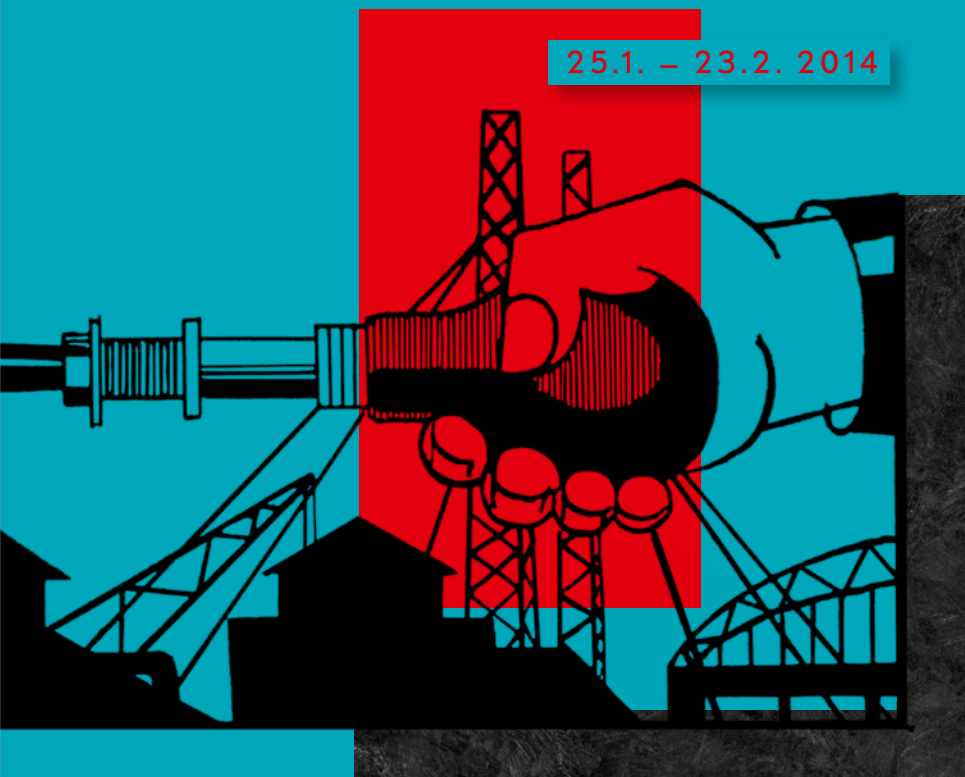


GENERATION Z : RENOISE

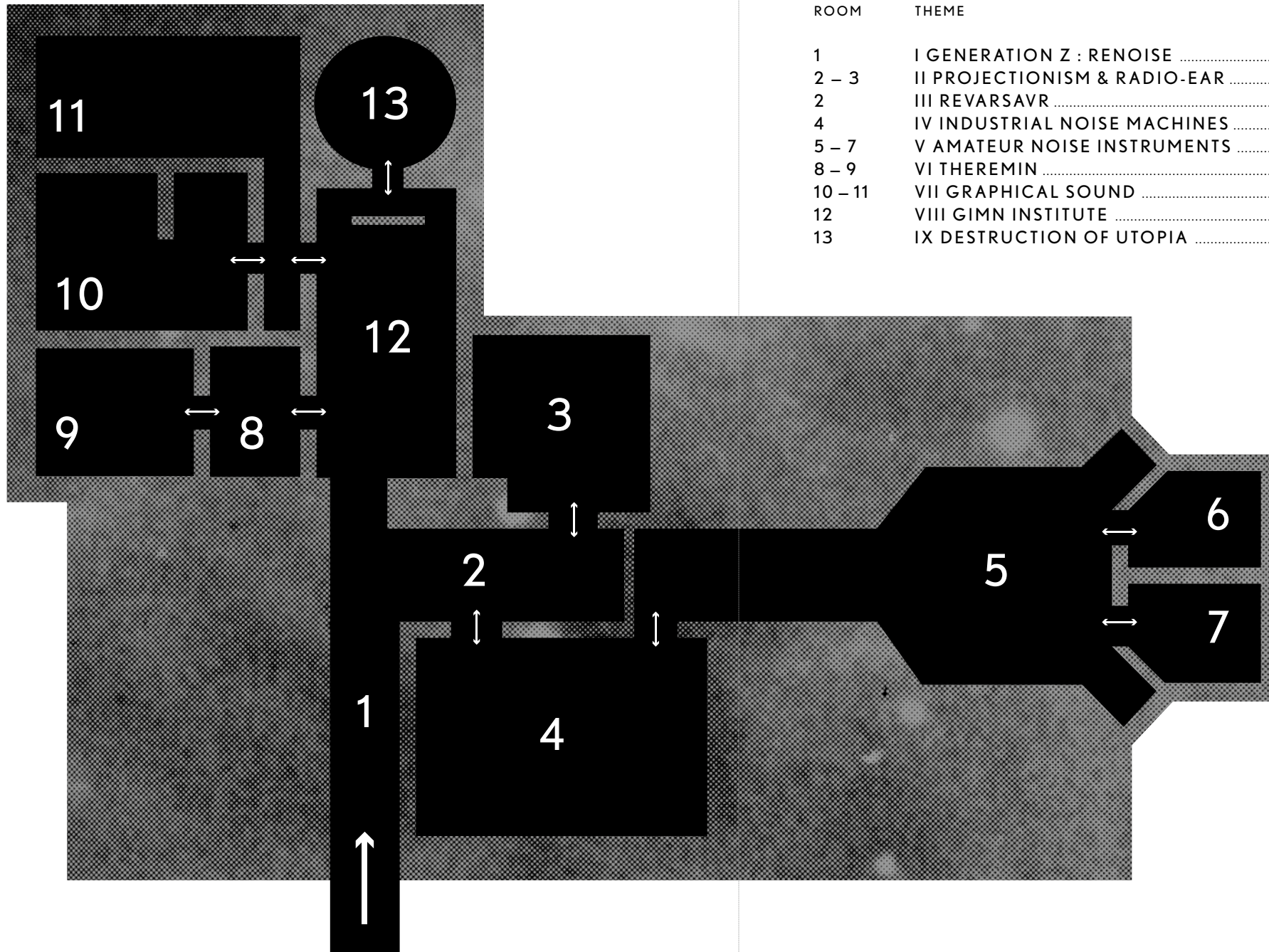
RUSSIAN PIONEERS OF SOUND ART AND
MUSICAL TECHNOLOGY IN THE EARLY 20TH CENTURY

25.1. – 23.2. 2014



PRESENTED WITHIN CTM 2014
DIS CONTINUITY
FESTIVAL FOR ADVENTUROUS MUSIC AND ART

PLAN



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ROOM 1

I ~ GENERATION Z : RENOISE



BOOK COVER „FORD VS MARX“.
PROFINTERN. MOSCOW, 1925.

The exhibition Generation Z : ReNoise is, in many ways, a story of utopias and anti-utopias, of the avant-garde and the institution, of collaboration and personal achievement, of ambition, opportunity and oppression, of genius and bureaucracy, of intellectual freedom and totalitarianism. It is a story of remarkable personalities, curious inventions, astonishing performances, radical ideas and experimentation. It is also a story of patents and funding applications, of success and failure, support and rejection, optimism and disillusionment. This exhibition offers an introduction to some key figures of the period and their areas of research, attempting to reconstruct the Russian revolutionary artistic Utopia of the early 1920s, when the Russian State was almost at the point of collapse and society was structured as a kind of anarchical >network culture<, based on numerous cross-connected >creative units< comprised of artists and scholars who had realised apparently unreal projects in sound and related technologies.

However, the consolidation of Stalin's dictatorship, as of the mid-1920s, had resulted in a political sea change. Collision with the totalitarian state of the 1930s was fatal. In less than ten years, all of their work had ended and was almost instantly forgotten. By the mid-1940s, the cultural and intellectual elite of the previous two decades had been rendered powerless or effectively written out of >official< histories, and excluded from the text books as though they had never existed. The last phase of Stalin's epoch was entirely fruitless for music technology. The new generation of engineers, living in cultural and informational isolation, was primarily engaged in attempts to copy or follow western developments. No significant inventions were made in the realm of musical technology in Russia until the turn of the millennium.

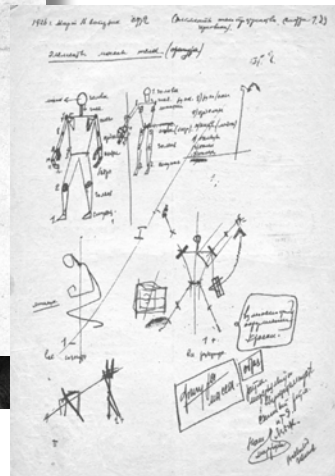
Meanwhile, life since has confirmed the value and significance of the work and foresight of the lost pioneers. Many ideas and inventions, which at the time might have been considered utopian, were then reinvented decades later. We use them today not knowing their origins, and many ideas appear to still be awaiting fresh consideration.

ROOM 2 LEFT & ROOM 3

II ~ PROJECTIONISM & RADIO-EAR



SOLOMON NIKRITIN. DRAFT
MANUSCRIPTS. 1922.



SOLOMON NIKRITIN. DIAGRAMS OF MOVEMENTS OF THE
PROJECTION THEATRE ACTORS, BASED ON PRINCIPLES OF
BIOMECHANICS. 1922.

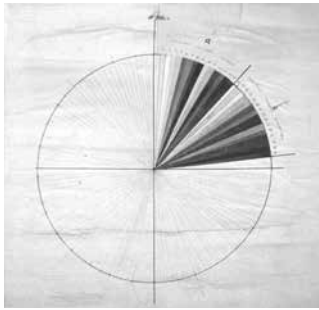
PROJECTIONISM

There is no general definition or style that can claim to characterize the art of the late 1910s and 1920s. A term that sought to capture the essence of the period was proposed in 1919 by the artist and philosopher Solomon Nikritin: projectionism. It was intended to reflect the urge to rush into the future. He applied this term not only to new approaches in painting and methods of art criticism, but also to the methodology of constructing a new classless and authority-less society, to which it was considered necessary to aspire. According to his philosophy, the rational essence of nature is the highest goal of technology and culture.

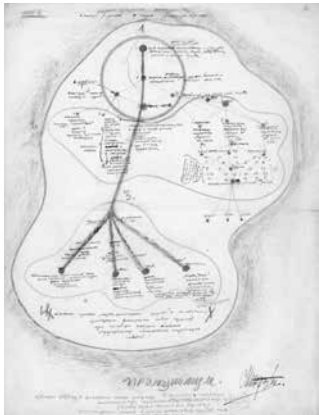
In his manifesto of Projectionism Nikritin asserted: »The Artist is not a producer of consumer goods (a cupboard, a picture), but of PROJECTIONS of the METHOD – the organization of matter. The method, therefore, invented by the artist, becomes the purpose of the creative process.« The intention was for new ideas to transfer creative energy into further development. Following this manifesto, Nikritin began to develop a universal language of the arts and presented at the »First Discussional Exhibition of Active Revolutionary Art« (1924) his tectonic research–texts, photographs, sketches, reliefs, and a three-dimensional construction. A notice accompanying the display explained that the project required two hours of study, and the artist provided a stepladder for the use of exhibition visitors. To dispel any doubts about his technical expertise, the artist also exhibited a naturalistic portrait, accompanied by the written explanation: »I am exhibiting this as a demonstration of my professional skill. I reject it because I consider it socially reactionary«. His friends Luchishkin, Plaksin and Tischler also exhibited drawings, photographs, volumetric models and hand-written theoretical calculations of research into pictorial space, instead of seeking to make end products of the creative process. The group was named »The Method«.

In the context of Projectionism even faults and paradoxes gained a new constructive sense and value. In the early 1920s much project-based research took place that could be considered within the framework of Projectionism, including Alexei Gastev's »Art of Movement« exhibitions, the concert-lectures by Leon Theremin, and Arseny Avraamov's concert series »Music of the Future«, in which the author demonstrated his practical ideas regarding the future of musical harmony and techniques, rather than presenting finished musical pieces.

New artistic groups were founded or were able to grow, united by the motivation of bright individuals rather than by a common agenda. All manner of artistic approaches and movements were in the mix, including futurism, suprematism, constructivism, expressionism, modernism, and realism. Many people aspired to acquire universal knowledge – an understanding of the laws of science that would help to explain the workings of the human body and mind, including concepts of aesthetics, creative accomplishment, and cultural activity.



SOLOMAN NIKRITIN. THE SYSTEM OF ORGANIZATION OF COLOUR-SOUND SENSATIONS. EARLY 1920s.



SOLOMON NIKRITIN, CARTOGRAMS OF THE THEORY. MOSCOW, 1924.

SOLOMON NIKRITIN

The artist, painter and scholar Solomon Nikritin (1889-1965) was born in Chernigov. In 1915-16 he attended art lessons at the private studios of M. Leblanc and L. Pasternak in Moscow, and in 1917-18 at the studios of A. Yakovlev, M. Dobuzhinsky and E. Lanceray in Petrograd as well as A. Exter's. In 1921-22 he attended the Higher Arts and Technical Studios in Moscow, studying under Wassily Kandinsky and David Sterenberg, the head of the IZO department of the Public Commissariat of Education.

Like many other avant-garde artists, Nikritin himself was involved in the Proletkult workshops in Moscow in 1921. The same year he founded the last group of avant-garde painters in Russia, called ›Projectionists‹ (or ›The Method-‹). One year later he founded the Studio of Projection Theatre. In 1924 he took part in the ›First Discussion Exhibition of Associations of Active Revolutionary Art‹. In 1925-1929 Nikritin was president of the Art Research Council of the Museum of Painterly Culture and the head of its Analytical Cabinet, where he conducted experimental research. MPC was the only state funded museum to collect avant-garde works, acquiring the biggest collection in Russia. In 1932-1934 Nikritin was Head of the Department for Visual Art at the Moscow Polytechnic Museum. He joined the Methodology Bureau and the Exhibition Commission, and took part in the reconstruction work. He was among the first to create a method for exhibition design where each item has a text about its content and stylistic direction.

After the early 1930s, in the epoch of Socialist Realism, the Moscow Union of Artists accused Nikritin of formalism, and from then on his paintings were never exhibited in Russia. Most of the works and writings from his private archive ended up in the collection of Georgy Kostakis and were divided between the State Tretyakov Gallery in Moscow and the Museum of Modern Art in Thessaloniki. Solomon Nikritin is mainly recognized now as an avant-garde painter and draughtsman; his works in art criticism and his philosophical

theories, as well as his experiments in the field of theatrical culture related to the biomechanics of movement and sound, are largely forgotten.

PROLETKULT

The proletarian culture movement Proletkult was founded in 1917 by economist and philosopher Alexander Bogdanov (1873–1928) (the penname of Malinovsky) – the father of cybernetics. Bogdanov's grand project was tectology, a proposal to develop a universal science of organization and analysis, through a search for structural similarities in all spheres of knowledge. He advocated the reexamination of works of art to reveal their structure and underlying premises as a step towards the development of a new art. Alexei Gastev was considered the main ideologist of Proletkult.

Proletkult sponsored schools and workshops throughout the country that taught workers to read, write, make art, and to think about science, principally in Bogdanov's organizational approach. Their proclaimed goal was to strive for the universal development of the creativity of the new proletarian culture, to encourage and to focus the creative power of the proletariat in the fields of science and the arts. The plastic arts were influenced initially by constructivism, literature and the music of futurism. Proletkult was founded on the idea of independence from the State. From the start, it was a non-governmental association that subsumed more than 200 organizations in various areas of arts and sciences. In 1918, the Proletarian Federation of Futurists demanded the separation of art and state, opposing any political control over the arts, official posts and grades.

By 1920, Proletkult was comprised of around 400,000 members across Soviet Russia. Avant-garde artists, writers and actors were often involved in the Proletkult workshops, including the painter Olga Rozanova, Anatoly Lunacharsky, Aleksei Gastev, Platon Kerzhentsev, Arseny Avraamov, Nikolai Roslavets and many others.

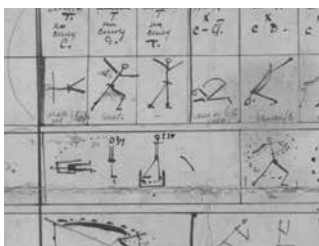
Proletkult's demands for autonomy put it on a collision course with the Communist Party. In December 1920, Lenin issued a devastating critique of the organization, attacking not only its independence, but also the very idea of a unique proletarian culture. In short order, Proletkult was made into a subsection of the governmental cultural agency, the Commissariat of Enlightenment. During the First Five-Year Plan (1928 - 1932), Proletkult saw a brief period of growth. However, in April 1932, the Communist Party summarily closed it down, along with all other independent cultural associations that assumed special ties with workers.



A PEOPLE'S THEATRE AS A PART OF THE PROPAGANDA TRAIN. CIRCA 1918.



SOLOMON NIKRITIN. CIRCA 1920.



SOLOMON NIKRITIN. DRAFT MANUSCRIPTS. 1922.

