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Collaborative Design: The Electric Industry in Soviet Russia 1973–79

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What are our first associations when we hear "Russian" or "Soviet" design? We probably do not have many, if then perhaps sputniks and weapons: Kalashnikovs, Molotov cocktails and the like. In addition to cosmic travel and the military, names from the Russian avant-garde could turn up: Rodchenko's advertisements, Tatlin's clothes, maybe even Alexandra Exter's constructivist plastic costumes for the 1924 science fiction film Aelita.

This paper will give an entirely different perspective on design practice in the Soviet Union.[1] I will present the working methods of the innovative and groundbreaking design program "ElektroMera" (Russian for "Electric Measurement Instruments") proposed for the "Electric Measurement Instruments Association" ("SouizElektroPribor").[2] The ElektroMera program developed a rigid state industry conglomeration into a Western-style company in the Soviet Union between 1973 and 1979. With the logo "M" reminiscent of an electric impulse diagram, its competitors were giants such as Siemens.

ElektroMera was a path-breaking project from many points of view. It was the largest design program ever launched in the USSR that was not exclusively military. Another important factor was that if the atomic and space programs were firmly established in Stalin's industrial system, ElektroMera went against the grain of the old

structures. In the Soviet Union complex production schedules and plans were drawn up with hundreds, or even tens of thousands of people collaborating from different branches and scientific fields. In this way, the large-scale projects on space shuttles, airplanes and nuclear industry were realized, as were the prognoses for everyday consumption. Nevertheless, when it came to designers, they mostly worked with small scale, isolated artifacts. ElektroMera also began as an individual commission of a small choice of electric measuring instruments produced for export. The progressive director of a Kiev factory commissioned a designer group at a branch of the State Research Institute for Technical Esthetics[3] in Kiev – VNIITE[4] – to restyle a small collection of his products. As a result of the new design, the export rate rose by more than eight times. Business partners were in the Eastern Bloc and Asia.

The designer group realized that this was their chance to elevate design in the Soviet Union to a completely different level. Design, conceived as the visual and organizational restructuring of the world for increased quality of life, was introduced only in the 1960s in the Soviet Union (I will come back to this later). Hitherto, the inhuman system had reduced the worker to little more than an obedient servant, an automat at the conveyor belt. The director of "SoiuzElekropribor", Mikhail Shkabardnia, agreed to expand the project to include all his factories. Not only had this director the enormous power to supervise a conglomerate of factories, but also the unusual will to implement change within the whole branch of electric measuring instruments. From one day to the next, the commission grew drastically. Instead of an individual commission, ElektroMera developed into a long-term program. The initial commission was expanded and reformulated to include practically the complete material production of this whole branch, including all activities involved in the production processes. The new concept "design-programming" was launched.[5] The aim of the program was a "systematic approach to planning, self-financing, organization and automatization of control and management".[6]

The project was unprecedented in all aspects: the planning, the scale, the goals, the organization of the processes and the inculcation of

the finished products. It was no less than a coup in which a group of designers took temporary control over the entire production line of a whole branch. The ambitious goals were to reorganize and coordinate a whole industrial branch to become compatible throughout a country with a population of over 300 million and eleven time zones. This meant a complete restructuring of the production processes and the implementation of a fundamentally new system for both electronic and electrical measuring instruments. In addition, a corporate design had to be produced for a group of enterprises comprising 32 factories from Vilnius (Lithuania) and Leningrad on the Baltic Sea in the west to Krasnodar, Erevan (Armenia) and Tbilisi (Georgia) in the south.

Dmitry Azrikan was, as the director of the state design institute put it, the "main catalyst for the new ideas in this field".[7] With abilities to discern gestalt patterns, organizational structures, and functions linked to form from his art-design- and engineering background, together with Dmitry Schelkunov, formal supervisor of the whole project and the point of contact with the authorities, he represented the motor of ElektroMera. Schelkunov was a master of translating visual into verbal language, and the author of numerous instructional and methodological papers. Azrikan, who made a proposal for a total redesign of a set of electrical equipment, became the leader of the production system and of the design group. The participants of the inner group were Ramiz Guseinov, a talented graphic designer who supervised the visual information, Andrei Meschaninov, a prominent designer from the VNIITE-branch (Institute of Technical Esthetics) in Leningrad, who led the systems of packaging and instruments, Vladimir Isakov, an architect who supervised the redesign of the production interiors and factory exteriors, and Kostas Yakovlevas-Matetskis from Vilnius branch of VNIITE.

