochaya Gazeta, Odessa) in the Russian-language periodical Rabochaya Gazeta (Workers' Gazette), Kiev, 1 March 1962.

To the collective of our Plant, which manufactures cine equipment and screens, it makes no difference what the onlooker has to say about the production we turn out. We are trying to do everything in order to perfect our production and to improve the quality.

Up until 1956 all movie screens were made from linen cloth which was subsequently coated with special chemical preparations. This required a great deal of time, of resources, and of materials. And nevertheless the coefficient of reflection, the chief condition and requirement, was not high; and it gradually became worse.

Later the output of new screens made of aluminized etched linen cloth, pavinol with a better coefficient of brilliance, was developed and organized.

It is true enough that this material did not last long either. The screen quickly darkened, became "weak," and after one or two years it became useless. To make matters worse the cost of it was very high, because much material was thrown out with the scrap.

The workers of the All-Union Scientific Research Cinephoto Institute (NIKFI) suggested a new type of material on a non-fabric base (a film substitute). It then became possible to produce seamless screens of any dimensions.

The first such screens were manufactured by our enterprise and installed in the Kremlin Palace of meetings and in the largest motion picture theatre in the country, the "Rossiya." Screens having an area of 450 square meters each were given the very highest rating. Their service life is practically unlimited, and the cost is considerably less than that of linen and pavinol screens. The plant received large orders for them from everywhere.

This year we must manufacture approximately 10,000 new screens. We must: if only we can bring certain responsible workers of the Ukrainian Sovnarkhoz over to our side. Comrade Gurin, manager of

Ukrzavlessbvtstv'ye , for instance, considers that for the plants it is sufficient to plan 92 thousand square meters of screen instead of the necessary 142 thousand square meters. Comrade Andrusenko, Administrator of Ukrzavkhimnabstv, also "tried," but did not guarantee to the Zaporozh'ye "Iskoz" Combine which manufactures the film substitute, the basic raw material it needs. What then is there left to do? Are we to return to the production of the other screens, to expend State funds for nothing?

Yes, it is a very strange conclusion that is being imposed upon us in the Ukrainian Sovnarkhoz. It scarcely can be considered the best method of introducing a new technique.

2584

CSO: 1830-N

DEFECTIVE "NEMAN-2" TELEVISION SETS PRODUCED  
BY MINSK RADIO PLANT

[Following is a translation of an article by  
V. Ponomarev in the Russian-language periodical  
Ogonik (Little Flame) No 2, January 1963,  
p 5.]

"People who turn out defective products themselves, all the while prattling about how our production must be the best in the world should, as the saying goes, not be permitted to get within gunshot of management of our enterprises!"

N. S. Khrushchev

So spoke Nikita Sergeevich Khrushchev at the November Plenum of the CC CPSU after he had read a letter from Krasnova, a resident of Riga, to Shapoval, former director of the Minsk Radio Plant. The letter told of how Krasnova fulfilled a dream when she purchased a "Neman-2" television set on the instalment plan. The set

lasted less than a month.

"The plant director should burn with shame, receiving such a letter!" Nikita Sergeyevich exclaimed.

Where is he now, this Shapoval? What do the people who make these ill-fated television sets think of them?

I set out for the plant to get the answers to these questions.

Shapoval has not been at the plant for several months. However, signs of activity that was aimed for the most part as if to throw a little more dust into the eyes could be seen still.

At the entrance to the plant administration to assist the guard was placed a semi-automatic unit so constructed that not even a strange fly could get through to the plant. Right there at the passage sat a television camera on steel girders to observe those who entered. Directly from Shapoval's office one could see who entered and who left the enterprise.

At the plant I stumbled directly into a meeting. Yershova, the Party Committee Secretary, was reading her report in such a bored and tedious voice that one citizen was bent over, asleep.

I sat down and listened, bored and surprised: was it possible that the expensive yet poor television sets were being made at another plant, that I had come to the wrong place and it had been to another Shapoval that Krasnova had written her bitter letter from Riga? Was it possible that here were none of those mal-practices the time to put an end to which had long since passed?

No, this was the very plant. And that which Yershova had left unsaid was being discussed painfully and with indignation by the party members at the plant at meetings and in just plain conversation.

When you ask about the cause for the poor reputation of "Neman-3," the answer usually given is that in design it is basically a successful television set but poor because it is made poorly. Of course the buyer is no better off for this, but the cleverly-conceived talk now inevitably shifts over to reproaches against the enterprises which deliver the parts. The trick, to speak quite frankly, is a clever one. The Party Committee Secretary did not resist this temptation in her report at the plant.