PROJECTION THEATRE

The Studio of the Projection Theatre was established by Solomon Nikritin and Sergey Luchishkin on January 10, 1922, within the Higher Art and Technical Studios. It was one of the most avant-garde theatre groups of the time. The Projectionists organized a theatre of »projects«, that reduced and dissected the fundamentals of rhythmic movement and individual speech sounds, playing in and around mobile, abstract sets. As Luchishkin explained: »We started to implement our experimental concepts by working up action scores by analogy with a piece of music, composing them out of different parts together with different rhythmo-dynamic characteristics. After that, we looked for the form of plastic expression in each part within the movement of the body, for the development of this movement, and for its nuances and transitions, including vocal resonance. All this was tinged by the emotional score, which became the basis of the entire action«.

Members of the Projection Theatre's troupe included Nikritin, Viliams, Luchishkin, Anna Amkhanitskaia, A.G. Bogatyrev and Alexander Slobodin. Prince Sergei Volkonsky's interpretations of Delsarte and Jaques Dalcroze served as the platform upon which Nikritin and Slobodin constructed their »scores« of sounds, gestures and movements for the Projectionist Theatre. After rejecting the Club of the Anarchists Intern-individualists as a training area, Alexei Gastev offered to transfer the Projection Theatre to the Central Institute of Labour headquarters, and to orient the »work of the Studio [...] towards organizing the expression of labor method on stage, towards creating an objective theatre of contemporaneity and, ultimately, a theatre of normalized labour«. In turn, Gastev was appointed »honorable member« of the Projection Theatre. From October 1923 onwards the Projection Theatre functioned in close collaboration with CIT, and especially with Nikolai Bernstein and Nikolai Tikhonov (the heads of the bio-mechanical and photocinematographic laboratories). The purpose of the Projection Theatre was to teach the whole of society to master the human mind and body. Mastering CIT techniques and methodologies, practicing the most complicated scores of sounds, gestures, movements and emotional states, as a result of daily exercises and psycho-training, the actors of the theatre played the role of living models of the future socially-engineered Human-Machine.

Besides gymnastic apparatus and a noise orchestra, the Projection Theatre made use of mobile scenery and moving constructions designed by Nicolai Triaskin. Special projectors were included in the script of the theatrical production »Pressing and Impact« in 1923, as well as large screens behind the

stage to produce a dynamic film projection as a part of the performance. Virtual characters from the film projection appeared to interact with the actors on the stage. Many instances of the use of current, multimedia technologies were already being explored in the performances of the Projection Theatre in the 1920s.

MACHINE WORSHIPPERS

René Fülöp Miller, »Die Maschinenanbeter«. Vossische Zeitung, Berlin, 1923, 13 Oct., No. 485, p. 3.

»[...]The worship of the machine in new Russia carries obvious features of a strictly expressed religious cult. I have clearly noticed it while visiting Studios and Workshops of New Artists (the name of the Temples where the mysteries of the Machine Worshippers are performed). Machine models are mystically rising from the ground along walls. Made out of iron, concrete or wood, these are temple statues of the new God-Machine. The walls are entirely covered with the schemes and drawings, representing in various positions and longitudinal sections a physiognomy and a torso of the god. All constructional drawings, in their turn, bear the exclusive appearance of icons, whether it be »a sacred longitudinal section of the machine« or »the sacred generator of a dynamo«. All here specifies attraction to uniform, to the highest light of truth, conducting all the laws of the world. Amen.

People entering a hall reminded me pensive sectarians; with their sight, gait and conversations they looked like the bearers of some sacred cult. Even their dress and hairstyles bear the mark of the sectarian's ritual garments. They have stood for hours in this divine temple, all overflowed with surprise towards these icons of the beloved deity, in front of innumerable iron and wooden constructions, installed on the walls. [...]

I was even more impressed by a new divine music performed in the festive hall of the Moscow Trade Union Palace. The celebration I am talking about was held in honor of the official divine service of the so-called »Engineerists«, »Projectionists«. The first public divine service of these »machine worshippers« began with a noise orchestra composed of a crowd of motors, turbines, sirens, hooters, and similar instruments of din; the choir master stood on a balustrade and »conducted« the din with the aid of a complicated signaling apparatus. After the noise overture had raged long enough to deafen the audience completely, the real passion play began. A few minutes later, my own consciousness had been finally muffled, or it is better to say, I had lost absolutely any ability to think. Certainly, in my present passive condition, I



THE WORKER AND THE MACHINE. CARICATURE OF ALEXEI GASTEV. SMENA MAGAZINE. 1930.



PORTRAIT OF ALEXEI GASTEV. GRAVURE BY Z. TOLKACHEV IN A. GASTEV, REVOLT OF CULTURE, KHARKOV, 1923.

ALEXEI GASTEV ORDER 05

Funeral rites at the cemetery of planets.
A howl in the catacomb of worlds.
Millions, into the manhole of the future.
Billions, weapons stronger.
Labor camp of the mind.
Chains of the heart.
Engineer Everyman.
Drive geometry into their necks.
Logarithms into their gestures.
Defile their romanticism.
Tons of indignation.
Normalize the word from pole to pole.
Phrases on the decimal system.
A boiler company for speech.
Annihilate verbality.
Make the tunnels resound.
Turn the sky red for arousal.
Gears – at superspeed.
Brain machines – high load.
Cinema eyes – fix.
Electric nerves – to work.
Arterial pumps, activate.
1921

ALEXEI GASTEV. THE PACK OF ORDERS. THE POETRY OF WORKER'S IMPACT, MOSCOW, 1921. TRANSLATION GREG AFINOGENOV

was entirely captivated by the drama which was played out in the hall. Of course, it had no wings or stage and was performed in the hall in the midst of the crowd, similar to the ancient religious mysteries. Priests appeared in the hall even prior to the beginning of the Noise Music. All of them came with a special machine-like gait. Finally, the Noise Orchestra stopped playing, responding by voices of the priests crying out, absolutely mechanically, a number of syllables, which were real riddle for the uninitiated. It should remind one of the reciprocal singing of a church soprano after the organ prelude. Action then began. Certainly, it is necessary to master all perfection of the newest language to express the various machine movements of the actors. Reckless gymnastics were zealously performed with choppy movements mechanized as far as possible, on all kinds of gymnastic apparatus, under, in, on, between, before, and beside the various machine structures [...]»

ALEXEI GASTEV

The writer, politician and polymath Alexei Gastev (1882-1939) was one of the most popular and outstanding proletarian poets of early post-revolutionary Russia. The son of a teacher and a seamstress in Suzdal, Russia, Gastev enrolled at the Moscow Pedagogical Institute, but was expelled after participation in a revolutionary meeting. Shortly after his expulsion Gastev was arrested and exiled to Northern Russia. As a result of his exile, followed by emigration, Gastev spent three years working in the industrial sector in Paris, from 1910 to 1913.

From Proletkult's inception, Gastev was the main ideologist of this proletarian culture movement. After the October revolution, Gastev became one of leading theorists and practitioners of Scientific Management in Soviet Russia. In 1918, he established a network of trade unions following the model of the French syndicalists. He insisted: »Each lathe-operator is the director of a machine tool. We put a resolute end to the division between the so-called executive personnel and the personnel of management«.

Gastev is said to have been a personal acquaintance and correspondent of Henry Ford. Fascinated by Taylorism and Fordism, he led a popular movement for the scientific organization of labor (NOT). He was convinced that his main artistic creation was CIT – the Central Institute of Labour, which was founded in 1920 and supported by Lenin. In 1928, after a survey of CIT laboratories, the famous proletarian poet Maxim Gorki embraced Gastev and, referring to his departure from poetry, commented: »now I understand why you have discarded fiction: the one is at the expense of the other«.

Because of NOT's emphasis on the cognitive components of labor, some scholars consider Gastev's theory (NOT) as a Marxist variant of proto-cybernetics. Similarly to Pavel Florensky's concept of organoprojection (1919), Bernstein and Gastev's approach had a powerful man-machine metaphor.

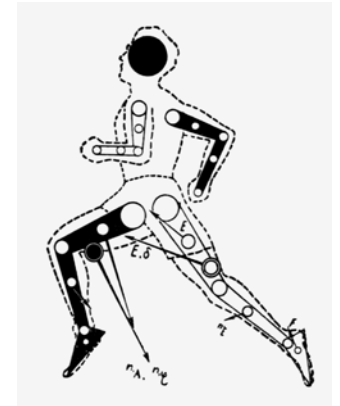
In 1938, Alexei Gastev was arrested on false charges of »counter-revolutionary terrorist activity« and sentenced to death following a hasty trial. His institute was closed. On April 15, 1939, Gastev was shot in the suburbs of Moscow.

BIOMECHANICS

Physiological research at CIT (Central Institute of Labour) was based on the conceptual approaches and experimental methods of the European science of biomechanics, in which the human body was represented by a mechanical system of muscle forces and weights. CIT activities went far beyond pure applied pragmatics. In 1921, Alexei Gastev, Nikolai Bernstein and Vsevolod Meyerhold brought the term biomechanics into common use, not only in the psychology of labour, but also in theatrical practices, in particular, by Vsevolod Meyerhold and Solomon Nikritin. Gastev's concepts, alongside the ideas of other outstanding representatives of his generation – the scientist-naturalist Alexander Bogdanov and the Russian Orthodox theologian, philosopher, mathematician and inventor Pavel Florensky among others – formed a conceptual base for the development of the most radical artistic concepts and experiments.

In Gastev's exhibitions of the 1920s entitled »The Art of Movement«, stereo images traced the physical trajectories of tools, hammers, weapons, the corporeal joints of workers, pianists and sportsmen, tracking and monitoring the three-dimensional characteristics of motion. Most of this documentary was produced by Nikolai Bernstein (1896-1966) – the Central Institute of Labour's leading physiologist – who conducted experiments measuring the trajectories and speed of human limbs while his subjects performed various labour tasks.

One of Gastev's ambitions was to stage a labour championship in addition to sports events. As he put it in one of his poems: »... Do you want? I shall strike the anvil with a hammer, striking the first quarter of a minute in a tempo of 120, the second quarter – 90, the third – 60. And he started. A boilermaker from Dublin has been recognized as a champion rivetter. It has happened? It will happen again!«



THE PHASE OF RUNNING. 1934–39.



VSEVOLOD MEYERHOLD. CIRCA 1932.



NIKOLAI BERNSTEIN. CIRCA 1948.



PHYSICAL TRAJECTORIES OF THE CORPOREAL JOINTS OF WIRED PIANIST. CIT & GIMN. MOSCOW, 1925.



CIT POSTER FROM THE BOOK 'YOUTH, GO!' BY A. GASTEV. MOSCOW, 1923.

»Let's take the snow-storm of the revolution in the USSR, let's put the rhythm of american life and perform well-adjusted work like chronometer.«

THE CENTRAL INSTITUTE OF LABOUR (CIT)

The Central Institute of Labour (Tsentralny Institut Truda – CIT) was founded by Alexey Gastev in Moscow in 1920 and supported by Lenin.

In his institute, Gastev investigated the functions of certain operational complexes that encompass both worker and machine in a single, unbroken chain: »These machine-human complexes also produce the synthesis between biology and engineering that we are constantly cultivating. And the integrated, calculated incorporation of determinate human masses into a system of mechanisms will be nothing other than social engineering.«

According to CIT methodology, every physical motion of cadets was precisely planned and assessed so that by the end of training, full automatism could be achieved. The human body was to become a machine. Gastev declared: »We start from the most primitive, the most elementary movements and produce the mechanization of man himself [...] The perfect mastery of a given movement implies the maximum degree of automaticity. If this maximum increases [...] nervous energy would be freed for new initiating stimuli, and the power of an individual would grow indefinitely.«

CIT was an unusual institution that was frequented by fanatical old inventors and fascinated teenagers alike. Alongside the physiological laboratory, there were labs for sensorics, psychotechnics and education. A variety of multimedia tools and interactive gadgets were devised, including instruments for photography and film, systems for monitoring musical performances and instructorless simulation apparatus for cars and planes. It was scientific research with an interdisciplinary and broad-ranging agenda.

In the mid-1920s, one of the CIT departments was Solomon Nikritin's Projection Theatre, a testing ground for the development of the ideal »Man of the Future.« In 1928, Gastev organized the Ustanovka (Setup) joint-stock company, which audited the work of industrial enterprises and provided recommendations on the efficient organization of their work processes on a commercial basis, which led to complete financial independence of CIT from the state. Although by the late 1930s, CIT had produced over 500,000 qualified workers in 200 professions and 20,000 industrial trainers in 1,700 educational centres, the totalitarian State was not interested in the creation of a network of socially engineered Cyborgs with liberated minds. In 1938, the institute was finally closed.

RADIO-EAR

THE LABORATORY OF HEARING

In 1916, Denis Kaufman (1896–1954) (later known as Dziga Vertov), a student at the Neurological Institute in Petrograd, attempted what would now be called sound poetry and audio art. As he put it: »I decided to include the entire audible world into the concept of ›hearing‹. It was during this time that I attempted to draw up the sounds of a lumber-mill. [...] I tried to describe the audio impression of the lumber-mill in the way a blind person would perceive it. In the beginning, I wrote down words, but then I attempted to capture all of these noises with letters.«

Best known now as a revolutionary filmmaker, Vertov did not set out to be involved in film production, but instead, as a boy, he wrote futuristic sound poems. In 1912, he entered the Białystok Conservatory (Poland) for three years to study violin, piano and music theory. According to Vertov, in Białystok he started his first experiments with the perception and arrangements of sound. »... I became interested in the rhythmic organization of separate elements of the visible and audible world in general. The next stage was my passion for editing shorthand records. It concerned not only the formal connection of these pieces, but also the interaction of meanings of separate pieces of shorthand records. It also concerned my experiments with gramophone recordings, where from the separate fragments of recordings on gramophone disks a new composition was created. But I was not satisfied experimenting with available pre-recorded sounds. In nature, I heard considerably more different sounds, not just singing or a violin from the usual repertoire of gramophone disks.« As Vertov noted: »... besides sounding vowels and consonants, different melodies, motifs, could still be heard. They needed to be written down as musical signs. But corresponding musical signs did not exist. I came to the conviction that by existing means, I could only achieve onomatopoeia, but I couldn't really analyze the heard factory or a waterfall. [...] The inconvenience was in the absence of a device by means of which I could record and analyze these sounds.« Frustrated, he switched to film to organize not the audible, but the visible world.



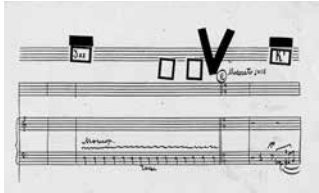
DZIGA VERTOV. 1929.



»RADIO-EAR. DZIGAR VERTOV. PORTRAIT BY PIOTR GALADJEV. 1926



DZIGAR VERTOV. FRAGMENT OF A POSTER FOR «KINO-GLAZ» FROM THE 1920s.



PAGES FROM THE SOUNDSCORE OF THE FILM «ENTHUSIASM (THE DON-BASS SYMPHONY)». 1930.

THE SYMPHONY OF NOISES

It was Vertov who, in 1929, did the first field sound recording using portable sound-on-film equipment, specially built for him by inventor A. Shorin, which allowed him to record actual urban sounds: industrial noises in the harbor, sounds of the railroad and the railway station, streets and trams to produce the film «Enthusiasm» (1930), which became the first approach to what would now be called *musique concrète*, which was invented by Pierre Schaeffer in France in 1948, and initiated the development of electro-acoustic music. This film is structured as a programmatic four-movement symphony in which leitmotifs and refrains develop a musical narration. Like the early pioneers of electronic music from the 1950s, Vertov was uninterested in using imitative instruments to recreate sounds and was irritated by such imitations in early sound films. In late November 1929 he and the composer Nikolai Timofeev (involved later in Graphical Sound) developed a musical score that integrated the noises and their transformation, distortion and variation. It is remarkable that the film also contains a unique documentary of the training of Gastev's CIT cadets, biomechanical ballet, recalling performances in Solomon Nikritin's Projectionist Theatre. After the first public screenings in Europe in 1931, the film was a great success. In a note sent to Vertov from London, Charlie Chaplin wrote: «Never did I realise that these mechanical sounds could be arranged to sound so beautiful. I regard it as one of the most exhilarating symphonies I have heard. Mr. Dziga Vertov is a musician.» Nevertheless, following political problems, Vertov never returned to the aesthetics of *musique concrète*.