The goodwill that allowed these young, smart, and hungry individuals to work autonomously on this project came from a tight network at the top of the political hierarchy. In order to save Soviet industry, its members – Alexei Kosygin, Soviet Prime Minister, Konstantin Rudnev, Minister of Instruments Industry, Dzhermen Gvishiani, Chairman of The State Committee for Science and Technology[8] (and

Kosygin's son-in-law), and Yuri Solovyov, founder of VNIITE, The All-Union Scientific Research Institute for Technical Esthetics (industrial design) – were prepared to try out new methods for innovation.

The goal for VNIITE as a design institute was to implement design early on in the production process in order to increase efficiency. Founded in Moscow in 1962 under the auspices of the State Committee for Science and Technology, VNIITE was the major research institute for design in the Soviet Union. One of the ideas behind this new research institute was to "invent" design methods within the planning economy by maximally exploring the relation technology – science – art. The need to "catch up with the west" was considered to be urgent. Five years later, fifteen branches of VNIITE had been founded all over the USSR with about 200 additional "artists' construction" (i.e., design) groups with "laboratories." Within just a few years about 10,000 people had become involved in the institute. Until 1991, when state subsidies decreased drastically, VNIITE was the biggest institute for design research in the world.[9] The unique position of VNIITE as a state institute for design was that it had the expertise and the magnitude to initiate and participate in large-scale projects, projects that only the biggest international companies were able to afford. Two such large-scale projects were initiated; the practical "ElektroMera" and the theoretical "Methods for Artistic Construction".[10] Here I will talk about the practical project "ElektroMera".

The factory association that ElektroMera was to restructure comprised 32 factories with a staff of up to 20,000 workers in each. Their production, including around one and a half thousand devices, apparatus, instruments and assemblies of instruments, covered almost every part of the economy. The technological level was considered to be satisfactory, even when compared to international standards,[11] but the ergonomic functionality and aesthetic appearance destroyed every possibility of export. It became the designers' collective task to solve this problem. They were supported by the VNIITE state system with its networks of designer bureaux and scientific research institutes. With large organizational processes to be managed with numerous participants, each working on some specific detail of the

overall design, the interdisciplinary working methods applied in the ElektroMera design program as well as those generally applied in the state design developed in the Soviet Union in the 1960s–80s, show many similarities to what is today called collaborative design.

Initially ElektroMera was intended to coordinate only the corporate design of the various companies, but the program was successively extended to organizational restructuring as well, remembers Marina Mikheeva, engineer, industrial designer and collaborator of Arzikan for eighteen years.[12] From the beginning, an effective network was set up throughout the USSR. In addition to the Moscow headquarters, the main participants were in Kiev, Vilnius and Leningrad with more than fifty contributing designers, ergonomists, architects, engineers, methodologists, standard experts, managers and economists. The vision of the design group was to coordinate the "technical compatibility", to induce "ergonomic equivalence" and to create "visual harmony".[13] Brainstorming meetings and planning seminars took place. Successively interior and landscape designers, experts on various materials and inventors were included. Professionals from various branches participated: Irina Mamontova worked on the graphics with Ramiz Guseinov, Marina Mikheeva on product design. The design of the uniforms was made by a Moscow designer bureau, which was also linked to VNIITE. As Dmitry Azrikan put it: "A City of the Sun was to be built in one selected industrial branch, in the middle of a grey country that had turned into an enormous garbage dump".[14]

The ElektroMera system's approach was not created in a void. The Scientific Organization of Labor[15] which the singer-poet Alexei Gastev had launched in the 1920s inspired by Fordism and Taylorism, was revived in the 1960s. Further the Hochschule für Gestaltung in Ulm (HfG) with its scientific, rational outlook and module furniture functioned as a model for its Soviet counterparts (HfG-director Tomas Maldonaldo had visited Russia, and his articles were published in Soviet design journals). And cybernetics, as an interdisciplinary approach to re-structure complex systems, had a peak in the Soviet Union in the 1960s and 1970s. In the Soviet Union cybernetics was a social movement which was used as a radical method to reform not

only science, but society as a whole. In the early 1960s it was praised as "science in the service of communism".[16]

The language of cybernetics was an important tool in opening up communication between different disciplines which had earlier had little or no contact. When it came to design, the experience from computerization increased the role of engineering principles in combination with visual communication.[17] In articles on ElektroMera, references were made to articles by A. A. Malinovsky on topics such as "Basic methods and definition of system's theory in connection to biology" and "Theory of structures and its position in a system's approach".[18] A. A. Malinovsky was the son of Alexander Bogdanov (a pseudonym), the "father of organization theory" whose path-breaking *Tektology* or "Universal Organization Science" was published in 1913. By the 1970s there was a renewed interest in this pioneer of cybernetics in Russia.[19] If cybernetics is a language using verbal and mathematical signs, design is a visual language. With their respective ambitions to embrace whole systems and not only isolated artifacts or factories, cybernetics and state design coincided. In combination with the centralized planning system this opened endless possibilities.