On the other hand, Comrade Prozetkiy, party organizer of the shop where "Neman-2" is assembled, presented a situation becoming complicated without fool



[[fokusy], simply and briefly. On 21 November the shop had] turned out only 2,500 television sets. It would be required to deliver another 6,500 within the next nine days. Now, there is quality for you! And all the bitterness of the situation lies in the fact that those at the plant have become accustomed to this mal practice; the industrial fever here is a chronic illness.

Herein lies the secret of why Krasnova of Riga did not implicate the television set, but rather the television shop.

It is the simplest thing of all to spend years finding fault with the bolts and nuts being used in assembling the "Neman-3" to close one's eyes to the fact that the annual production -- mountains of chassis! -- is ruined by careless storage, and simple stubbornly to use inflexible bracing for the kinescope (this defect might have been overcome a long time ago if elementary concern for quality had been shown). The end result is that the tube bursts before the television set can even be transported from the plant to the Minsk GUM.

"Enough blame has been heaped on the suppliers!" says Deputy Plant Director Kudinov angrily. You see, our neighbors deliver their assemblies and

components of such poor quality to other plants in the country in the same untimely manner as well. However, why is it precisely that the "Neman-3" has earned such a pitiful reputation for itself?

Besides, is the "Neman-3" so bad? At one time a consignment of television sets was completed for sale at a reduced price to a group of associates at the plant with the blessing of Shapoval. Even Party Committee Secretary Yershova was not embarrassed to avail herself of such an opportunity. And what then? If the "Neman-3" television sets had proved themselves to be the worst in the Country then those which the workers from the plant themselves had acquired at reduced prices turned out to be surprisingly lucky. At least no one experienced with his bargain the tormenting diversions with which Krasnova of Riga was fed up to the teeth.

The root of evil, in the opinion of Kudinov and of other plant party members, lay in the indulgent attitude of the plant management to poor quality, to the looseness and lack of discipline at the enterprise, to which they had been accustomed from the time of Shapoval.

When inspection-worker Khokhlov lamented some time that the television chassis, because of incomplete design, often broke during assembly I, I must confess,

thought that this was the responsibility of the supplier. No, on the contrary. The Radio Plant gives the supplier the unsuccessful press-forms of the chassis once more. Its own responsibility once again! The plant designers persistently do not wish to correct their own mistakes.

Yes, the matter of discipline at the Minsk Radio Plant is bad, very bad! The plant has become famous throughout the country for its television sets, but in Minsk the plant has earned a reputation for its drunkards and its hooligans.

Is it possible to ignore all these mal practices? No! On the other hand, as Yershova does, one can give the impression that they are being ignored and give in his happy, streamlined report comforting figures on the fact that reclamation, to be sure, on the "Neman-3" since January 1961 had been reduced right down to 16 percent. Could the truth be that it was a matter of repair? Sukhinin, chief of the Plant Technical Inspection Section, persuaded me to the contrary in this regard. According to his data the last check had showed that thirty percent of the television sets produced had been no good.

That is how the same event in life and in speeches may look different. To be more exact, it did

look different. Now things have begun to be looked at in a different manner; directly and honorably, truthfully in the eyes.

So where, then, is Shapoval now, who had caused the fuss at the Minsk Radio Plant?

No, he is not within shooting-distance of managerial duties. He is considerably closer. He safely took off for Moscow and now has the rank of deputy chief of one of the administrations of the Committee on Radio Electronics. Later he will be considered for advancement, but that will come later. This is because there were people who decided to accept dismissal from the post of director and stern party discipline as a recommendation.

The party members of the Minsk Radio Plant reelected their Party Committee. Yershova was not a part of it. She was not trusted.

2584  
CSO: 1830-N

## THE "EKKRAN" 8-mm MOVIE CAMERA

[Following is a translation of an article by R.M. Gaynullin and A.A. Usahev in the Russian-language journal Tekhnika Kino i Televideniya (Cinematographic and Television Techniques), No 3, Moscow, 8 March 1963, pages 73-74.]

The Tatarskiy Sovnarkhoz has begun series production of the "Ekran" magazine-type 8-mm movie camera. This convenient miniature camera, reliable in operation, immediately won the recognition of amateur movie makers. Its small ("pocket") size (105 x 98 x 38 mm) and light weight (approximately 600 g) make the "Ekran" irreplaceable on expeditions, tourist outings, holidays, and walks.