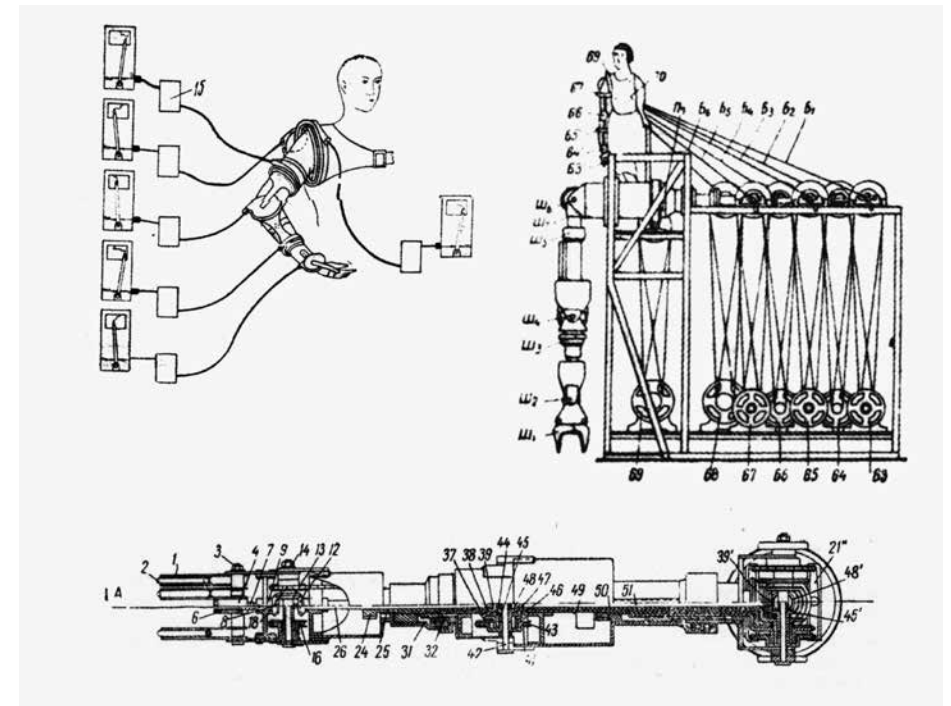
ANDROID

Living in famine, cold and poverty, creative people were dreaming about the future world, where the human being would become perfect: his body as a machine, his nervous energy freed for new initiating stimuli, with indefinitely growing power and liberated mind. They expected the World Revolution. Moreover they were planning further expansion in space.

The Soviet rocket scientist and pioneer of astronautics theory Konstantin Tsiolkovsky inspired leading Soviet rocket engineers and influenced rocket scientists throughout Europe, and contributed to the early success of the Soviet space program.

One of Tsiolkovsky's followers was a forgotten space pioneer called Ary Sternfeld (1905-1980), who was the first to calculate the best trajectories

to reach the Moon and Mars. He was the first to introduce the word *cosmonautics* into the language of science in 1932. Sternfeld's unusual career took him from Poland to France and finally to the Soviet Union. He enjoyed recognition, faced danger, and suffered indignity. In 1931, he patented the instrument for registering the movements of the human body, which was the basis of the system, called the Android, patented somewhat later in 1938. Ary Sternfeld envisioned this system as an important component of a future expedition to Mars. The Android represented a machine equipped with special extensions and manipulators similar to human fingers, capable of reproducing the movements of the operator, carrying out complex operations during a space expedition to the surface of Mars or another planet.



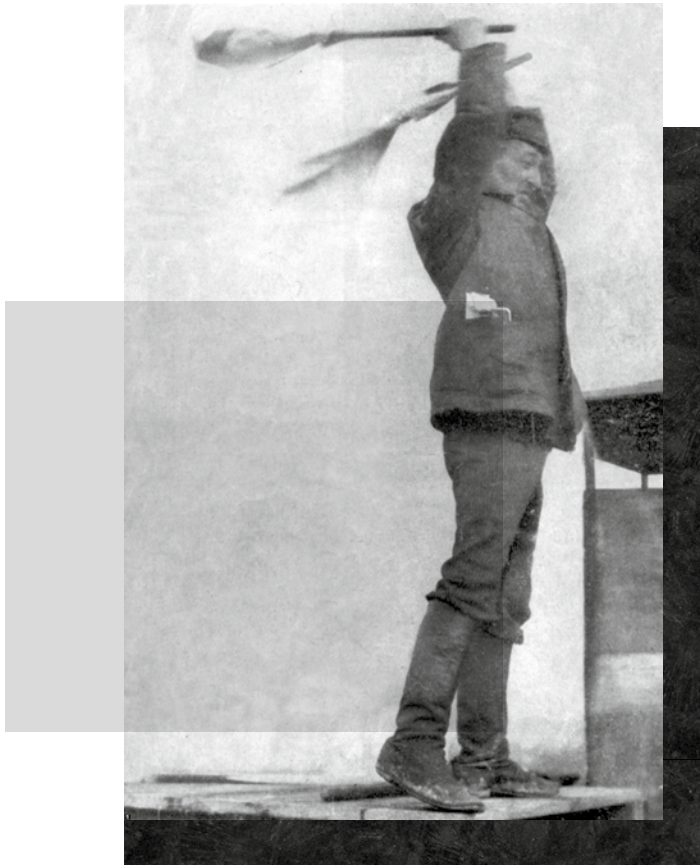
ARY STERNFELD. THE INSTRUMENT FOR REGISTRATION OF THE HUMAN BODY MOVEMENTS. CONSTRUCTION OF THE ANDROID.

Special mechanical extremities are intended to register all movements which are carried out by the operator. Each movement of the transducer causes movement of contacts of servomotors in one or other direction. The control over extremities can be automated.

Mechanical extremity is made of parts, rotary in joints in relation to each other. It can be set in motion from the central control unit by means of servomotors and a mechanical transmission. Based on concentrically located hollow shafts, which are connected in joints by means of conic gears. Ary Sternfeld envisioned this system as an important component of the future expedition to Mars.

ROOM 2 RIGHT

III ~ REVARSAVR



ARSENY AVRAAMOV CONDUCTING THE SYMPHONY OF SIRENS. MOSCOW, 7.11.1923.

ARSENY AVRAAMOV

Arseny Avraamov (Krasnokutsky) (1885–1944), aka Revarsavr (Revolutionary Arseny Avraamov), Ars, Arslan Ibragim-ogli Adamov etc. among other names, was one of the most adventurous people of his time. His biography is somewhat enigmatic – even his own accounts vary depending on why and for whom they were written.

In 1912, whilst in the Cossack military division, he was arrested and imprisoned for propaganda. After escaping from prison, he moved to Norway where he worked as a sailor on the cargo ship Malm Land. In 1913, he joined a traveling circus as a dzhigit-equestrian, acrobat and musician-clown. He was also on the editorial boards of the main Russian music magazines »Muzyka, Muzykalny Sovremennik«, »Zavety«, and »Letopis«. In a series of articles from 1914 to 1916, he developed the theory of microtonal, ultra-chromatic music and invented special instruments to perform it. Composer, performance instigator, music journalist and creator of the first ever artificial soundtrack, shortly after the October Revolution, Avraamov proposed to the Commissar of Education, Anatoly Lunacharsky, a project to burn all pianos – symbols of the despised twelve-tone, octave-based, well tempered scale, which he believed had adversely affected human hearing for several hundred years.

As early as 1916, in the article »The Future Science of Music and the New Era in the History of Music«, Avraamov predicted and explained different approaches to synthesizing sound, including some of today's latest techniques of physical modeling.

During the 1910s and 1920s, he experimented with specially prepared pianos, harmoniums and various noise sources as well as a symphony orchestra to develop new approaches to organizing sound that are very similar to recent techniques of electroacoustic and spectral music. He explored new genres of music devised for urban contexts and presented around specially constructed environments, including the acclaimed »Symphony of Sirens«.

In 1925, predicting the future of music technology, Avraamov emphasized the importance of developing Radio-Musical Instruments. He noted: »And if the sound of sirens is not powerful and qualitative enough, what could we dream about? Clearly: about the devices of Theremin or Rzhavkin, installed on aeroplanes, flying above Moscow! An aero-radio-symphony! We will hear it anyway!«



ARSENY AVRAAMOV BEFORE THE PERFORMANCE OF «SYMPHONY OF SIRENS». MOSCOW, 7.11.1923.

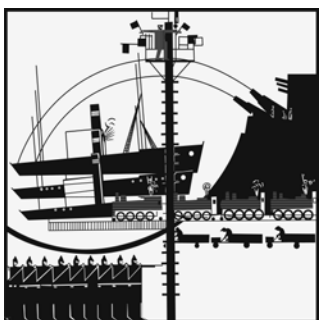


ILLUSTRATION OF THE SYMPHONY OF SIRENS IN BAKU, 1922. GORN MAGAZINE, VOL. 9, 1923.

THE SYMPHONY OF SIRENS

One of Avraamov's best-known projects was the »Symphony of Sirens«, inspired by the poetry of Alexei Gastev. It was first staged in the port town of Baku in 1922, in celebration of the 5th anniversary of the Revolution. This epic spectacle featured a cast of choirs, the foghorns of the entire Caspian fleet, two batteries of artillery, a number of infantry regiments including a machine-gun division, hydroplanes, and all the town's factory sirens. The conductor, mounted on a purpose-built tower, signaled various sound units with coloured flags and pistol shots. A central sound-machine called the Magistral contained 50 steam whistles controlled by a crowd of musicians following the called text-scores. While it incorporated The Internationale, The Marseillaise and specially composed music, the content of the Symphony was not fixed; it was to be reinterpreted for particular cities and contexts. According to Avraamov: »Artillery. Because of the wide area of distribution of the factory sirens, it is necessary to have at least one heavy gun for signaling purposes with the possibility of firing live ammunition (shrapnel is not suitable, since air-bursts would be most dangerous and would produce the noise of a second explosion, which might confuse performers). The big drum can be provided by field artillery as well. Skilled machine gunners (as long as they are firing off live ammunition belts) not only simulate drumbeats, but also beat out complex rhythmic figures. Firing with blank cartridges and firing in frequent bursts are good for vivid scenic sounds.«

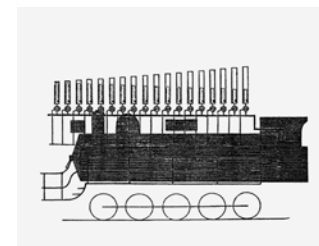
A second performance of the Symphony took place in 1923 in Moscow. It was not as successful as the first because of a huge area covered with sirens and artillery leading to enormous distances between the performers. The military was not provided with as much ammunition as requested by Avraamov. The show overlapped with the demonstration dedicated to the 6th anniversary of the October Revolution. As Avraamov noted: »They gave us only 27 rounds of heavy cannon-fire! It is for the big drum! And there were no machine guns at all... only rifle fire! And there were two dozens airplanes buzzing over the Red Square«.

In the title and the score of introductory fanfares, played by Magistral, Avraamov has ciphered names of two beloved women – his wife Olga and his girlfriend Rebecca.

THE NOISE ORCHESTRA

From 1921 to 1923 performances at the Projection Theatre and the Foregger Studio, as well as sound experiments at the Eisenstein Studio, created a fashion for Noise Music and Noise Orchestras. As René Fülöp-Miller noted in 1926, »The same idea also ruled the true proletarian music: it, too, emphasized the rhythms which corresponded to the universal and impersonal elements of humanity. The new music had to embrace all the noises of the mechanical age, the rhythm of the machine, the din of the great city and the factory, the whirring of driving-belts, the clattering of motors, and the shrill notes of motor-horns. Therefore, the Bolsheviks very soon proceeded to construct special noise instruments, to form noise orchestras, to give the public a real new music instead of the usual old bourgeois individualistic »patchwork«, and, in this way, to prepare the collective soul for the revelation of the holiest. They imitated all conceivable sounds from industry and technology and united them in peculiar fugues, in which a whole world of noise made itself felt, and soon noise symphonies, noise operas, and noise festive performances were composed.«

Many inventors patented new sound machines intended specially for performance of the noise music. Some devices based on electro-optical, electro-mechanical and newest electronic technologies were ahead of their time by decades.



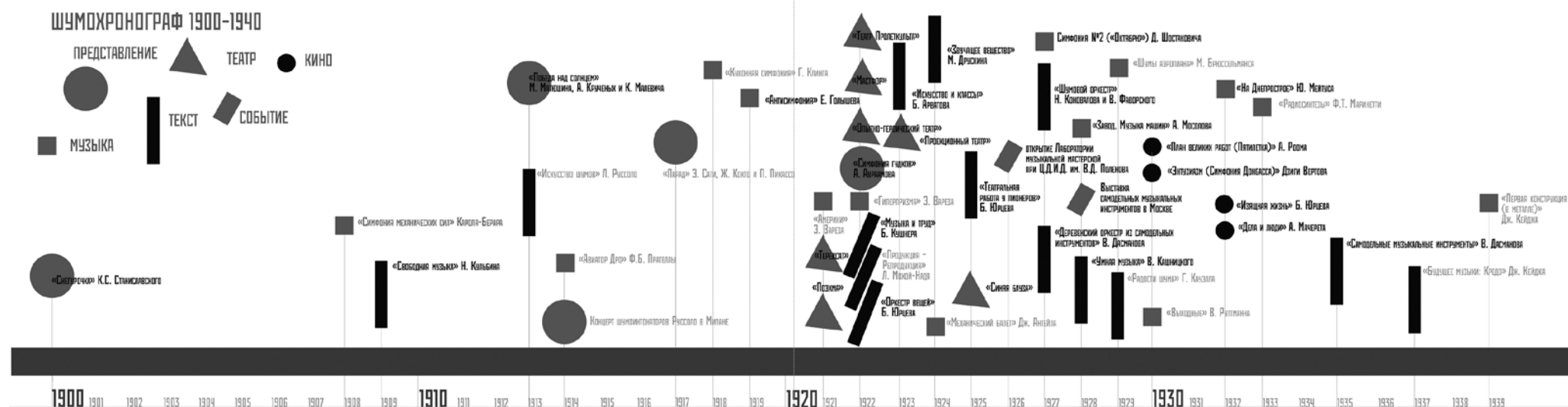
THE STEAM WHISTLE ORGAN. ARSENY AVRAAMOV. GORN MAGAZINE, 1923, VOL.9.

The Steam Organ was proposed by composer Arseny Avraamov as a mobile instrument intended to perform his Symphony of Sirens. The electrified musical keyboard, mounted in the cabin of a locomotive driver, could activate and control the numerous, specially tuned whistles, equipped with electrical valves. The factory sirens were the most popular sound sources in the early 1920s, considered as a substitution of the former »bourgeois« church bells and popular in construction of the new sound machines.

ALEXEI GASTEV ORDER 06

»Asia – all on the note D.
America – a chord above.
Africa in B-flat.
The radio-conductor.
Cyclono-cello – solo.
Play forty towers by a bow.
The orchestra is along the equator.
The symphony is along the parallel 7.
Choruses are along the meridian 6.
Electro-strings – to the terrestrial center.
Keep a sphere of the Earth in music
Four seasons.
Sound pianissimo on an orbit 4 months.
Make four minutes volcano-fortissimo.
Tear off for a week.
Burst volcano-fortissimo crescendo.
Hold on volcano half a year.
Fade out to zero.
Finish the orchestration.«
Alexei Gastev. The Pack of Orders.
The Poetry of Worker's Impact. Moscow, 1921.

CHRONOLOGICAL TABLE OF NOISES. 1900-1940.