The Story of Electromera

In the same issue of "Technical Esthetics," on the pages following Brezhnev's call for increased labor efficiency and industrial output, Dmitry Azrikan and Dmitry Schelkunov presented their concept for a complete restructuring of the electrical branch association "SoiuzElektroPribor".[20] The duo proposed a rationalized system to be applied to the production processes as well as to the products themselves. Thanks to their combination of unusual skills and youthful boldness they energetically plunged themselves into this enormous project. Common difficulties in collaborate design practice were eliminated thanks to the state system. As the ElektroMera project was not one artifact (no matter how complex), but a whole branch, the number of nodes and issues were tremendous. Would this complex system be manageable? Would so many people be able to collaborate? How could people be persuaded to reveal their professional

secrets and patents, their guarantee for existence? How could the complex dynamics between all these actors – individual and collectives – be handled? How could the goals of this collective action be managed? Would it even be possible to produce maximum utility value for the ElektroMera project with the given conditions?

How to redesign production processes of hundreds of thousands of workers that produced more than 1,500 artifacts? A radical solution had to be found. VNIITE mobilized all their fields of expertise, from engineers and inventors to ergonomists, from professionals working on graphics and packaging, exterior and interior design of production complexes, to clothing. The category "coherence" was introduced not only to the products themselves but to the entire strategy of the production processes. The long-term perspective of "unification" boosted the economy of the project due to reduced production costs and working hours.

Before ElektroMera, products were produced without any planning or interaction. Surprisingly enough, as one would perhaps think that the totalitarian Soviet Union was an all-embracing, all-surveying machine, making everything run according to the master plan. In practice it was entirely different. The products consisted of "a chaotic collection of non-compatible instruments, extremely non-practical, dangerous, and disagreeable", according to Azrikan. This was the chance for the VNIITE design group to show what could be achieved with new design methods: to turn an "enormous featureless bureaucratic formation, which put ugly deformed products on the market, into a first class design production with irreproachable corporate design that would be able to compete on the free market".[21] The system of material objects were subdivided into "Means of Production" (buildings, equipment, transportation, uniforms, publications, documentation, etc.) and "Product".[22] The most difficult task was to organize already existing means and products, to analyze their functionality in order to find out how they could be optimized and yet decreased in number. They were therefore grouped together and approached as one single system. The goal was to give the user an impression of one coherent system.

The nomenclature and the assortment of the products had to be optimized.[23] The challenge was to formulate a maximum of functions from a limited selection of simple elements.[24] The approach to the restructuring of the product was to unify its procedures according to a clustering principle based on a complex set of standardizations. The strategy proposed was to bring together, or alternatively to reduce the number of functions provided (which occasionally meant an additional function). The engineers of the companies unified the use of existing measuring instruments and in some cases even invented new ones by analyzing the functions hierarchically (analogies were made to a tree trunk, its branches and leaves). The initial step was to make the parameters, the metrology and constructions compatible. Modules were defined to give a distinct and relatively clear-cut overview, thus enabling a quick and convenient modernization. Rapid technology innovation, which makes parts of the artifact obsolete and therefore causing the whole instrument to be replaced, was reduced here to a minimum: only those parts of the construction that needed to be replaced were involved. With these changes, the engineer did not have to make decisions on designs issues for every new step. Instead of the existing "monstrous chaos" a ready and applicable system would be in place to support every step of the production processes.

Ergonomics and Communication

The classification structure of the whole production system were changed by optimizing the user-centered functions.[25] This basic ergonomic outlook was a revolutionary change in that it focused the well being of the producer (the factory worker) when it came to conditions of production. When the consumer was considered, user-friendliness was of major importance. As for the situation before ElektroMera, little consideration was paid to the application of ergonomics as the concern of human capabilities in relationship to their work demands. The contact between the operator and the instrument was investigated in theory. All the same, the practice was not standardized at all, but completely random. For example, there is an acceleration pedal on the right side and a brake pedal on the left side of a car, regardless of the kind of car you are driving. The team

found many varieties of such positions within the instruments groups, which of course led to mistakes being made, and occasionally even accidents. The task was to coordinate a great number of different instruments, all however, with the common denominator of being measuring instruments with a common interface.