The characteristics of the "Ekran" make it an average amateur movie camera. It has a rigidly mounted 1:2.8/12.5 mm "Triplet" lens adjusted to the hyperfocal distance. No additional focusing of the lens is required during filming; depending on the f-stop to which the lens is set, the foreground depth-of-field limit lies at the following distances:

f-stop	2.8	4	5.6	8	11	16
In focus from (in <u>m</u> )	2.2	1.7	1.35	1.05	0.9	0.6

The lens is threaded to accept filters and auxiliary lenses. The outfit includes a quadruple neutral grey NS-9 filter, a ZhS-17 filter, and a 3-diopter lens for taking pictures at distances of less than 0.7 m. An adapter makes it possible to use the filters and auxiliary wide-angle lens from the "Admira" camera. Production of auxiliary telephoto and wide-angle lenses for the "Ekran" are planned for the near future.

The "Ekran" has a number of innovations and accessories which permit complete utilization of the possibilities inherent in an amateur movie camera. The use of a magazine makes reloading of the camera rapid and simple. One type of film can be replaced by another at any time, depending on exposure conditions and the wishes of the photographer; color film may be substituted for black-and-white, low-sensitivity film for exposures in bright light may be replaced by high-sensitivity film, negative film may be replaced by positive film for making title strips, etc. The plastic magazines, which are very simple in design, are loaded beforehand in a darkroom or changing bag.

The magazines are loaded with 1 x 8 mm film packed in 10-m lengths. However, it is also possible to use 2 x 8 mm film cut lengthwise with an ordinary cutter and wound into rolls on standard bobs, emulsion side out.

The magazines are 97 x 55 x 11 mm in size and weigh 53 g when loaded with film.

In contrast to 2 x 8 mm cameras which, when loaded in light, use only 7.5 m of film, the magazine of the "Ekran" makes it possible to expose the entire 10 m, this corresponding to 2.5 min of continuous exposure at the normal exposure rate of 16 frames/sec.

The fact that it is possible to remove the magazine and film from the camera at any time facilitates cleaning the dust which so frequently impairs image quality in amateur films from the film path. By withdrawing the magazine and removing the film-path pressure plate from the pins which fasten it down, it is possible to use prisms to check the framing in the aperture during macrophotography or when making title strips, when it is impossible to use the viewfinder.

Recently produced cameras have two slits in the rear housing wall, through which previously processed film passes to be printed on the unexposed film in the magazine. No other amateur movie camera has this important feature.

The camera housing has a tripod socket with a standard thread and slot so that the camera may be precisely mounted on a titler or copier, this also being a very necessary and useful innovation.

A convenient leather bracelet with a threaded tap which screws into the tripod socket is provided for hand-held work.

Durable high-quality paint and polished metal trim enables the "Ekran" to remain in a state of good preservation.

When the spring is completely wound up, the feed mechanism pulls 2 m of film through the path, this being sufficient for 32 seconds of normal exposure. The length of exposed film is shown by a counter, which must be set to zero when the camera is loaded with a new magazine. A faint click is heard every 4 seconds, this being a audible signal which aids the photographer in determining the length of the scene. A special device indicates that the film is running through normally; a tiny flag "dips" into the viewfinder field (as soon as the film ends or fails to be transported because of damaged perforations, the flag stops dipping).

If the camera is not to be used for a considerable period of time, it is necessary to remove the magazine and film and unwind the spring.

The wide range of exposure rates (8, 16, 24, and 48 frames/sec) makes it possible to take slow-motion and fast-motion as well as normal pictures, a smooth transition from one exposure rate to another also being possible.

The shutter button is equipped with a rotating disk which can be used to set the camera to single-frame exposure for copying, this also being known as "automatic release." A standard cable screwed into the threaded shutter button can be used under all conditions. A cable is absolutely necessary when making title strips or when working with a copying stand.

The possibilities inherent in this camera have been substantially expanded by the appearance of accessories; these include knobs for rewinding the film in order to free it if it jams and for trick photography, a fade-out device mounted on the lens setting ring, tubes with masks and curtains, and a hermetically sealed case for underwater photography.

It is desirable that the plant speed up its production of afocal auxiliary lenses and developing tanks. Additional magazines are also absolutely necessary, since the three magazines supplied with the "Ekran" outfit are clearly insufficient.

2157  
GSO: 1830-N



## DESIGN DEFICIENCIES IN THE 16-SP MOTION PICTURE CAMERA

[Following is a translation of an unsigned article in the Russian-language journal Tekhnika Kino i Televideniya (Cinematographic and Television Techniques), No 3, Moscow, 8 March 1963, p 75.]