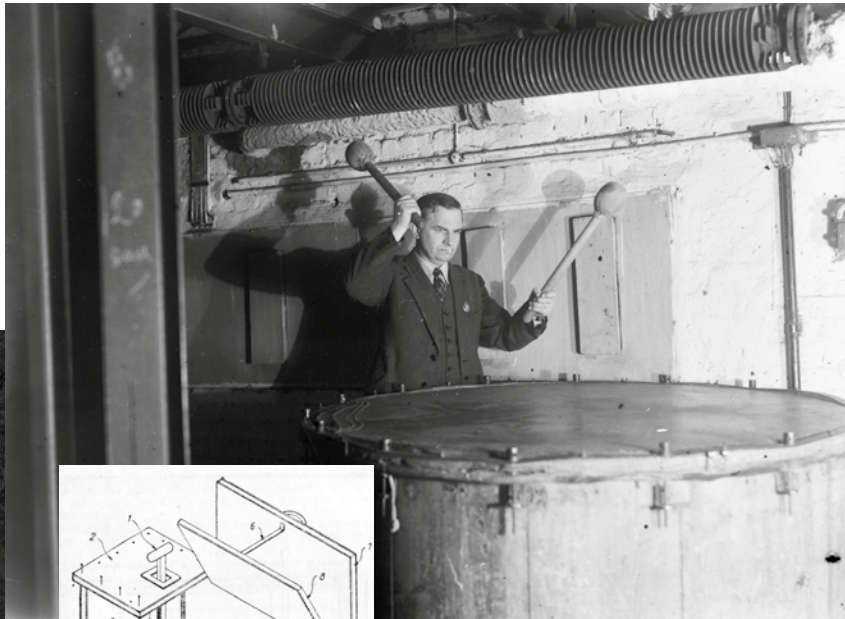
- Performance ●
 Theatre ▲
 Film ●
 Music ■
 Text |
 Event ▽
- 1900 »The Snow Maiden« C. Stanislavski
 - 1908 »Symphonie des forces mécaniques« Carol-Bérard
 - | 1909 »Free Music« N. Kul'bin
 - 1913 »Victory over the Sun« M. Matjushin, A. Kruchenykh & K. Malevich
 - | 1913 »Arte dei rumori« L. Russolo
 - 1914 Russolo's intonarium concert in Milan
 - 1914 »L'aviatore Dro« F.B. Pratella
 - 1917 »Parade« E. Satie, J. Cocteau & P. Picasso
 - 1918 »Küchen-Concert« H. Kling
 - 1919 »Antisymphonie« J. Golysheff

- ▲ 1921 »Poekhna«
- ▲ 1921 »Terevsat«
- 1921 »Amériques« E. Varèse
- ▲ 1922 »Proletcult Theatre«
- | 1922 »Orchestra of Things« B. Yurtsev
- ▲ 1922 »Mastfor«
- ▲ 1922 »Experimental-Heroic Theatre«
- 1922 »The Sirens Symphony« A. Avraamov
- 1922 »Hyperprism« E. Varèse
- | 1922 »Produktion Reproduktion« L. Moholy-Nagy
- | 1922 »Music and Labour« B. Kushner
- ▲ 1923 »Projectionist Theatre«
- | 1923 »Art and Classes« B. Arvatov
- | 1924 »The Sounding Substance« M. Druskin
- 1924 »Ballet Mécanique« G. Antheil
- ▲ 1925 »The Blue Blouse«
- | 1925 »Theatrical Production by Pioneers« B. Yurtsev
- ▽ 1926 launching of the Music Workshop Laboratory of the Polenov's Central House of Arts in the Countryside

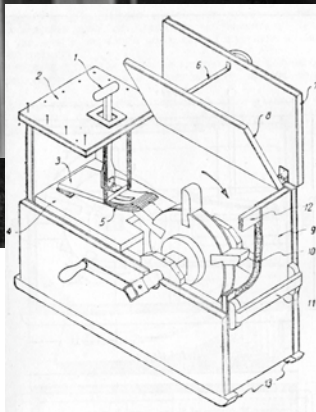
- | 1927 »Noise Orchestra« N. Konovalov & V. Favorskiy
- | 1927 »Countryside Orchestra of Self-made instruments« V. Dasmanov
- 1927 »Symphony 2« (To October) D. Shostakovich
- ▽ 1928 exhibition of self-made musical instruments in Moscow
- | 1928 »Sophisticated Music« V. Kashnitskiy
- 1928 »The Iron Foundry. Machine Music« A. Mosolov
- 1929 »Bruits d'avions« M. Brusselmans
- | 1929 »The Joys of Noise« H. Cowell
- 1929 »Plan for Great Works« A. Room
- 1930 »Enthusiasm. Donbas Symphony« D. Vertov
- 1930 »Wochenende« W. Ruttman
- 1932 »On the Dnieper Dam« Y. Meitus
- 1932 »An Elegant Life« B. Yurtsev
- 1932 »Men and Deals« A. Macheret
- 1933 »Sintesi radiofoniche« F.T. Marinetti
- | 1935 »Self-made Musical Instruments« V. Dasmanov
- | 1937 »The Future of Music: Credo« J. Cage
- 1939 »First Construction (in Metal)« J. Cage

ROOM 4

IV ~ INDUSTRIAL NOISE MACHINES



VLADIMIR POPOV PLAYS THE BIG
DRUM. CIRCA 1940s.



DRAFT OF POPOV'S MOTORCYCLE
SOUND DEVICE. CIRCA 1940s.

INDUSTRIAL NOISE MACHINES

The history of sound effects used in theatre goes back in ancient times, but it is only since the 17th century, with its baroque aesthetics of illusionism, that noise machinery started to develop in this context. Various treatises on stage engineering from the 19th century illustrate a few more or less universal types machines that imitated wind, thunder, waves, rain, etc. The tendency for realistic theatre required wider range of sounds, as it was exactly with the Moscow Art Theatre and Constantin Stanislavski as its originator and leader. It was under his assistance that Vladimir Aleksandrovich Popov (1889–1968) – a young artist then with a musical background – started to invent and advance sound devices for backstage purposes. From the mid-1920s – particularly while working in Mikhail Chekhov's MKhat-2 – Popov became increasingly involved in shaping the soundscape of the most renowned plays of the Second MKhat as well as with Vakhtangov's Theatre, the Jewish Theatre Gabim, and other groups. Thanks to his efforts, noise crews were afforded daily rehearsals, and special noise scores were written for their roles. These noise brigades, supervised by Popov himself, staged »noise symphonies« for each production, considered then not just within the scope of mere sound effects, but more as an actual character in a play. This approach is noteworthy within the context of noise experiments undertaken at the same time, despite the fact that Popov worked more academically and independently.



VLADIMIR POPOV AND THE UNKNOWN SOUND MACHINE. 1950s.



DRAWING OF POPOV'S SOUND DEVICE THAT IMITATES GUN SHOTS. EARLY 1940s.

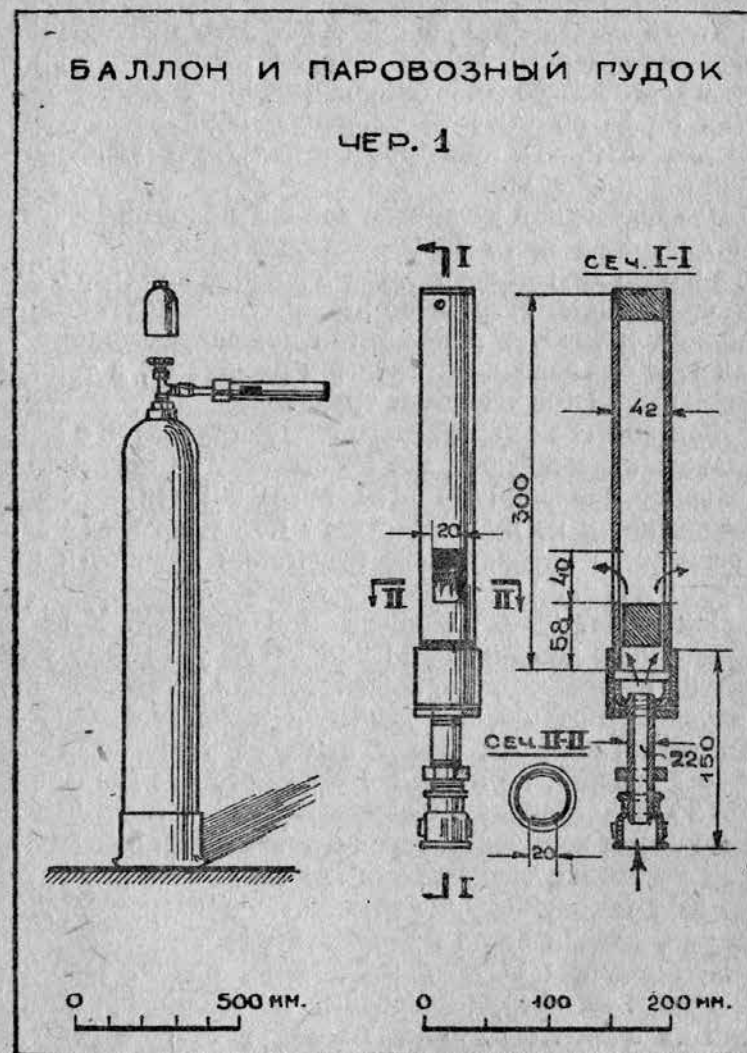


NOISE REHEARSAL OF ANTON CHEKHOV'S 'THREE SISTERS'. 1940.

In the late 1920s and early 1930s, Popov achieved such outstanding results—both in composing noise scores and in constructing acoustic sound machines, that the leading film production company Rosfilm hired him to work on the first sound motion pictures. It is a coincidence that figures closely associated with former avant-garde theatrical scene such as B. Yurtsev (Eisenstein's fellow from Proletcult and one of the chief protagonists of noise music in the 1920s) and A. Macheret (former Mastfor actor and Blue Blouse leader) worked with Popov, so that he and his noise crews could create impressive soundtracks for their industrial pictures: »An Elegant Life« (1932) and »Men and Deals« (1932), respectively. With regards to cinematic production, perhaps their most celebrated work turned out to be the »Battle on the Ice« scene in Eisenstein's »Alexander Nevsky« (1938).

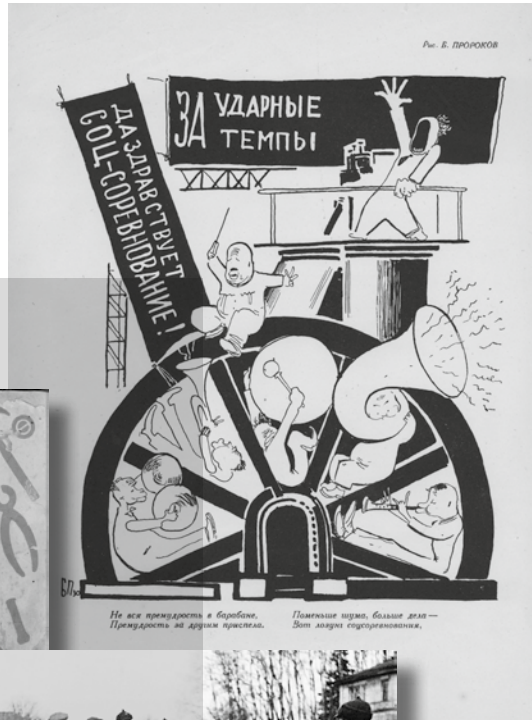
By the early 1950's, Vladimir Popov advanced and invented more than 200 acoustic machines—industrial ones in particular—as they represented the whole range of sounds for transport, battles, factories and construction, and functioned more like instruments, than pure mechanical devices. From 1943 on, Popov began publishing books, grouping each type of noise, and by 1953, his magnum opus »The Sound Accompaniment to a Play« received the Stalin prize. Ironically, this treatise may be regarded as the last manifestation of noise from the period of great experiments. Reconstructions of the machines undertaken by The Music Laboratory show that nowadays, Popov's instruments might be considered contemporary, sound-art installations.

DRAFT OF A TANK WITH WHISTLE. DESIGNED BY V. POPOV. 1943.



ROOMS 5-7 V ~ AMATEUR NOISE INSTRUMENTS

DRAWING BY B. PROROKOV, WHICH MANIFESTS THE IDEA OF SOCIALIST COMPETITION SUPREMACY OPPOSED TO MEANINGLESS NOISE MAKING. 1930.



COVER OF VLADIMIR DASMANOV'S TREATISE 'SELF-MADE INSTRUMENTS'. 1935.



NOISE ORCHESTRA REHEARSALS OF INMATES OF THE SHELYCHENSKY CHILDREN'S HOME. VOLOGDA, 1927.

AMATEUR NOISE INSTRUMENTS

The idea of noise music and noise orchestras in particular seems to be specifically of an avant-garde, and precisely of futurist origin; however, it is as much radically modernistic as it is deeply rooted in the Russian medieval traditions of >skomorokhs<, east Slavic harlequin actors who were persecuted in the 17th century. In the 19th century, the growth of circus genres, and particularly, music clownery gave new birth to the mastery of self-made, eccentric instruments, which parodied professional ones, thus comically representing some anti-music. In many cases, this comic tradition was essential for the new generation of theatre directors, who adopted eccentric principles along with its sound forms – Meyerhold, Eisenstein, Vakhtangov, Foregger were just few among many others, who introduced noise orchestras to the avant-garde stage in the early 1920s. Moscow Proletcult theatre, Mastfor (Foregger's Workshop), Experimental-Heroic Theatre, Blue Blouse movement and some others were especially persisting in making noise performances – solely or as an accompaniment to the stage act. Thus, the early Soviet hybrid of post-futurism, constructivism and agit-prop became the main platform for noise orchestras, which, in its turn, were a sort of mixture of eccentric clownery, modified jazz-bands – practically unheard in Russia – and pro-industrial ensembles.

In the mid-twenties, this noise movement has gradually shifted from experimental theatre circles to wider proletarian audiences, and primarily to the pioneers theatres. Proletcult musicians and actors were in charge of this adjustment, so that noise music has become an amusing adaptation of the futuristic urbanized style, and noise instruments substituted now for professional ones, for the purpose of ease of playing. In this sense, noise music entered the terrain of mass musical education, particularly essential after the World War I and the Civil War, due to the deficiency of professionally manufactured instruments. Although the peak of amateur noise music making came at the second half of the twenties, noise bands survived until the late forties, but mainly in the mixed form – together with guitars, accordions and professional percussion instruments.



B. ERDMAN'S DRAWING OF 'DON'T WEEP THEATRE'S NOISE ORCHESTRA'. COVER OF ZRELISH'A MAGAZINE. 1923.



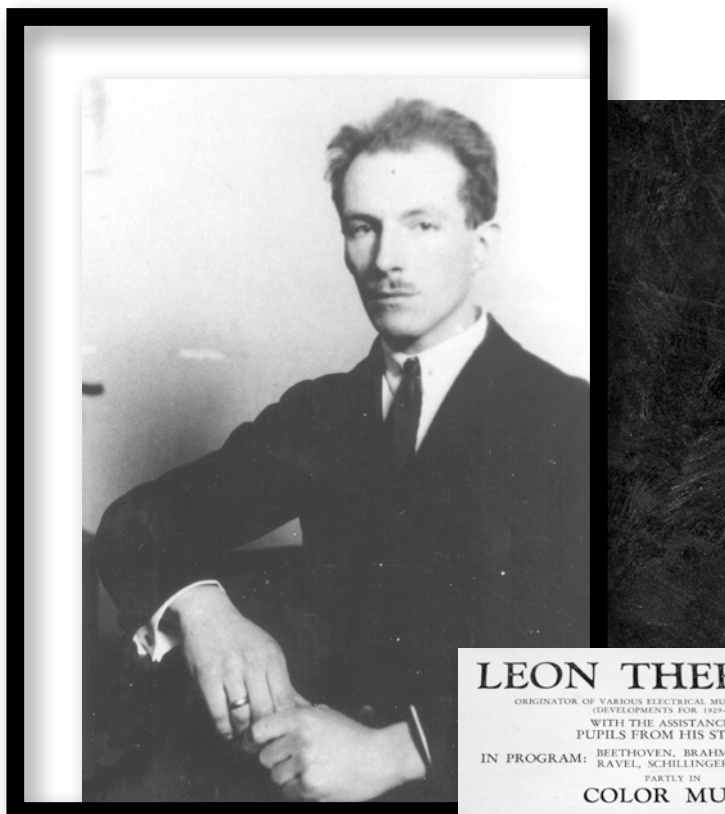
FROM THE BLUE BLOUSE MAGAZINE. 1926.

ECCENTRIC NOISE ORCHESTRA 'BLUE BLOUSE'.

«All of the above instruments have been tested by the 'Blue Blouse' Percussive group. When used by a skillful orchestra, they sound wonderful.»

ROOMS 8-9

VI ~ THEREMIN



LEON THEREMIN (1896 - 1993).
MID-1920s.

LEON THEREMIN

ORIGINATOR OF VARIOUS ELECTRICAL MUSICAL INSTRUMENTS
(DEVELOPMENTS FOR 1929-1930)

WITH THE ASSISTANCE OF
PUPILS FROM HIS STUDIO

IN PROGRAM: BEETHOVEN, BRAHMS, CHOPIN, DEBUSSY,
RAVEL, SCHILLINGER, WAGNER, ETC. . . .

PARTLY IN

COLOR MUSIC

CARNEGIE HALL APRIL 25, 1930
FRIDAY EVENING AT 8:30

Seats on Sale at Box Office

And until April 20 at the Theremin Studio, 24 West 59th Street, N. Y. C.

Prices: \$2.50, \$2.00, \$1.50, \$1.00, 75c, 50c

THEREMIN STUDIO MANAGEMENT
MRS. JOSEPH SCHILLINGER
340 EAST 57TH STREET
NEW YORK 22, NEW YORK

A LEAFLET OF LEON THEREMIN'S
CONCERT AT CARNEGIE HALL. 1930.

LEON THEREMIN

One of the most charismatic figures in the history of electronic and audio technology was Leon Theremin (1896-1993), well known as the inventor of the first commercially-produced electronic musical instrument, the Theremin (1919). As composer and author Albert Glinsky asserts, »this clumsy instrument was the first foray into the brave new world of electronic music.« Its arrival heralded a new, technologically-based trend in the arts. As a physicist, musician, and engineer, Theremin worked on the development of innumerable projects, often trying to combine music with colour, with gesture, scent and touch. Having worked at the crossroads of creative technology and espionage, it is hardly possible today to imagine any synthesizers, burglar alarms or automatic doors without his pioneering research.

Theremin's life story is a fascinating and well-documented one, not least for his secret work for the NKVD (the KGB). He developed most of his inventions in Russia and the US between 1920 and 1938. In early 1939, he returned to Soviet Russia where he was soon arrested and sentenced to eight years in the GULAG camps. Fortunately, after one year in Kolima (a brutal area in Siberia) he was moved to a special NKVD prison for scientists.

On August 4, 1945, Soviet pioneers (school-age children) presented a carving of the Great Seal of the United States to U.S. Ambassador Averell Harriman. It hung in the ambassador's Moscow residential office until 1952, when the State Department discovered that it was bugged. This came to the attention of the world when it was displayed at the United Nations in May, 1960.

It was a real microwave theremin. For this invention, the freshly released Leon Theremin was awarded with the first Stalin Award. After his release in 1947, he continued working for the KGB until his retirement in 1962, when he moved to the Acoustics Laboratory at Moscow State Conservatory, where he tried to revive his American inventions and research. His groundbreaking musical invention led to the application of the technology for a variety of civilian, military, surveillance and espionage purposes, adding to his status as a cult figure in electronic music in the West.