Unified ergonomic principles imply a consequent system of interfaces between man and machine.[26] The overall concept was a "necessary set of functions connected to the user"[27] to facilitate the operations of the various complexes of different instruments. As the operator needs to fulfill a number of various tasks, a lot of research was done to keep the variety of the operations to a minimum. At the same time, maximum information and control management should remain. This is the most visible linking factor.

Measuring instruments are constructed according to three schemes: a/ the circuit (the interior construction, the "filling", the drive); b/ the elements that connect the instrument with its user, and c/ the element that connects the instrument with its surroundings. The functions therefore had to be directly linked to the constructions. This demanded a collaboration between the engineering construction specialists, the ergonomists and the designers. When the initial reconstruction had been done, ergonomical and form-giving steps followed. The visual factors linked and revealed all functions on the exterior of the instruments. The functions visible on the exterior panel or terminal were subdivided into following groups: 1/ "Controls": Information control and managing elements, the concrete organs for control (handles, switches, toggles, key(boards), buttons etc.); elements for exterior commutation (plugs, sockets); indicators (scales, casing, frames, dials, pointers, digital elements, signal lamps). And finally locks, supports, circuit control labels, and handles of various kinds (for transportation, for taking out of the stand). This is the basis for the production pyramid that is included in all other orders. 2/ Front panels, consoles. Finding a unified visual language for the front panels is considered to be especially important from an ergonomic, but also an aesthetic point of view. 3/ Shells and membranes (cases, covers, jackets, housings). The difference in the ElektroMera project, compared with previous constructions, is that the casings

are completely separate from any interior function (which earlier was not always the case). 4/ Carrying constructions linked to the surrounding space (stationary pillars and posts, frames, stands, cabinets and boxes, trucks and trolleys).

Great effort was put into communicability and transparency. The immediate "perceptibility" of the whole system was of utmost importance. The graphic language connected the operator with the instrument. The unity of the system lay in its ability to communicate with the user. The machines should "actively turn" to the user and the high technological level should be visible and reflect the perception of the operator.[28] As the most visible factor of the whole design program, the corporate design "cemented" all the components into a visual entirety. All these visible signs were potential carriers of a common language for the whole Electro-Measurement-Instrument-Association. The system of activities and processes were subdivided into the following groups: objects that perform multiple functions, including information, buildings, equipment, administration, transportation, storage, uniforms, and objects that carry out purely informational functions (instructions, educational, orientation and security, public relations).

The text and symbol system facilitated communication between operator and machine, between different instruments and their surroundings. Text and symbols were combined. One profile was used for the instruments, another for the packaging, and a third one for the industrial interiors. Short texts on the instruments described their functions, to which association, factory, department and even operator they belonged – in short, the exact location of each specific instrument in the system of production. The 'mirror' of this information was a list of all the participating instruments – the carriers of texts. Simple graphic codes (color, text, symbols) signaled the level of significance and importance of each instrument within the system. Color and graphic language were coordinated. Different colours were used in different spheres, but the style unified production, distribution and consumption. Within the production sphere, there were different colors for the management and production spheres, which, however, taken together produced a unified style. All this collected

information was clearly displayed on a matrix in the language systemized for the whole system.

Instead of the given obsolete, unclear, non-transparent and inflexible system, the ElektroMera suggested a fundamentally different approach: clear communication, visibility, transparency, and the possibility to survey in a *coup d'oeuil*. According to its authors, the ElektroMera design program cannot simply be reduced to the visual corporate style of a company. It was not only about the relation between consumer and producer. It was not only about a visible system but about a functional system that aimed to restructure the production processes on a fundamental level as well.[29] The new concept was to conceive all the different devices as one single product and to link the functions in the organization of the products as well as in the production between many companies in a whole branch association. These were aspects that increased the well being of the workers, a perspective that hitherto had not existed within Soviet production.