I.M. Rabinovich, the motion picture photographer of the mobile laboratory of the L'vov Railroad, has sent the editor a letter reporting a number of design deficiencies in the 16-SP motion picture camera.

"The SP-16 motion picture cameras which have been released do not justify the expectations of motion picture photographers," writes Comrade Rabinovich. "A large number of defects in this new camera became apparent during the first few days of use.

The magazines give rise to very serious criticism. They are difficult to insert into the camera, deep scratches soon appearing on their polished surfaces. We have found that the clutch coupling between the camera drive and the magazine is not sufficiently countersunk and does not permit the magazine to be removed from the camera. The outfit includes magazines with capacities of 30 and 60 m. The design of the 60-m magazine has proved to be unfortunate; the spring-loaded pins advance the film poorly.

Too much play in the pressure plate causes the film to buckle and jam in the camera.

The motor is not powerful enough. At an exposure rate of 24 frames/sec, the camera stops when 15-20 m of film have been exposed. This creates great difficulties

when making newsreels.

The potentialities of this camera are sharply limited by the fact that the aperture angle of the shutter must be adjusted in stepwise fashion, as well as by the absence of manual and spring drives. The manufacturing plant can produce these drives separately and supply them in accordance with the customers' requirements, as is done for the "Konvas-avtomat" motion picture camera.

The absence of rings for attaching a shoulder strap and a handle for hand-held work makes this camera inconvenient.

Certain of the camera's accessories such as the attached fade-out device are not intended for 10 mm and 15 mm lenses.

The size of the sunshade has been chosen such that it cannot be used with 10 mm and 15 mm lenses, although these lenses are most subject to flaring in direct light.

The sunshade is equipped only with a filter adapter, no adapters for masks and vignetting devices being produced."

The editors acquainted the workers of the enterprise which manufactures the 16-SP motion picture camera with this letter. Here is the reply made to the editors' query by G.I. Zubovskiy, the deputy chief of the design bureau of this enterprise.

"Our organization has organized the production of these professional-type 16-mm motion picture cameras in accordance with plans drawn up by the Moscow Design Bureau for Motion Picture Equipment (MKEK).

The comments made by I.M. Rabinovich are essentially correct.

Measures are now being worked out to improve the operational quality of the 16-SP camera and eliminate the deficiencies in its design."

2167  
CSO: 1830-N

A NEW TRAINING SHOP AT THE "ARSENAL"

PLANT IN KIEV

Following is a translation of an article in  
the Ukrainian-language monthly Ukrayina  
(The Ukraine), Kiev, February 1965, p 27

A training and production shop has been established  
at the Kiev "Arsenal" Plant named V. I. Lenin. More than  
one hundred units have been installed in a large hall.  
Here, students of the 9th to 11th classes of secondary  
schools get training as lathe operators, millers, turret  
lathe operators and fitters. Close to the shop there are  
well-equipped classrooms for theoretical studies.

Photograph: student of the 9th class of School No  
90, Pava Bulakh operates a turret lathe. Foreman of pro-  
duction training of the milling machine section, Anatoliy  
Oleksandrovych Yermakov (right) explains to tenth class  
students of School No 94, Volodymyr Lyasheenko and Valeriy  
Anuryayev, the technology of parts processing.

1169  
CSO: 1800-1

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CALCULATION TIME CUT FROM ONE YEAR TO  
TEN HOURS WITH "URAL-2" COMPUTER

Following is a translation of an article by  
D. Kan in the Ukrainian-language monthly  
Ukrayina, (The Ukraine), No 4, February 1963,  
p 12.]

Fire-boring equipment, used with success at the Southern Ore Concentration Combine, operates with much higher efficiency than its predecessors. However, all the possibilities of these units have not been as yet exhausted, and the scientists of the "Diprobdmash" Institute of Krivoy Rog are working on improvements. Numerous calculations consume a great deal of time. However, a reliable helper appeared: the "Ural-2" computer.

The first to use its services were the designers of the fire-boring equipment. Their order - to make thermal calculations of the burners - was completed in ten hours. With regular calculators these mathematical solutions would have taken twenty experienced people one year.

The computer center which has been established in the Krivbas will considerably accelerate the solution of research, construction-project, and economic planning problems.

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[photograph]

Engineer Ivan Fedorovich Yermenko behind the control panel of the "Ural-2" electric computer.

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