Like an alchemist in search of the philosopher's stone, since the 1920s he had been trying to solve the problem of immortality: »I was fascinated with the idea of the struggle against death. I studied [...] the life of biological cells of animals buried in permafrost. I was interested in what would happen to people if their bodies were frozen and then defrosted again.«

Leon Theremin died on November 4, 1993. He had dreamed of being buried in permafrost, to be recovered when science reached an appropriate level, but instead was buried in Kuntsevo Cemetery, Moscow.



ARSENY AVRAAMOV ›REVIVAL OF MUSIC. THE THEREMIN‹. ROBIS, NO. 23, 1927.

REVIVAL OF MUSIC. THE THEREMIN.

In 1927, predicting the future of music technology, Arseny Avraamov emphasised the importance of developing ›Radio-Musical Instruments‹. He noted in one of his articles:

›Our press responded chillily, avariciously and unsympathetically to the largest event of an expiring musical season – Rosfil’s demonstration of the amazing invention of the young Soviet engineer L. S. Theremin.

Although it is not an absolute ›novelty‹ – Theremin already having shown his musical ›machine‹ in Moscow several years ago in its first, embryonic edition, and while it is true that since then, many scientists and technicians in Moscow and Leningrad have been working on similar technical projects – but only Theremin in the last years has been able to develop his invention to that level of artistic-musical importance that allows us to qualify his ›lecture-concert‹ as the biggest musical event of our days.

The prospects opened to music by Theremin’s invention are really boundless. His ›Theremin‹ is not a simple ›new musical instrument‹ as our music critics are thinking; no, it is a solution to the huge social-scientific-art problem; it is the first big step into the future, into our future – it is a social revolution in the art of music, in its revival.

All that ›mushroom-like‹ young growth, which was recently precisely and angrily described on these pages by L. Sabaneev in his ›Letter from Paris‹ (#18, p.14 – 15) – is a natural product of the rotting of the top layer of the European cultural ›ground‹. it is that ›magnificent moss, growing on a rotten stump‹ about which we have already been hearing for a long time from Romen Rollan, who is far from ›LEF‹ and not a communist.

The development of the Theremin is the first real mine under the basis of the former musical world and, simultaneously, one of the cornerstones of the basis of the future. It won’t be a primitive-handmade Symphony of Sirens! The full freedom of timbral and intonational nuances leads to: An extension of the European tonal system, which has brought out today’s music in the above mentioned deadlock.

A connection with the grandiose art of the East, hitherto not able to be realised because of the well-tempered twelve-tone system.

An all-time, deep synthesis with the art of words, for speech intonations and timbres covering the Theremin range, and, lastly:

The creation of an absolutely new, unprecedented ›differential‹ music (Dif-

ferenz-Musik) – grandiose harmonious ›glissando‹ in parallel and counter movement, without having already mentioned the enrichment of means, even within the limits of old [musical] forms.

The sensitivity and accuracy of the electro-device will, at last, allow close engagement with the problem of the ›duplication‹ of music, its automation, without an inevitable decrease of the ›quality of art production‹ – it is a really unique opportunity for the true ›democratisation‹ of musical art. I have purposely stopped only on a social-musical problem to emphasise the absolutely insufficient keenness of our musical criticism: chasing ›the Marxist approach‹ to music for every ›less than pin head‹ occasion... it (criticism) has managed to pass by indifferently, ›not having noticed‹ such an elephant as the performance of L. S. Theremin.‹

THE THEREMIN

The Theremin was invented by Leon Theremin in 1919. It was one of the earliest electronic musical instruments, the first to be manufactured commercially and the first to be played without being touched.

In 1919, Theremin realised the possibility of producing pitched sound whilst fixing a radio station in Russia during the Civil War. Soon afterwards, he was hired by the Institute for Physics and Technology in Petrograd. To measure the dielectric resistance of gases he developed a tool that could produce controllable pitched sounds relative to the human body. According to witnesses, the next day Theremin was playing a voltmeter.

In 1921, Leon Theremin performed for a fascinated Lenin, who invited him to tour Russia, promoting the idea of ›electrification‹ of the country.

In 1929, America’s RCA started to manufacture Theremins. Released after the stock market crash of 1929, and while not a commercial success, the Theremin fascinated audiences in America and abroad. Robert Moog started his career by building theremins in the 1950s. His Moog Music Company has since sold thousands of theremins across the world.

THE TERPSITONE

The Terpsitone is a variation on the Theremin – instead of an antenna for the hand it uses an antenna-platform for the whole body. Dancers’ movements are converted into corresponding tones – moving an arm or a leg is suffi-



THE VERY FIRST THEREMIN, DEMONSTRATED BY LEON THEREMIN AT GIMN IN 1921.



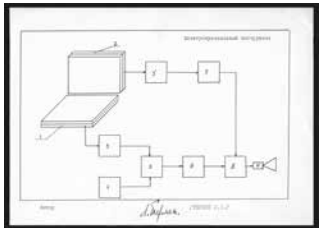
LEON THEREMIN PLAYING THE THEREMIN IN KAZAN, 1925.



THE THEREMINS AT THE ACOUSTICAL LABORATORY OF MOSCOW CONSERVATORY. IN THE MIDDLE - THE RCA THEREMIN. CIRCA 1960.



THE TERPSITONE, PERFORMED BY CLARA ROCKMORE. CARNEGIE HALL, APRIL 1932.



BLOCK DIAGRAM AND DESCRIPTION OF THE TERPSITONE.



THE THIRD PORTABLE VERSION OF THE RHYTHMICON, BUILT AT THE ACOUSTICAL LABORATORY OF MOSCOW CONSERVATORY. CIRCA 1960.

cient to produce a noticeable change of pitch. It was one of the first known motion-tracking systems, and was developed independently of Gastev's and Bernstein's research.

Built by Leon Theremin in the early 1930s it was demonstrated at Carnegie Hall in 1932. Despite its conceptual beauty, it was hard to »dance in tune«, since musical appreciation and artistic movement are so different. In the beginning, the Terpsitone was performed well only by violinist and Theremin virtuoso Clara Rockmore, who had perfect pitch and a supple body.

At the Acoustics Laboratory at Moscow State Conservatory, Leon Theremin built a terpsitone to fill a small room. Writing for the New York Times in 1967, Harold Schonberg described how he »ushered the visitor into a room in which a small dance floor had been constructed. Mr. Theremin stood on the floor, raised his arms, made motions, and started to play the Massenet Elegy on nothing at all...«.

THE RHYTHMICON

In 1930, the avant-garde American composer and theorist Henry Cowell commissioned Leon Theremin to build the world's first rhythm machine: the rhythmicon. The project was supported by Charles Ives and realised in collaboration with Russian composer and theorist Joseph Schillinger, who had emigrated to the U.S. in 1926.

The Rhythmicon produced up to 16 different basic rhythms and their arbitrary combinations. Using the device's keyboard, each of the 16 rhythms could be produced individually or in combination, forming almost innumerable possible rhythms.

One of the original Rhythmicons ended up at Stanford University; the other stayed with Nikolas Slonimsky, from whom it later passed on to Schillinger and then to the Smithsonian Institution.

In the early 1960s at Moscow State Conservatory, Leon Theremin built a third, more compact model. It was made of odds and ends since in the USSR as the 60s electronic parts were not readily available – inventors had to steal or salvage those pieces.

HARMONIUM

While Arseny Avraamov, Pavel Leiberger and other researchers were exploring the harmony of microtonal music, Leon Theremin was interested in the psychoacoustic nature of human perception of complex musical intervals, as well as in spatial sound perception.

In the 1930s in New York and in the 1960s at Moscow State Conservatory, Theremin built several experimental electronic harmoniums that superseded the old acoustic instruments of Arseny Avraamov and GIMN.

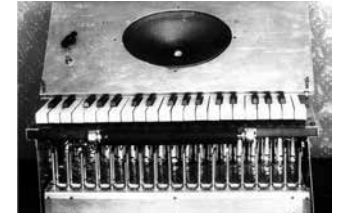
The most often used microtonal harmonium, which was built at Moscow State Conservatory in 1965, was oriented towards the subjective human perception of sounds (psychoacoustics) in relation to complex musical intervals as experienced in physical space. In this instrument, each of 24 oscillators has an independent key on the keyboard, pitch control and loudspeaker. Listening to the sounds produced by this instrument allows people to experience the final mix directly in their brains. Any beats or sub-harmonics appear as pure psychoacoustic phenomena – the result of interpretation by the mind. For many years, this instrument was used for training choir conductors and singers.

EAVSEDDROPPING ON PIANISTS

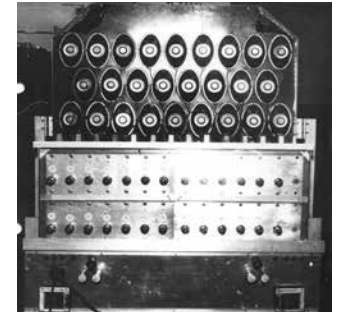
During his many years working for the KGB, Leon Theremin was involved in the development of various eavesdropping systems, some of which were the most advanced in the world at the time.

After retiring from the KGB, working at Moscow State Conservatory, Theremin continued his favourite secret research. From 1965 to 1966, in collaboration with one of the best Russian piano adjusters, G. Bogino, Theremin developed a system that was hidden under the pedals of the concert piano in the Bolshoi Concert Hall at Moscow State Conservatory (the main concert hall in Russia). The system was capable of monitoring piano pedal movements during live performances. Being wireless, this gadget could transmit data behind the stage in complete secrecy. A great deal of significant data were collected and studied. Many leading international pianists were investigated. Theremin and Bogino received a State Award for their research.

Working at Moscow Conservatory, Theremin made numerous inventions for which he tried to obtain Russian patents – most of them were refused. The piano pedal monitoring system was one of only a few of Theremin's inventions to be patented and put to use.



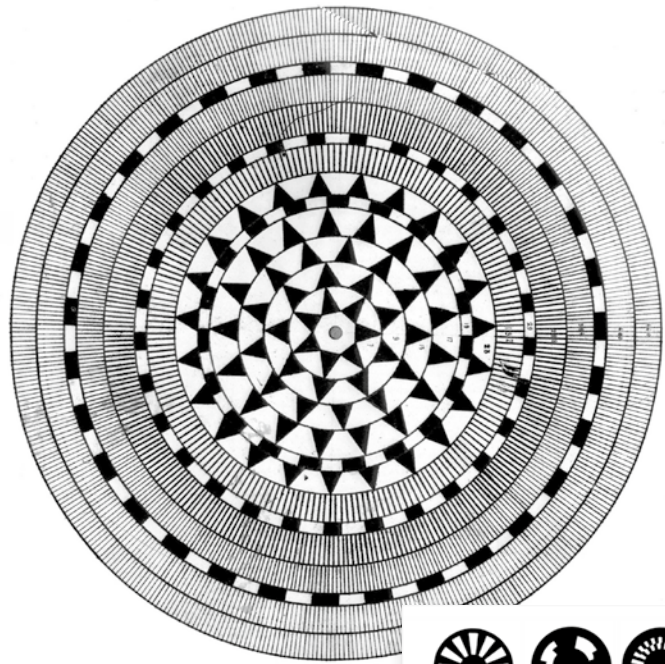
A PORTABLE HARMONIUM, BUILT BY LEON THEREMIN AT THE ACOUSTICAL LABORATORY OF MOSCOW CONSERVATORY IN THE 1960s.



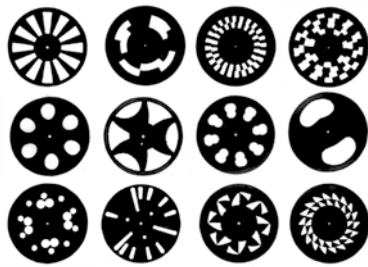
EXPERIMENTAL ELECTRONIC HARMONIUM, BUILT AT THE ACOUSTICAL LABORATORY OF MOSCOW CONSERVATORY IN 1965.

ROOMS 10-11

VII ~ GRAPHICAL SOUND



MULTI-TRACK EXPERIMENTAL
OPTICAL DISK FOR THE NEW
VERSION OF THE VARIOPHONE.
1949.



VARIOPHONE DISKS WITH CUT
WAVE SHAPES. VER. 1, 1932.

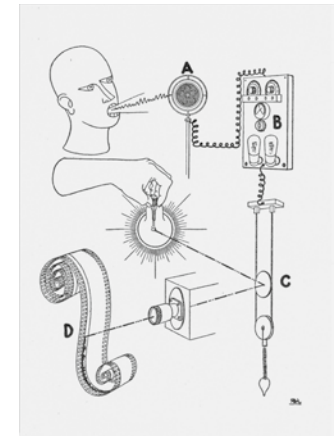
ROOM 10

SOUND-ON-FILM AND GRAPHICAL SOUND

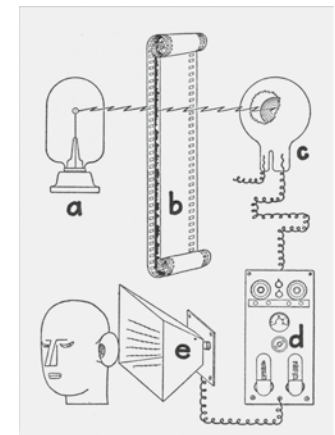
Graphical (drawn) Sound is a technology for synthesizing sound from light that was invented in Soviet Russia in 1929, as a consequence of the newly invented sound-on-film technology. In Soviet Russia, Pavel Tager initiated these developments in 1926, in Moscow. In 1927, just a few months later, Alexander Shorin started his research in Leningrad (today St. Petersburg). Tager's system, the tagephon, was based on intensive variable-density, optical recording on film while in Shorin's »Kinap« system the method of transversal variable area optical recording on film was realized. Another version of Shorin's system, the shorinophone, which was widely used for field and studio sound recording, was based on the mechanical reproduction of gramophone-like longitudinal grooves along the filmstrip.

Among the first Soviet sound movies ever created was »The 5-year Plan. Plan of Great Works« by Abram Room. The group working on this film in 1929 at Shorin's Central Laboratory of Wire Communication in Leningrad included the painter, book illustrator and animator Mikhail Tsekhanovsky, the chief of the composer's brigade Arseny Avraamov, and the inventor Evgeny Sholpo. When, in October of that year, the first roll of film was developed, it was Tsekhanovsky who voiced the idea: »What if we take some Egyptian or ancient Greek ornaments as a sound track? Perhaps we will hear some unknown archaic music?« He was referring to the shapes and outlines of vases and how these could be used like wave forms to generate sound. It was at this precise moment that graphical sound techniques were invented. The next day, they were already furiously at work on experiments in making what they referred to variously as ornamental, drawn, paper, graphical, artificial or synthetic sound.

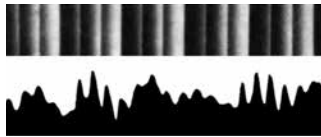
In December of 1930, Mikhail Tsekhanovsky wrote in his article »About the Drawn Sound Film«: »with the invention of new drawn sound techniques (developed by Arseny Avraamov in Moscow, Sholpo and [Georgy] Rimsky-Korsakov in Leningrad), we are achieving a real possibility of gaining a new level of perfection: both sound and the visual canvas will be developing completely in parallel from the first to the last frame [...]. Thus, the drawn sound film is a new artistic trend in which, for the first time in our history, music and art meet each other.«



SOUND-ON-FILM: SOUND IS PROCESSED INTO A PICTURE BY PHYSICALLY RECORDING ONTO PHOTOGRAPHIC FILM-STRIP.



THE SOUND PICTURE (REFERRED TO AS OPTICAL SOUND) IS COLLECTED BY A PHOTSENSITIVE ELEMENT AND EMITTED VIA LOUDSPEAKERS.



INTENSIVE (TAGER SYSTEM, TOP) AND TRANSVERSAL (SHORIN SYSTEM) SOUNDTRACKS.



ARTIFICIAL DRAWN ORNAMENTAL SOUNDTRACKS BY BORIS YANKOVSKY. 1931.



SOUNDTRACK-PROFILES OF BORIS YANKOVSKY (LEFT) AND ARSENY AVRAAMOV (RIGHT). DRAWN BY YANKOVSKY. 1931.

At exactly the same time similar efforts were being undertaken in Germany by Rudolf Pfenninger in Munich and, somewhat later, by Oscar Fischinger in Berlin. Serious research was conducted in Moscow by Boris Yankovsky.

Among the researchers working with graphical sound after World War II were the famous filmmaker Norman McLaren (Canada) and the composer and inventor Daphne Oram (UK).

ORNAMENTAL SOUND

The ornamental sound technique, originally developed in 1929–1930 by Arseny Avraamov, was similar to German animator and filmmaker Oscar Fischinger's sounding ornaments first presented in 1932. In 1930, however, Avraamov was the first to demonstrate experimental sound pieces – based on geometric profiles and ornaments – produced purely through drawing methods. This was achieved by means of shooting still images of drawn sound waves on an animation stand.