The Road to Communism

The story of ElektroMera lasted six years, from 1973 to 1979. Soon after the program was finished, products started to appear on the market and new standards were implemented. A new interface for instruments including pictograms was introduced. It is still applied today.[30]

ElektroMera was a pilot project that was followed by design programs on tape recorders for private consumption, a system for recycling paper, outdoor activities, watches, medical technology and airports.[31] One program for the Moscow subway system included unified escalators, trains, dispatching points, methods for cleaning, turnstiles (from all that moves to all you see).[32] Actually, ElektroMera was a turning point for all the activities at VNIITE. Most of its ten branches in their respective Soviet republics came to be part of one design program or another. The design programs became something of a "white horse" for Yuri Solovyev, on which he could ride into any Soviet governmental office, national or international congress.[33] As the leader of the state design institute, Solovyov received numerous

awards for the design programs for "the outstanding contribution to international design" by the Industrial Designers Association of America (IDSA) at the ICSID congress in Washington in 1985. Showing the ElektroMera project to a delegation from Siemens visiting Moscow Solovyov remembers: "They were shaken: if this program were implemented and its products to appear on the market, they said it would be a very serious blow for them."[34]

The final ElektroMera proposal was received enthusiastically in the Ministry of Instrument Engineering. One thousand boards were used for the presentation, such was the magnitude of the project. The future results of realized design programs would initially be a transition from design of piece-goods to design systems, and later cheap and effective products for the masses. Profits could be enormous, with paradise on the horizon. But ElektroMera had yet to be inculcated into the production.

Design and innovation was not popular among the majority of factory directors. "The less we changed existing products, the better, the industry thought" remarked Andrei Meschaninov, a designer with more than thirty years experience, and responsible for the control elements of the front panels in ElektroMera.[35] Why? The answer is quite simple. Each factory director achieved a certain sum of money for material and wages from the state and in return he had to deliver a certain quantity of goods – coats, ice-creams, or whatever. Quantity is what counted (I have heard a story, true or not, where a factory delivered only left shoes – but in great quantity, so the plan was fulfilled). If, however, a director wanted to introduce new production methods, new designs and new inventions, there were no incentives to do so. Only the leaders of the country could initiate investments in new fields. And even they needed tedious anchoring into the plan.

Only at the top were concerns expressed about optimizing profits. Ambitions to succeed on the market abroad occurred only among the highest echelons. Paradoxically enough, the standardization institute became the organ that enabled the design system, at least some extent, to become real products. What is usually the case was here the other way around, as design is what breaks with current

models and thus threatens what already exists. One such incentive was the "znak kachestva", a quality symbol introduced in 1967, inspired by the German "Gute Form" and Italian "Compasso d'oro". Without these, the State Standard Committee could impose negative sanctions for the enterprise. This quality symbol, however, was difficult to achieve and easily lost – any product could at any time be excluded from production – decisions came from above. Another detail worth mentioning is that in the Soviet Union, the director was more often an engineer than an economist[36] – which is one explanation for the high interest in technical problems at the cost of frequent economic neglect.

The general mood as well as the existing structures were inert. Nevertheless, many clever people tried to change from within, challenged by the enormous potential of the system being centralized and nationwide. The initiative to develop complex design programs – "total design" – which included regulation of the processes from above, in accordance with socialist planning ideals, was one of these. "We were naïve in our belief that through design we would be able to improve the face of socialism, to give it human features. We thought that we could re-tailor the old Soviet costume and with the same costume transform the system. This is what we honestly tried to do", according to Dmitry Azrikan.[37] The production system did not accept design, as it was forced upon them through decrees. "If the government levers were not moved, nothing moved. The commissions came from above, and so did design. Everything had to come through a decree. Creative initiative was simply lost. As the big money was spent on weapons", says Andrei Meschaninov, with experience from many years of struggle to change the system from within, "no incentive was left for innovations, there was no interest. The system was idling", he laconically concludes.[38]

The timing for the launching of the program was simultaneously timely and unlucky. At the time of starting mass-production at the beginning of the 1980s, the national economy was stagnant. It had come almost completely to a standstill, or it was "paralyzed" as people used to say. In 1990, just before its dissolution, the Soviet economy was less than 20% the size of the USA's, from 60% twenty

years earlier.[39] Gorbachev came to power to bring change, but the system was too instable to endure.

What the State Research Institute for Technical Esthetics could do (which Solovyov and his collaborators were perfectly aware of) was to initiate, participate and run projects on a scale that only very large international conglomerations would otherwise be able to afford. In the USSR, additionally, the cooperation took place not only within one, but between many companies. It is therefore not surprising that South Korea imported the whole format of Soviet state design with its carefully worked out methodologies.