In autumn of 1930 Avraamov founded the Multzvuk group at Mosfilm Productions Company in Moscow. To produce his first drawn ornamental sound tracks, he had on staff a special draughtsman, cameraman Nikolai Zhelynsky, animator Nikolai Voinov and acoustician Boris Yankovsky. Yankovsky was responsible for the translation of musical scores into Avraamov's microtonal Welttonsystem, as well as Samoilov's Ober-Unter-Ton Harmony system. The final scores were coded in Yankovsky's 72-step, ultrachromatic scale with the dynamics and speed variations indicated by the number of frames. Yankovsky was also involved in the production of acoustic experimental studies, developing methods for the synthesis of sounds with glissando, timbral cross-fades, timbral variations, and polyphony, by means of multiple shootings on the same optical soundtrack (a type of multi-track recording). From 1930 to 1934, more than 2000 meters of sound track were produced by Avraamov's group, including the experimental films »Ornamental Animation«, »Marusia Otravilas«, »Chinese Tune«, »Organ Cords«, »Untertonikum«, »Prelude«, »Piruet«, »Staccato Studies«, »Dancing Etude« and »Flute Study«.

In autumn of 1931 the Multzvuk group moved to NIKFI (Scientific Research Institute for Cinema and Photography) and was renamed Syntonfilm Laboratory. In December of 1932, NIKFI stopped supporting Syntonfilm, and the group moved to Mezhrabpomfilm, and was closed in 1934 because it was unable to operate economically. The whole archive was kept for many years at Avraamov's apartment, where, between 1936–37, during Avraamov's trip

RIGHT:
A. LEO. DIE GROSSE
ERFINDUNG - GRAPHOMUSIK.
MOSKAUER RUNDSCHAU. 15.03.1931.

DIE GROSSE ERFINDUNG — „GRAPHOMUSIK“

Von A. Leo.

Bevor ich auf die bemerkenswerte Arbeit des Leningrader Erfinders eingehe, die in der technischen und künstlerischen Welt bald zweifellos zur Sprache kommen wird, will ich dem Leser einige Grundlagen der Tonfilmtechnik in Erinnerung rufen. Das Band des Tonfilms unterscheidet sich von dem des stummen Films dadurch, dass längs des linken Randes des Tonfilmbandes, unmittelbar neben der Bilderreihe, eine schmale Kante läuft, die mit der sogenannten Tonschrift bedeckt ist. Nach einem System ist dies eine Reihe von Strichen, die sich durch ihren Dunkelheitsgrad voneinander unterscheiden; in den moderneren und praktisch vollkommeneren Filmen aber sehen wir eine permanente weisse gezahnte Kante, die mehr oder weniger tief in den schwarzen Fond des Bandes einschneidet und deren Zahnbreite die Stromstärke wiedergibt, während die Dichtigkeit der zwischen diesen Zähnen bestehenden Abstände die Frequenz der Tonvibrationen, d. h. die Höhe des Tones bedingt. Diese Schrift entsteht derart, dass die während der Aufnahme erklingenden Töne ein Vibrieren der Stromstärke im Mikrophon verursachen. Vom Mikrophon wird der Strom zum Elektromagneten geleitet, wo er das dort zwischen den Polen liegende Eisenspiegelmchen in Vibration versetzt. Das Spiegelmchen reflektiert sodann den Lichtstrahl auf die Kante des sich abwickelnden Bandes und zeichnet dort, ununterbrochen vibrierend, die oben erwähnte Kurve. Während der Filmprojektion läuft der Prozess in entgegengesetzter Richtung: der Lichtstrahl durchleuchtet die Kante des im Projektionsapparat sich abwickelnden Bandes, wobei seine Helligkeit je nach dem Durchsichtigkeitsgrad der Stellen, die der Strahl passiert, variiert (je breiter an der betreffenden Stelle der Zahn der weissen Kante ist, desto mehr Licht dringt hier durch). Auf die photoelektrische Zelle aber gelangend, verursacht dieser weisse Strahl ein Vibrieren der Stromstärke, worauf der in die Membrane des Lautsprechers geleitete Strom diese Membrane vibrieren und die gleichen Töne entstehen lässt, die während der Aufnahme vor dem Mikrophon erklangen.

Der glänzende Gedanke des Leningrader Erfinders E. A. Scholpo war nun folgender:

Das Endresultat des in den Tonfilmateliers regelrecht durchgeführten Tonfilmaufnahmeprozesses ist die oben erwähnte gezahnte Kurve. Wäre es nun vielleicht möglich, diese Kurve auf dem Band, unmittelbar mit der Hand zu ziehen, d. h. sie erst auf das Papier zu zeichnen, um sie dann auf die Filmbandkante zu photographieren? Unter Ausschaltung des Mikrophons, des Elektromagneten, der ganzen komplizierten Tonaufnahmeverrichtungen und sogar der Tonquelle selbst — haben wir hier die Möglichkeit, ohne Noten und Instrumente — sozusagen „mit der Federspitze“ — Musik zu schaffen, mit der Feder auf dem Filmband lautlos beliebige Melodien zu spielen, um sie später in der Membrane des Lautsprechers erklingen zu lassen.

Die technische Durchführung dieser Idee ist ausserordentlich schwierig und erfordert grosse Vorkalkulationen. Nehmen wir als Beispiel das „hohe C“, dessen Frequenz 2000 Vibrationen pro Sekunde beträgt. Wir wissen, dass der Film mit einer Geschwindigkeit von 50 cm/Sek. läuft, müssen also pro cm Filmband 2000:50 = 40 Kurvenzähne ziehen. Zur Erlangung der erforderlichen Tonstärke muss die Breite eines jeden oder längerer Zähne wünschgemäß geändert werden. Die entsprechende Figur der Kante wird, bei zehnfacher Vergrößerung, auf Millimeterpapierstreifen gezeichnet, und dann beim Photographieren auf das Filmband wieder um zehnfache verkleinert.

Da gewöhnlich bei Musik und Lärm gleichzeitig nicht bloss einer, sondern mehrere (einander interferierende) Töne erklingen, so werden dementsprechend auch bei der graphischen Darstellung die Zähne nicht in einer, sondern in mehreren, parallel nebeneinander laufenden Reihen gezeichnet. Die Zahn-

formen berechnet man im vorhinein auf Grund akustischer Formeln und Musiktheorie.

Was sind nun die praktischen Möglichkeiten, die uns diese kühne Idee gibt? Bei Fällen dokumentaler Filmaufnahme, wo die Wiedergabe natürlicher Töne, im besonderen der Töne der menschlichen Rede, wichtig ist, kann die graphische Methode E. A. Scholpos selbstverständlich keine Anwendung finden.

Die Kinomultiplikation ist das erste Gebiet, auf dem sich dem graphischen Tonfilm sofort nennenswerte Perspektiven eröffnen. Von nun an kann es möglich sein, mit absoluter Genauigkeit und grösster Einfachheit die Kinomultiplikationen zu vertonen, indem am Rande desselben Papierstreifens, worauf der Künstler die Bilder zeichnet, die mit der Bilderreihe ununterbrochen korrespondierende Tonkante unmittelbar skizziert wird. Damit wäre erreicht, dass an Stelle der bisherigen groben medianischen Zusammenfügung der Tonfilmteile mit den besonders gefilmten, gezeichneten Teilen, eine absolute Uebereinstimmung der gezeichneten Darstellung mit der tonenden erzielt wird, da die Synchronisierung der Aufzeichnung beider Aufzeichnungen durch ein und dieselbe Hand von Bild zu Bild stattfindet.

Doch nicht nur darin liegt die Bedeutung der Sache. Wir bemerkten schon oben, dass die graphische Produktion der Tonaufzeichnung auf dem Tonfilmband das Tonfilmwesen in einer Reihe von Fällen nicht nur von der ganzen Einrichtung eines Tonfilmateliers entlastet, sondern sogar die Tonquellen überflüssig macht. Wir könnten Tausende von Rauteilsparen, können mit der Hand auf einem Zelluloidfilmband das Spiel eines ganzen, eine grosse Menschenzahl vereinigenden Symphonieorchesters produzieren, ohne Hilfe auch nur eines Musikers, ohne Beanspruchung auch nur eines Instruments, — ausschliesslich mittels Reissfeder und Tusche. Und noch mehr: bei graphischer Produktion der Töne auf dem Filmband ist der Operateur gar nicht gezwungen, die in der Musikpraxis schon vorhandenen Instrumente zu imitieren, oder für diese Instrumente geschriebene Kompositionen zu verwenden. Der Operateur ist jetzt in der Lage, mit Hilfe von Zahn und Tuschestrich, auf Papier und Filmband beliebige neue Tonkombinationen zu schaffen, beliebige neue Melodien zu komponieren, ohne akustisch an ein Material (Saiten, Röhre) gewöhnlicher Instrumente gebunden zu sein, ohne auf die akustischen Möglichkeiten dieser Instrumente, oder — und hier liegt das Hauptmoment — auf die physiologischen Mittel des menschlichen Körpers beschränkt zu sein.

Nur den Komponisten ist es in vollem Masse bekannt, wie sehr das musikalische Schaffen durch die Notwendigkeit der fortwährenden Berücksichtigung dieser beiden, zwischen Komposition und Ton wirkenden Vermittler, — durch das Instrument und den Körper des Musikers — belastet wird.

Nun kann der Komponist der Graphomusik, durch keinerlei Vermittler behindert, über absolute Bewegungsfreiheit im Meer der dem menschlichen Ohr zugänglichen Töne verfügen, kann, einerseits, die Möglichkeiten der alten Instrumente unbegrenzt erweitern, andererseits hat er die Möglichkeit, beliebige neue Klänge auf dem Filmband zu kombinieren und zu erfinden, Klänge, die denen der materiellen Instrumente vielleicht gar nicht ähnlich sind, — ist in der Lage, neue musikalische Muster zu kreieren, die aus physischen und physiologischen Gründen kein Orchester, kein Künstler der Welt darstellen kann.

Diese Erfindung, die eigentlich dahin führt, dass die Geschichte der Musik von neuem beginnt, lenkt heute die ganze Aufmerksamkeit der Leningrader Musikwelt auf sich. Der Komponist Rimski-Korsakow (Enkel des russischen Musikklassikers) führt bereits, zusammen mit E. A. Scholpo, die ersten Versuche des Zusammenstellens und Schaffens von Graphomelodien und Graphokompositionen durch, und es haben auch schon einige experimentelle Vorführungen stattgefunden.

to the Caucasus, it was burned by his children, who made rockets and smoke screens with the old nitro-film tapes, which were highly flammable.

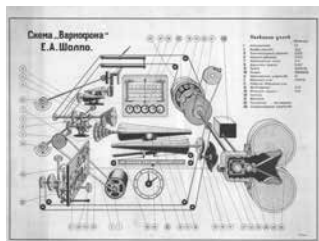
THE VARIOPHONE

The Variophone was invented by Evgeny Sholpo in 1930 at Alexander Shorin's Central Laboratory of Wire Communication in Leningrad. In May of 1930 Sholpo applied for a patent on a »method and device for the production of a periodic sound track on film.« It was a continuation of research that Sholpo had been conducting since the 1910s, when he was working on performer-less music.

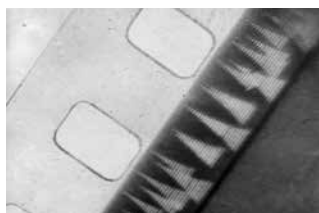
The first version of the variophone was built in 1931 by Sholpo, together with composer Georgy Rimsky-Korsakov (grandson of the famous composer Nikolai Rimsky-Korsakov). It was capable of producing artificial soundtracks by means of automated paper sound techniques. The instrument was made with wooden parts fixed by wires and tuned with cords. Compared with later versions, it produced the best quality and complexity of sound. Unlike Avraamov, who shot still images of sounds on an animation stand, Sholpo used cardboard disks with circular images of combs with suitably-shaped cogs rotating synchronously with a moving filmstrip. The advantages of the Variophone were in flexible pitch control and vibrato. Sholpo's method improved access to varieties of timbres; he could produce polyphonic soundtracks with up to twelve voices.

By the early 1931, at Lenfilm Studio, with assistance from G. Rimsky-Korsakov, Sholpo made a soundtrack for the short propaganda film »The Year 1905 in Bourgeois Satire« (director N.I. Galkin, composer V.M. Deshevov). In the summer of 1932, Sholpo and Rimsky-Korsakov produced the synthesized soundtrack for the new color cartoon »The Symphony of Peace« by E.J. Johansson and G.V. Bankovsky.

Many soundtracks for movies and cartoons were produced using the Variophone. Among the most accomplished pieces recorded with the Variophone from 1933 to 1934 were »The Carburettor Suite« by G. Rimsky-Korsakov, »Waltz« by N. Timofeev, »Flight of the Valkyries« by Richard Wagner, and Franz Liszt's »6th Rhapsody«. In 1941, during the blockade of Leningrad, together with composer Igor Boldirev, Sholpo synthesized one of his most experimental pieces – the soundtrack for the cartoon »The Vultures«. Although aesthetically these works are similar to Wendy Carlos' »Switched-on Bach« (1968) and sound like eight-bit music, the main difference is in their timing.



VARIOPHONE CONSTRUCTION DIAGRAM, VER.3, LATE 1930s.



VIEW ON THE TYPICAL SOUNDTRACK PRODUCED BY THE FIRST VERSION OF THE VARIOPHONE.

In 1918, Sholpo developed special tools – the Melograph and the Autopiano-graph – to register the temporal characteristics of live musical performance. Much electronic music has a rigid tempo, like a metronome; Sholpo was able to simulate more subtle variations in tempo such as »rubato«, »rallentando« and »accelerando«, based on his careful analyses of live piano performances by the best pianists.

EVGENY SHOLPO

Evgeny Sholpo (1891–1951) was born in the town of Gorohov in the Pskov region (North-West Russia). From 1918 to 1922 while doing military service during the Civil War in Russia, he was a draftsman and a freelance musician and researcher. In 1918, he developed the Melograph and the Autopiano-graph – tools capable of registering the temporal characteristics of live musical performances. From 1920 to 1923 he taught geodesics, plotting and art construction at the Oranienbaum Wood Technical School. At the same time, he took classes in musical theory with Professor V.P. Kalafati. From 1923 to 1924 he wrote a research paper »Introduction to the Experimental Analysis of Piano Performance«. In January 1926, he was hired by the State Institute for History of Arts as an assistant manager of the Laboratory for Musical Acoustics. When the Institute was reorganized as the Leningrad branch of the State Academy of Art History, he became an assistant in the Film Laboratory. In 1930, he worked as a constructor at the Audio Sector of the Sovkino Film Studios. That same year he patented a principle of the future Variophone. After 1932, he was the manager of the department for Graphical Sound at the Scientific and Technical Laboratory of the Lenfilm Studios. In 1934, he worked at the Souztechfilm Studios.

In 1935, Boris Krasin, who had just been appointed Commissar of the Soviet Pavilion at the 1937 Paris World Fair, invited Sholpo to present his graphical sound program during the exhibition. At the same time Sholpo was invited to join the ANTES (The Autonomous Scientific-Technical Sector at the Union of Composers) branch in Leningrad. For a short period, the laboratory received better funding and additional staff, and Sholpo was able to start developing the second (and most successful) version of the variophone. After Krasin's death in 1936 the Paris project was dropped and in January 1937 Sholpo's laboratory was passed to the Leningrad Musical Scientific Research Institute (later renamed the Scientific Research Institute of Theatre and Music) without staff or sufficient funding.



EVGENY SHOLPO WORKS WITH THE FIRST VERSION OF THE VARIOPHONE. 1932.



THE BUILDING OF THE LABORATORY FOR GRAPHICAL SOUND. LENINGRAD 1946.



THE SPECIAL »EMPLOYEE-COMPUTERS« AT THE LABORATORY FOR GRAPHICAL SOUND. LENINGRAD. 1946.



EVGENY SHOLPO WORKS WITH THE FIRST VERSION OF THE VARIOPHONE. LENINGRAD, 1931-32.



EVGENY SHOLPO'S WORKING PLACE.

In 1940, he received a doctoral degree in art criticism. In 1939, Sholpo and Boris Yankovsky decided to unite their efforts and to establish the new Laboratory for Graphical Sound in Leningrad. The project was interrupted by World War II, when it crossed the border of the USSR in June 1941. Sholpo spent the first six months of the war in Leningrad, working on the soundtrack for the cartoon »The Vultures.« In December 1941, he was evacuated to Tashkent with the staff of the Leningrad Conservatory. He was teaching at the Conservatory until 1944, when he returned to Leningrad.

In 1946, Sholpo became director of the new Scientific Research Laboratory for Graphical Sound at the State Institute for Theatre and Music in Leningrad. In 1947, a criminal case was brought against Sholpo, who was accused of wasting resources. The accusation was not proven and the prosecution dropped the case, but Sholpo's reputation had been undermined. In 1948, the laboratory was reorganised and moved to Moscow. Sholpo was removed from his position as director, and in 1950, the Laboratory was finally closed. In 1951, after a long illness, Sholpo passed away.