With the dissolution of the Soviet Union in 1991, the system of a state design disappeared. The organizational and economical support was no longer in place. Dmitry Schelkunov, one of the leaders of ElektroMera said in hindsight: "Today it would be impossible to organize such collectives that would be able to create and to work out such a commission. A project like this could only work in a well-defined industrial branch structure, where a whole class of products could be approached as one unified object.[40] In 2007 attempts were made to re-introduce state design. But the infrastructural means are no longer in place. What gave potential was at the same time part of the problem.

"The global challenge that could have made cheap and effective products and thus save natural resources, slipped out of our hands" Dmitry Azrikan, former initiator and leader of one of the largest collaborative design programs in the former Soviet Union, stated in a paper to be presented at the ICSID congress in Toronto in 1997. He considers the socially oriented design to be a subversive protest movement. "It was dynamite against the system. Our projects were concrete protests against an inhuman economy and alienation of the material culture from any human values. Our products were projects of disagreement." But the products were neither produced nor the projects inculcated. "Our designer work became a purely futurologist activity, but not of any less quality than programs that I have seen in the West."[41]

At the last minute however, the art philosopher, designer and manufacture engineer, who emigrated to the United States in 1992, decided instead to show works by his students from Western Michigan University. "Who would be interested anyway in old Soviet problems?" he thought.[42]

Why should this interest us today? Considering the incompatibility between the products of different firms, coherence within different systems (offices, schools, wherever electrical devices are used), maybe the collaboration efforts of the state design programs to save the Soviet Union have something to tell us after all. Dell is incompatible with Hewlett Packard, electrical outlets differ in Buenos Aires, Tokyo and Paris. Standards for television signals – NTSC for USA and Japan and Pal/Secam for Europe – make globetrotters unhappy. HD DVD formats compete on the market with Blu-Ray. The incompatibility of user-unfriendly computer programs and telecommunication products, complicated user manuals are simply a nuisance. "The only difference between the Western and Soviet situation is that the Western products are much better than the Soviet ones were" Azrikan sums up.[43]

The choice of electrical devices was a symbol laden one. With Lenin's famous proclamation "Communism equals Soviet power plus the electrification of the whole country," electricity became the symbol of a bright future. Lenin's vision was truly grandiose. He had fantastic plans to bring light to the remotest village, also in a literal sense. The city lights were to be spread all over his empire through an electrical network that was to successively integrate neighboring countries – the USA with Alaska for one should be connected with Siberia. How physically dark it must have been when Lenin came to power in 1917. Three years later H. G. Wells, the best selling science fiction author in Russian, came for a visit.[44] When Lenin demonstrated a map of his future plans during an evening session in the crenelated Kremlin, small flashing lamps marked out the locations of the electrical power stations, industrial centres and cities. In order to give this demonstration, however, the electricity in the rest of Moscow had to be switched off. Nevertheless, Wells and the other comrades were convinced. Full support was given to the "State Plan for

the Electrification of Russia", GOELRO, the first major Bolshevik project. In this way, the prototype for the whole future planning system – all dreams about a better world – was based on electricity. Ten large hydroelectric plants connected to a network of more than thirty regional power plants and the most important large-scale industries, all electricity-powered bases were built in little more than ten years.

The road to Communism certainly was a dark and cold one. According to the Plan, Communist Paradise had to be built by 1980. In 1979 ElektroMera, the largest collaborative design program in the USSR that was not exclusively military, was launched to realize this. That same year Soviet troops invaded Afghanistan.