MECHANICAL ORCHESTRA

In the summer of 1917 in Petrograd (St. Petersburg nowadays) the young inventor Evgeny Sholpo (1891–1951) wrote a science-fiction short story entitled *The Enemy of Music* in which he described a sound machine named the *Mechanical Orchestra*, capable of synthesizing any sound and producing music according to a special graphical score without any need for a performer. The second chapter of Evgeny Sholpo's story describes the *Mechanical Orchestra* and the process of its performance. The instrument is based on the same principles as the *ANS Synthesizer*, built 35 years later by Evgeny Murzin. According to Sholpo's description the instrument incorporates a set of sine wave oscillators, based on numerous Helmholtz tuning forks, adjusted on fixed frequencies, forming a discrete scale which covers the whole audible range with intervals between successive pitches imperceptible to the human ear. Control over the system and the process of sound synthesis is to be carried out by means of a special graphical score with the diagram which represents the spectrum of a sound by means of cut-out transparent strips, having appropriate shapes and slopes, allowing a complete set of sine wave tones to be operated synchronously and independently, controlling the sound on a spectral level, directly manipulating the overtones, erasing the difference between the pitch-based harmony structures and the spectral tissue of a sound.

In spring 1917 the Leonardo da Vinci Society was founded in Petrograd by Evgeny Sholpo and Arseny Avraamov accompanied by the young mathematician and musicologist Sergei Dianin. Their objective was to unite efforts to produce a revolution in music theory and techniques based on the interconnection of the arts and sciences. They declared that academic views on music theory were dull and scholastic, and that techniques related to it were old-fashioned, proclaiming that both were becoming increasingly outdated. As Sholpo noted: »We were sure that by knowing this data we could get an analytical insight into the secrets of creativity (at least in performance) and, armed with mathematical formulae, break mystical and idealistic tendencies with an explanation of the phenomena of music creation.« Evgeny Sholpo was focusing on the development of a device for the automatic monitoring and registration of the temporal characteristics of piano performances. He was interested in the opportunity to gain exact objective data about the process of musical performance. Arseny Avraamov was applying physics and history in the fields of philosophy and sociology of music. Sergey Dianin, searching for new timbres, was fighting with an iron string, »forcing it to vibrate contrary to the laws of mechanics. Only the invention of sound cinema was able to change everything.«

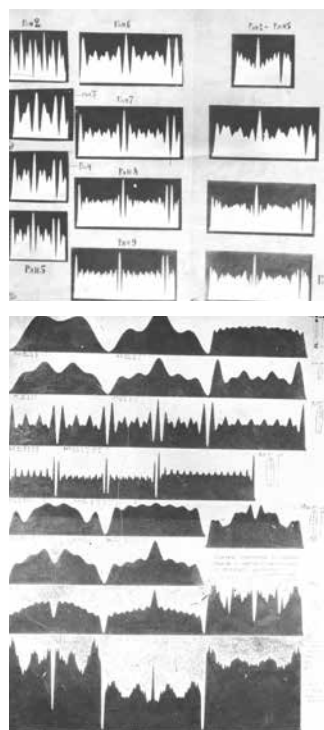
BORIS YANKOVSKY: SYNTONES

From 1931 to 1932 Boris Yankovsky (1905–1973) was on the staff of the *Multzvuk* group. In 1932, however, disappointed with its ornamental sound approach, he left the group. Unlike most of his colleagues, he understood that the waveform does not represent the tone colour uniformly and that only the spectrum of sound developed in time with all the nuances of its temporal transitions can give a complete picture. Of all the early graphical sound pioneers, Yankovsky alone pursued the approach of spectral analysis, decomposition and re-synthesis. His concept was based on the belief that it is possible to develop a universal library of sounds similar to Mendeleev's table of chemical elements. His curves were spectral templates, semiotic entities that could be combined to produce sound hybrids. As an option, he developed several sound processing techniques including pitch shifting and time stretching based on the separation of spectral content and formants, resembling recent computer music techniques of cross synthesis and the phase vocoder. To realize these ideas, he invented a special instrument, the *Vibroexponator* – the most paradigm-shifting proposition of the mid-1930s.

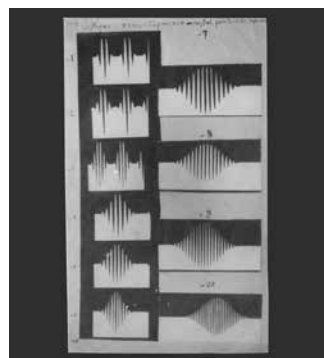
In 1933, Yankovsky was invited to Mosfilm Studios to organize the Laboratory for Synthetic Sound Recording, where from 1934 to 1935 he recorded a



BORIS YANKOVSKY. CIRCA 1939.



COLLECTION OF DIFFERENT SYNTONES. 1935–36.



PENTAOVERTONES. PROTOTYPE OF THE MODERN FORMANT SYNTHESIS. 1935–36.

sizeable collection of samples of instruments from the Symphony Orchestra of the Bolshoi Theatre. By 1936, the collection of 110 synthesized templates was created.

In 1935, Yankovsky joined the Autonomous Research Section (ANTES) at the Union of Composers in Moscow, founded by Krasin, Avraamov and Ogolevets. It was the last significant manifestation of creativity with its roots in the forward-looking 1920s. In 1936, the infamous Pravda article »Confusion Instead of Music« was published, initiating a war by the totalitarian state against the freedom of artistic expression. After the death of Krasin in 1936, ANTES was closed and the Ministry of Culture stopped funding Yankovsky's laboratory. It was passed on to the NIMI institute at Moscow Conservatory. Little changed, but by the end of 1937, Yankovsky finally got his syntones to make sounds.

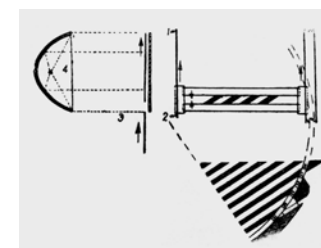
In 1939, Yankovsky met Evgeny Murzin – a young inventor, fascinated by the idea of a universal tool for sound synthesis. After a year of conversations, the final concept of the future ANS synthesizer was formulated. The same year Boris Yankovsky and Evgeny Sholpo decided to unite their efforts and the new Laboratory for Graphical Sound at the Institute of the Theatre and Film was established. Yankovsky moved to Leningrad. He expected to complete the final version of his Vibroexponator in 1940, but was prevented, in the end, by World War II, and never returned to the graphical sound.

SYNTONES AND AUDIO COMPUTING

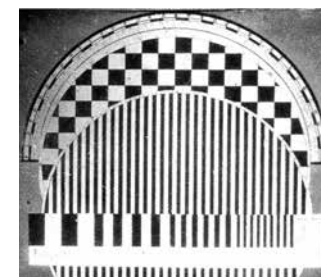
Boris Yankovsky proposed the method, based on research into structural similarities and distinctions among spectrums of sounds of different character, to limit, as much as possible the number of calculations needed for the additive synthesis of various complex sounds.

In order to achieve this he decided to analyze the spectra of various sounds; to divide all sounds into classes according to common features of timbres, related to spectra and spectral dynamics; to calculate and draw the waveforms related to these spectral groups; and to build a library of drawn waveforms for further manipulation within the framework of various synthesis tasks.

Yankovsky named these final drawn waveforms »spectro-standards« or »spectral templates«. To synthesize a new sound, one would need to choose several templates, to recalculate their sizes according to the desirable frequencies and intensities of formants, and then, to mix them.



A PART OF THE CONSTRUCTION OF THE VIBROEXPONATOR RELATED TO THE SLIDE COPYING AND PITCH SHIFTING TOOLS. 1936.



SCALE WITH PRECISELY CALCULATED ANGLES OF ROTATION RELATED TO DESIRABLE PITCH SHIFT. YANKOVSKY, 1935.

To produce the sound dynamically changing in time, one would have to calculate the sequence of static frames, in which each frame represents the successive state of changing timbre. In order to produce the final soundtrack, one would have to cross-fade successive overlapping frames by optical means to achieve smooth transitions and to avoid clicks. Yankovsky developed his Vibroexponator to realize this process in a single tool. A crucial part of the Vibroexponator was the slide-copying machine tool devised to convert the initial »transversal« optical soundtrack into the »intensive« form necessary, in order to produce new waveforms related to different lower pitches of the sound. To achieve this, the photo plate with variable-density waveform needed to be mounted behind another thin aperture, rotated according to the scale, with precisely calculated angles of rotation related to the desirable pitch shift. Further film was then exposed using this aperture.

PAPER SOUND

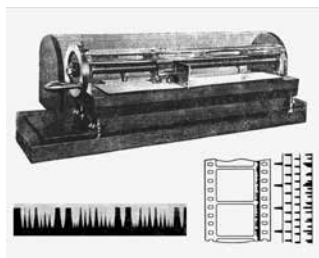
Nikolai Voinov (1900–1958) began his career as an animator in 1927. In 1930, he was involved in the production of the first drawn soundtracks at Arseny Avraamov's Miltzvuk laboratory. In 1931, he left and started his own research as a developer of paper sound techniques. These were based on the synthesis of sound waves by means of paper cutouts with the carefully calculated sizes and shapes produced by his newly invented tool, the Nivo-tone. Voinov's method offered a surprisingly efficient level of control over the dynamics of sound.

As of 1931, Voinov was involved in the activities of the IVVOS group (Ivanov, Voinov, Sazonov). This group produced a number of animated cartoons with synthetic sound tracks, including »Barynia« (1931), »Rachmaninov's Prelude« (1932), »The Dance of the Crow« (1933), »Zones, Safety Lines« (1934) and »The Thief« (1935). The original script of the cartoon »The Thief« was written by Béla Balázs in 1932–33 and was based on Stalin's remark: »We won't let a fascist pig get into our soviet kitchen garden.« The main character was a disgusting pig with a swastika on its back. In a final 1934 version of the film (after the Nazi take-over in Germany), the script was changed: the swastika disappeared and the pig was stealing water-melons at the collective farm.

In early 1936, Voinov was dismissed from the Moscow Film Factory and his laboratory was closed. For the rest of his life, he worked successfully as a cameraman at Souzmultfilm Studio. In Voinov's official biography his most experimental work from 1931 to 1936 is not even mentioned. According to the remembrances of animator and illustrator Evgeny Migunov, Voinov be-



NIKOLAI VOINOV CUTS FROM THE PAPER THE PROFILES OF THE WAVE SHAPES. MOSCOW, 1933.



NIVOTONE TOOL (1931) AND ILLUSTRATION OF PAPER SOUND METHOD WITH A FINAL SOUNDTRACK.

longed to the »generation of the 1920s – a generation with characteristics of the time that distinguished them as a new formation. His latent intelligence, total absence of impudence and absolute decency guaranteed him unconditional respect.« Migunov observed that »for most of his life, he [Voinov] was deeply disappointed as his main ideas and potential were unrealized« and attributed Voinov's heavy drinking and related problems to this longstanding frustration. This sense of unfulfilled ambition was common to many other pioneers of the period.

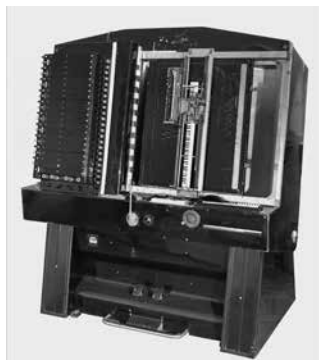
ROOM 11

EVGENY MURZIN

Inventor Evgeny Murzin (1914–1970) graduated in 1938 from the Moscow Institute for Engineers of Municipal Construction, and in 1941, he completed his postgraduate study at the same institute.

During World War II, he attended courses at the Dzerzhinsky Military Academy in Moscow. During the war, he worked as a military technician and inventor in military research laboratories. Later, as a military inventor and a senior lieutenant, Murzin was directed to the secret scientific research institute, where he directed the development and testing under fighting conditions of various control devices for ground artillery. After the war in 1945, Murzin completed his master's thesis on these subjects. Later he was involved in the development of equipment for audio investigations for ground artillery and instrumental methods for directing fighter interceptors at enemy bombers. From 1945 to 1950, Murzin was the assistant of the main constructor of the laboratory. From 1951 to 1953, he was the main constructor of command equipment for directing and managing the fighter corps of the air defence systems of the USSR.

In 1938, Murzin proposed a project for a photo-electronic ANS sound synthesizer (the initials of composer A.N. Scriabin), which was finally built and patented in 1958. It was remarkably close to the concept of Evgeny Sholpo's Mechanical Orchestra. After 1967, Murzin was the head of the first Soviet Electronic Music Studio at the Scriabin Museum in Moscow. The ANS synthesizer was the last original development in the realm of musical technology that was created in the USSR.



THE SECOND VERSION OF THE ANS HAS BEEN CONSTRUCTED IN 1964.

THE ANS SYNTHESIZER

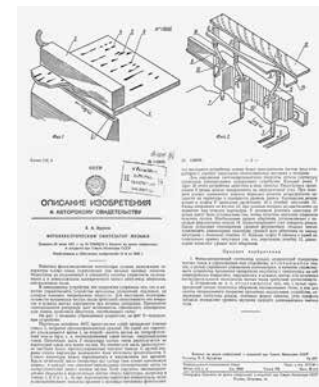
In 1957, the young inventor Evgeny Murzin (1914–1970) finished developing and patented a photo-electronic musical instrument called the ANS Synthesizer. (Its name was derived from the initials of influential composer Alexander Nikolayevich Scriabin.) It was remarkably close to the concept of Evgeny Sholpo's Mechanical Orchestra. The instrument was based on a set of sine wave oscillators, adjusted on fixed frequencies, forming a discrete scale, covering the whole audible range with intervals between successive pitches imperceptible to the human ear. Control over the system and the process of sound synthesis was carried out by means of a special graphical score, with a diagram representing the spectrum of a sound by means of drawn, transparent strips with appropriate shape and slopes, making it possible to operate the whole set of sine wave tones synchronously and independently, and control the sound on a spectral level by directly manipulating the overtones, erasing the difference between the pitch harmony structures and a spectral tissue of a sound. A similar principle of the graphical score was used in the legendary UPIC computer system, developed by Yanis Xenakis in 1977, in the Centre d'Etudes de Mathematiques et Automatiques Musicales in Paris.

The ANS synthesizer was based on the scale of 72 steps per octave proposed by Boris Yankovsky, who was involved in the development of the ANS in 1939–40. The instrument utilizes the same principles as those of the Variophone. It incorporates a set of rotating optical disks with photo-printed round optical sound tracks. While in the Variophone, one rotating disk produced a single sound, in the ANS, each optical disk contained 144 independent sound tracks. Four disks, used in the first version of the instrument, could produce 576 sine waves simultaneously with frequencies covering the entire audible range. ANS was a real-time instrument, producing the audible result directly while functioning.

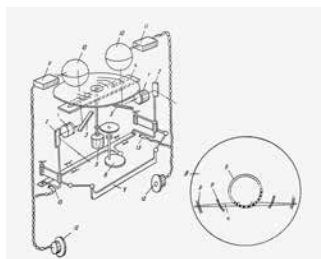
In 1967, the studio of electronic music was established in Moscow, with the ANS synthesizer at its core. Among the composers working with the ANS were Alfred Shnitke, Sofia Gubajdulina, Edison Denisov, Eduard Artemyev, Alexander Nemtin and Stanislav Krejchi. The instrument was used for scoring many films, in particular the early films of Andrei Tarkovsky.



EVGENY MURZIN. MOSCOW, 1940.



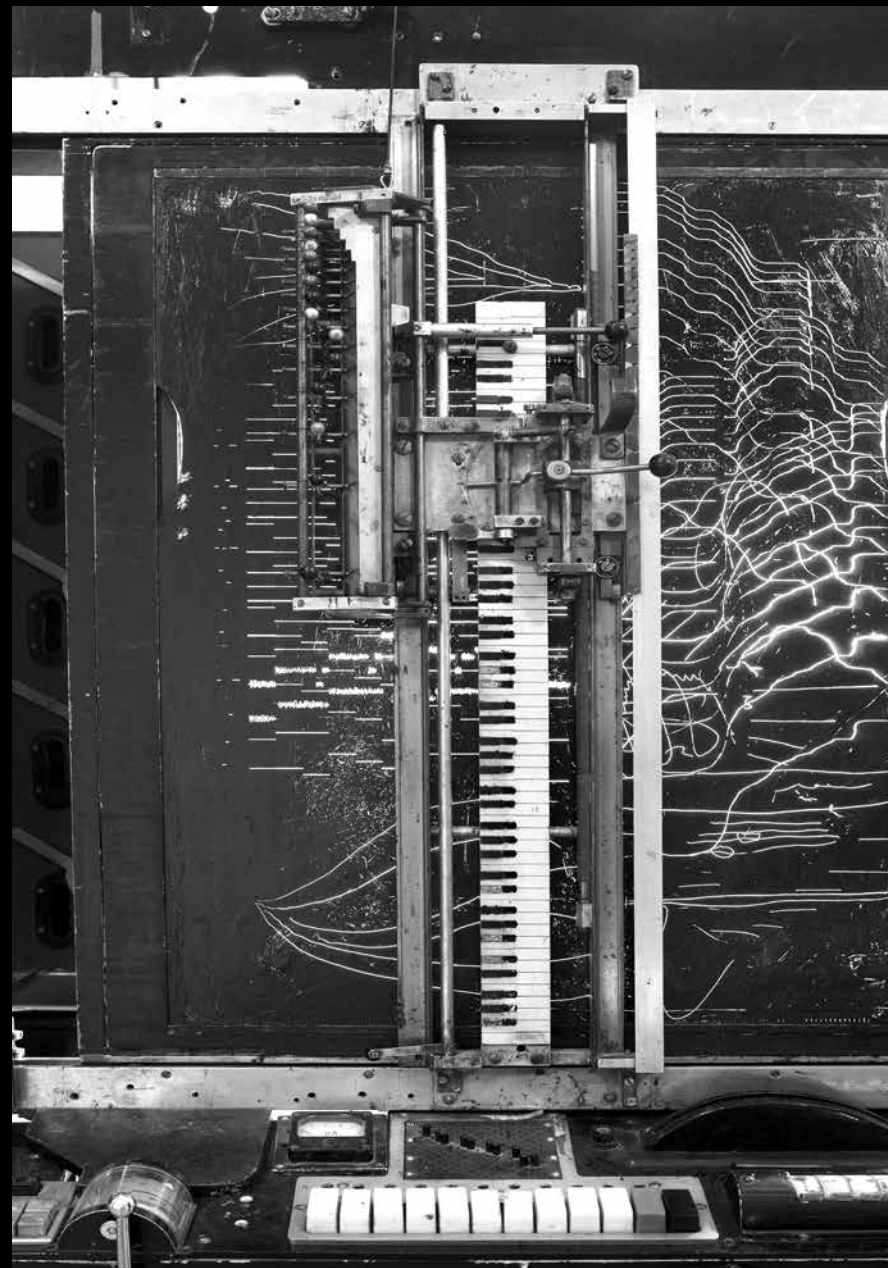
EVGENY MURZIN. COPYRIGHT CERTIFICATE N 118695 ON THE PHOTOELECTRIC MUSIC SYNTHESIZER (ANS SYNTHESIZER).