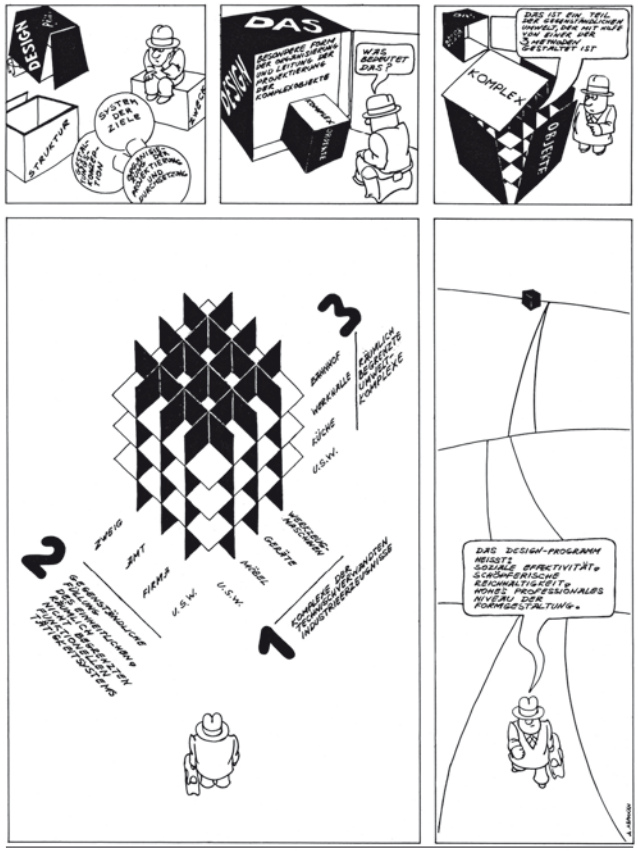

Fig. 1: Comic from Brochure made for the exhibition "Design in der UdSSR", a VNIITE exhibition in Berlin, 1982, by Dmitry Azrikan.

Endnotes

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2 All the translations from Russian are made by the author, M.T.

3 The foreign sounding word "design" was forbidden in the USSR and came into unofficial use among designers themselves only in the late 1960s. Officially, the name was acknowledged as late as 1987 when the "Designers' Union, Russia" (Soiuz dizajnerov Rossii) was founded. Interview with Yuri Solovyov, Moscow, Russia, April 2008. Instead "technical esthetics" and "artist construction", with connotations from the 1920s classical Russian avant-garde when terms such as "artist-constructor", "engineer-constructor", were applied. On the 1920s avant-garde, see for example Maria Gough, *The Artist as Producer. Russian Constructivism in Revolution* (University of California Press, 2005).

4 Vsesoiuznyi nauchno-issledovatel'skii institut tekhnicheskoi estetiki.

5 Yuri Solovyov, *Moia zhizn' v dizajne* (Moscow: Soiuz dizajnerov Rossii, 2004):194.

6 D. A. Azrikan and D.N. Schelkunov, "O kontsepsii firmennogo stilia VO "Soiuzelektropribor"," *Tekhnicheskaia estetika. Biullenten*, no. 2 (1976); see also: D. A. Azrikan, "Tipologicheskaia model' kompleksa produktsii," in *Problemy tipologicheskogo modelirovaniia kompleksnykh ob'ektov dizajna*, *Trudy VNIITE* (Moscow VNIITE, 1985); D. A. Azrikan, "Cherty sistemnogo ob'ekta dizajna," in *Tekhnicheskie i metodologicheskie problemy khudozhestvennogo kompleksnykh ob'ektov*, *Trudy VNIITE* (Moscow: VNIITE, 1979); D. A. Azrikan, "Metodicheskaia model' ob'ekta dizajna," *Tekhnicheskaia estetika. Biullenten*, no. 9 (1982); D. A. Azrikan, "Obraz tselesoobraznosti tekhnomira," in *Khudozhestvennoe modelirovanie kompleksnogo ob'ekta*, *Trudy VNIITE* (VNIITE, 1981); D. A. Azrikan, "S tochki zreniia proektirovschika," in *Esteticheskie problemy khudozhestvennogo konstruirovaniia kompleksnykh ob'ektov*, *Trudy VNIITE* (Moscow: VNIITE, 1981; D. A. Azrikan, "Sistema sredstv elektroizmeritel'noi tekhniki" *Tekhnicheskaia estetika. Biullenten*, no. 9 (1981); L. A. Kuzmichev and D.N. Schelkunov, "Dizajn-programma VO "Soiuzelektropribor"," *Tekhnicheskaia estetika. Biullenten*, no. 9 (1981).

7 Solovyov, *Moia zhizn'*: 193.

8 Ministerstvo priborostroeniia SSSR and Gosudarsstvennyi komitet po nauke i tekhnike soveta ministrov SSSR.

9 See for example D. Azrikan, "Vniite, Dinosaur of Totalitarianism or Plato's Academy of Design?," *Design Issues* 15, no. 3 (1999); N. Voronov, *Rossijskii dizajn. Ocherki istorii otechestvennogo dizajna.*, 2 vols. (Moscow: Soiuz dizajnerov Rossii, 2001): 125–341.

10 Solovyov, *Moia zhizn'*: 192.

11 Ibid: 193.

12 Interview with Marina Mikheeva, Moscow, April 2008.

13 D. Azrikan, personal communication, April, 2008.

14 D. A. Azrikan, "O proekte "Soiuzelektropribor'", manuscript for a paper never presented at the ICSID congress in Toronto in 1997.

15 "NOT – Nauchnaia Organizatsiia Truda".

16 See further Slava Gerovitch, *From Newspeak to Cyberspeak. A History of Soviet Cybernetics* (Cambridge Massachusetts, London, England: The MIT Press, 2002).

17 Voronov, *Rossijskii dizajn*: 322

18 Azrikan, Metodicheskaia model', TE 1982/9.

19 A. A. Malinovsky wrote the entry "Tektologiia" for the *Filosoficheskaia entsiklopediia*, Moscow 1970. Malinovsky the younger was a famous genetist and ardent opponent of Lysenko. He translated the work *What is Life? The Physical Aspect of the Living Cell* by Ernst Schrödinger (London 1944) into Russian. His father's career was full of complications as Lenin saw him as a rival. It was not until 1989 that Bogdanov was fully rehabilitated and a two-volume edition of his *Tektologiia* was published at the Institute of Economics of the Soviet Academy of Sciences, see *Alexander Bogdanov and the Origins of Systems Thinking in Russia*, eds. John Biggart, Peter Dudley, Francis King. (Ashgate, 1998). For an introduction to Bogdanov's thoughts connecting art with science, see for example Margarete Vöhringer, *Avantgarde und Psychotechnik. Wissenschaft, Kunst und Technik der Wahrnehmungsexperimente in der frühen Sowjetunion*. (Göttingen: Wallstein Verlag, 2007).

20 Azrikan & Schelkunov, "O kontseptsii", TE 1976/2: 2–8.

21 Azrikan, "O proekte "Soiuzelektropribor'".

22 Azrikan & Schelkunov, "O kontseptsii", TE 1976/2: 3.

23 This systems approach to artifacts and products was one of the hobby-horses of the founder of VNIITE, Yuri Solovyov, see Y. Solovyov, "Ob assortimente bytovykh izdelij", *Tekhnicheskaia estetika*, 1966/6.

24 Azrikan, "O proekte "Soiuzelektropribor'"; Azrikan & Schelkunov, "O kontseptsii", TE 1976/2: 4.

25 Azrikan, "Tipologicheskaia", Trudy VNIITE 1985/48; Azrikan, "Metodicheskaia model', TE 1982/9.

26 V.M. Munipov and V.P. Zinchenko, *Ergonomika: chelovekoorientirovannoe proektirovanie tekhniki, programmnykh sredstv i sredy* (Moscow: Logos, 2001).

27 Azrikan & Schelkunov, "O kontseptsii", TE 1976/2: 3.

28 Ibid: 6.

29 Ibid: 8.

30 Solovyov, *Moia zhizn'*: 194, and interview with Andrei Meschaninov, St. Petersburg, Russia, March, 2008.

31 For design programs on tape recorders, see D. A. Azrikan, "Tipologicheskoe proektirovanie: bytovye magnitofony," *Tekhnicheskaia estetika. Biullenten*, no. 2 (1986), on radios, see D. A. Azrikan, "Perspektivnaia kontseptsiia dizajna bytovoi radioelektroniki," *Tekhnicheskaia estetika. Biullenten*, no. 6 (1987).

32 Solovyov, *Moia zhizn'*: 196.

33 Dmitry Azrikan, personal communication, April 2008.

34 Solovyov, *Moia zhizn'*: 194.

35 Interview with Andrei Meschaninov, St. Petersburg, Russia, March 2008.

36 T. J. Grayson, "The Factory": 125.

37 Azrikan ""O proekte "SoiuzElektroPribor".

38 Interview with Andrei Meschaninov, St. Petersburg, Russia, March 2008.

39 Gregory & Stuart, *Soviet and Post Soviet*.

40 Dmitry Schelkunov as quoted from Solovyov, *Moia zhizn'*: 195.

41 Qutotations from Azrikan, "O proekte "Soiuzelektropribor'", manuscript for a paper never presented at the ICSID congress in Toronto in 1997.

42 Personal communication, April 2008.

43 Personal communication, April, 2008.

44 For H.G. Wells visit with Lenin, see Richard Stites, *Revolutionary Dreams. Utopian Vision and Experimental Life in the Russian Revolution*, (Oxford University Press, 1989): 41ff.

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