VISUAL PROTHESIS FOR GENERAL USE BY THE TOTALLY BLIND. DIAGRAM FROM THE COPYRIGHT CERTIFICATE, 1958.

VISUAL PROTHESIS

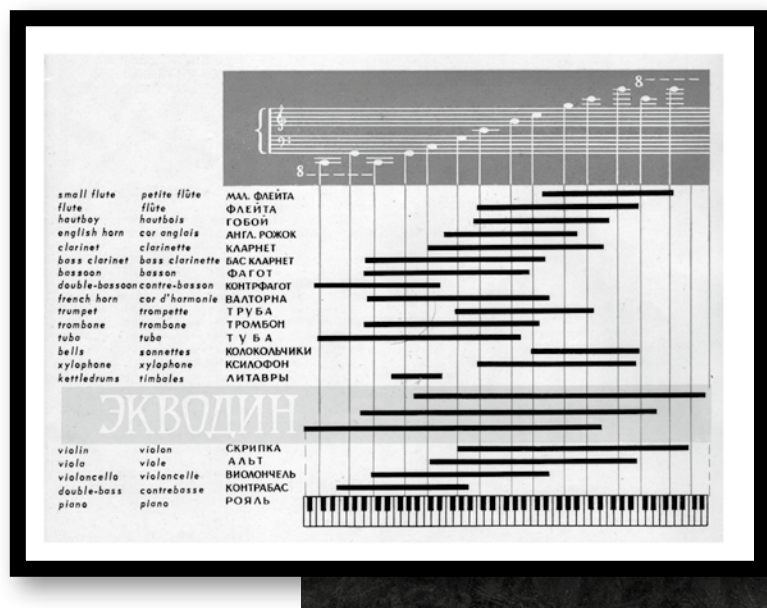
In December 1958 in Moscow, Evgeny Murzin applied for a patent entitled »Visual Prosthesis for General Use by the Totally Blind«, concerning an apparatus which mapped »viewed« images across based on the same principles as the ANS Synthesizer. This visual prosthesis system was conceived as an optoelectronic camera mounted on the head of the user. It contained two lenses, and two scanning mirrors, which are directed forward in eye-like fashion. These mirrors periodically scan the user's notional field of view, sending an image through each lens to a special optical system, modulating light similar to the ANS synthesizer. The modulated light, when detected by photovoltaic cells, produces a corresponding current, which is then amplified through headphones, to produce sounds with different pitches and complexities, the height of the image corresponding to pitch, and the brightness to amplitude. By means of two parallel scanning systems having slightly different points of view, it is possible to resolve the contours, or outlines of objects by their position in relation to the mechanism and therefore the user's head. Murzin proposed that with practice, a blind user might learn to decode the complex sounds produced by this apparatus as a meaningful representation of vision.



RIGHT:
SCORE AND CODER OF THE SECOND
VERSION OF THE ANS.

ROOM 12

VIII ~ GIMN/ NIMI INSTITUTE



THE DIAGRAM, ILLUSTRATING THE PITCH RANGE AND THE SOUND LIBRARY OF THE EKVODIN B11. MOSCOW, CIRCA 1960.

GIMN/NIMI INSTITUTE

The State Institute of Musical Science / Государственный институт музыкальной науки (GIMN) was founded in Moscow in 1921 in an attempt to centralize all activities related to musical science, including disciplines such as acoustics, musicology, psychology, physiology, construction of new musical instruments and ethnomusicology. Nikolai Garbuzov was elected director.

From the beginning, GIMN was oriented towards academic research. Among GIMN associates were many scholars and inventors from the realm of music and beyond, including Peter Zimin, Leonid Sabaneev, Leon Theremin, Nikolai Bernstein, Pavel Leiberg, Boris Krasin and Emily Rosenov. Numerous research projects were conducted, articles published and experimental devices built.

In 1923, GIMN supported the performance of the «Symphony of Sirens» in Moscow, and even applied for an additional night-time show, which was never realized. In autumn of 1923 Arseny Avraamov was involved in the reorganization of GIMN. He considered this institution his own creation, since most of its research activities were based on ideas he had developed and published in numerous articles between 1914 and 1917. It came to represent a struggle between revolutionary artistic approaches and increasingly conservative mentalities. Although the draft program of the new GIMN was signed by Avraamov, Garbuzov and Gnesin, the final document contained neither Avraamov's ideas nor his signature. Even though Mikhail Gnesin – one of Russia's foremost composers – considered Arseny Avraamov one of the founders of Russian musical acoustics, in the official documentation of GIMN Avraamov's name is not even mentioned.

In 1931, GIMN was closed, and in 1933, Garbuzov established a new Research Institute for Musical Science (NIMI) at the Moscow State Conservatory where in the 1940s, it was renamed as the Acoustical Laboratory. In the realm of music and its technology, GIMN/NIMI was the highest-level organization in Moscow. Projects from all over Soviet Russia seeking a patent or financial support needed a positive review from the appropriate GIMN/NIMI experts. As many of these experts were involved in similar research or had different aesthetic views, their responses were often negative, based on biased opinions and self-interest rather than scholarship, discourse and the greater good.



THE STAFF AND FACILITIES OF THE ACOUSTICAL LABORATORY (FORMER NIMI) IN THE 1950–70s.

RESEARCH AT GIMN

Piotr Zimin specialized in research into musical instruments, especially organs and piano. He conducted very advanced research into rhythm and the temporal characteristics of instrumental musical performance, which was very similar to Evgeny Sholpo's research taking place concurrently in Leningrad. Leonid Sabaneev undertook research into Alexander Scriabin's music, microtonal ultrachromatic music, synaesthesia and colour hearing. Pavel Leiberg was exploring microtonal scales, combinational tones and beats, while Alexander Samoilov, supposing that the structure of a spatial lattice of musical intervals possesses the same features as the structure of a spatial lattice of crystals, conducted research into the multidimensional nature of sonic space, studying the locations of musical intervals on a line, on a plane and in space.

Among the many researchers and inventors involved were Leon Theremin, Nikolai Bernstein, Boris Krasin, Emily Rosenov, Mikhail Gnesin, and Arseny Avraamov. Numerous research projects were conducted, articles published and experimental devices built, including a harmonium in a natural (overtone) scale, and a quarter-tone harmonium with two keyboards. Sergei Rzevkin built his Radio-Harmonium on cathode valves; this was the second electronic musical instrument to be built in Russia after the invention of the Theremin. It was a sort of three-voice oscillator, capable of producing polyphonic chords in any temperament. Nikolai Garbuzov built a device to study the phenomena of synopsia (colour hearing).

MICROTONAL MUSIC

One of the most popular areas of experimentation and research in the first decades of the 20th century was microtonal music. It was explored further in 1907 independently by Ferruccio Busoni in Europe and Nikolai Kulbin in Russia. However, the first practical and theoretical work in Russia was developed and published in numerous articles by Arseny Avraamov from 1914 to 1916. By the 1920s, there were several musicians involved in this research and related composition. Among them were Leonid Sabaneev, Arthur-Vincent Lourié, Emily Rosenov, Georgy Rimsky-Korsakov. One of the most advanced studies on microtonal music was developed by polymath Pavel Leiberg – a teacher of mathematics and physics at Moscow University from the 1890s onwards. Being very much involved in musical acoustics, he undertook important research on acoustic resonances, and from 1923, while working at GIMN, he developed a series of studies on microtonal music which he



PAVEL LEIBERG, CIRCA 1910s.

presented in a series of reports. He compared various microtonal scales and also explored the physical nature of microtonal scales and related problems of human perception.

Among other projects under development related to microtonal music were those of Leonid Sabaneev, who developed a mobile instrument based on a 28-tone modulation scale, as well as a 53-tone, well-tempered scale and a related harmonium with four musical keyboards. Emily Rozenov conducted research into the analysis of temperaments from 12 up to 48 steps, based on Rimsky-Korsakov's methods. He proposed the construction of a harmonium based on a 17-tone overtone-undertone modulation scale (permitting transpositions between different tonalities), that possessed three keyboards and special controls for transposition. Piotr Renchitsky was at work developing a 24-tone well-tempered system as a way of extending the common temperament. Arseny Avraamov made several studies on the de-temperament of music, ultrachromatism and the universal tone system (the Welttonsystem).

EXPLOSION OF CREATIVITY IN THE EARLY 1930s

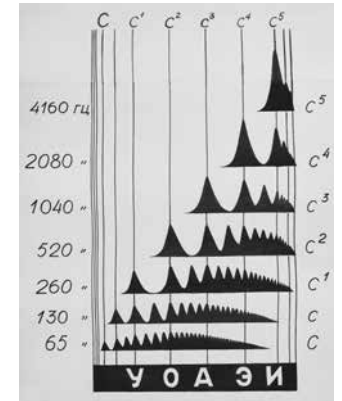
In the field of music and its technology NIMI was the highest-level organization in Russia. Projects from all over Soviet Russia seeking a patent or financial support needed a positive review from the appropriate NIMI experts. The explosion of creativity in the 1920s resulted in the avalanche of proposals for invention, produced in the early 1930s all over Soviet Russia. Dozens of proposals, related to new musical instruments, new systems of harmony, new scales and temperaments, new musical »interfaces«, keyboards and fingerboards etc. are collected in the GIMN/NIMI archive, where one can find a number of surprising stories that illustrate the process of interaction between the authoritarian State and the creative community. According to NIMI correspondence, by the late 1930s, this avalanche almost finished and never came back again.

ELECTRONIC INSTRUMENTS THE EKVODIN

A two-voice duophonic electronic instrument, the Ekvodin was invented during the early 1930s at NIMI institute in Moscow by Andrey Volodin with the assistance of Konstantin Kovalsky. In the early versions, it was operated from a fingerboard which later was replaced by a conventional keyboard, as in



PAVEL LEIBERG. COMPARISON OF VARIOUS SCALES. GIMN, 1926.



ANDREI VOLODIN'S ILLUSTRATIONS OF THE VOCAL FORMATS.



THE EKVODIN VERSION B11



IGOR NIMONOV DEMONSTRATES HIS POLYPHONIC HARMONIUM TO NICOLAI GARBUZOV AND THE NIMI/ ACUSTICAL LABORATORY STAFF.



EMIRITON. THE MODEL, BUILT IN THE EARLY 1940s.



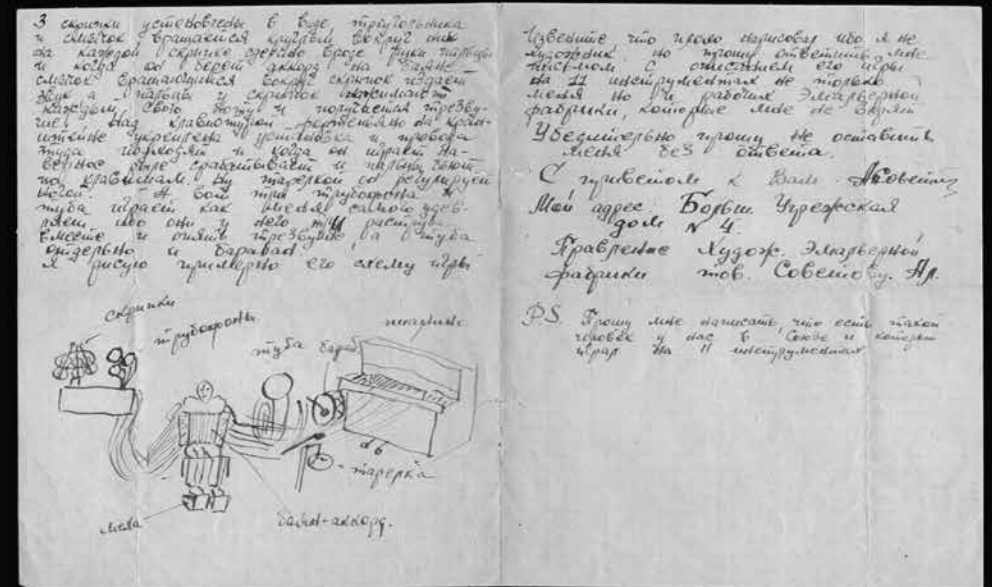
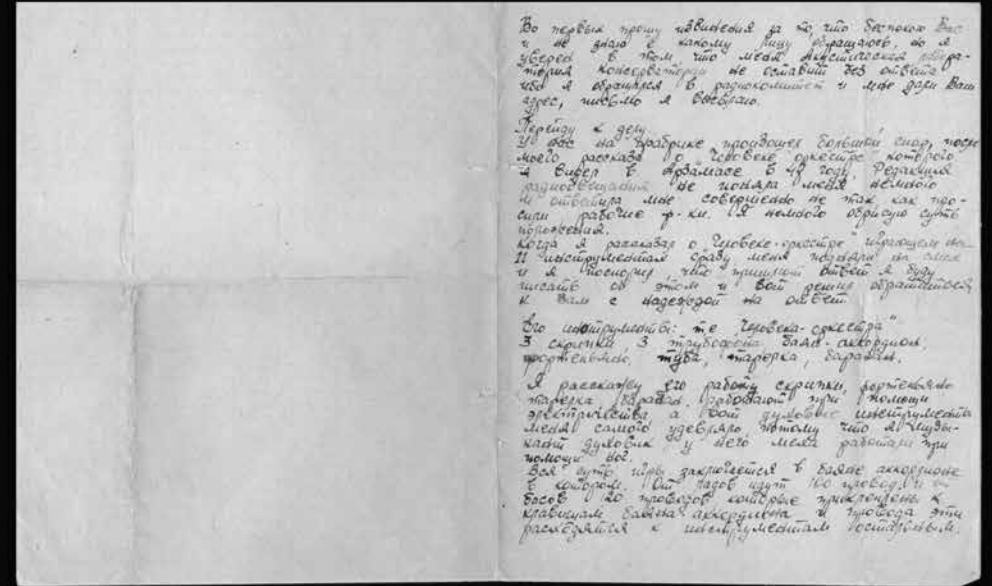
COMPOSER DMITRY SHOSTAKOVITCH AND INVENTOR ALEXANDER IVANOV DURING THE WORK WITH THE EMIRITON. CIRCA 1939.

the V-8 model, which, in addition to two manuals, appears to have had a fingerboard of about 45 notes, with an improved attack and a greater range of timbres. The V-II version (early 1960s) has a single manual of about 41 notes (transposable within a compass of over seven octaves). It came with a dynamic, velocity-sensitive keyboard with many features, including after-touch (pressure sensitivity), the option of playing vibrato on the keyboard with one's fingers, as on the violin, two voices, 660 presets with excellent imitations of all the acoustical musical instruments of a symphony orchestra, including percussion, portamento control, built-in fingerboard, volume-control foot pedals, special levers for knee control of the timbre and synthesis, based on its maker's research into musical acoustics and psychoacoustics.

THE EMIRITON

The Emiriton was one of the first electronic musical instruments created in the USSR. The first version was developed in Leningrad in 1935 by A.V. Rimsky-Korsakov and A.A. Ivanov with the assistance of V.L. Kreitzer and V.P. Dzerzhkovitch. Advanced Emiritons were manufactured in the 1940s. Owing to a combination of the keyboard and a fingerboard, the Emiriton gives one the opportunity to play music based on just intonation, as well as the well-tempered scale. It is possible to change the timbre instantly, as the foot pedal gives a very precise controls loudness very precisely.

RIGHT: SINGLE PERSON ORCHESTRA. THE PROJECT FOR PLAYING THE WHOLE RANGE OF THE INSTRUMENTS OF A SMALL ORCHESTRA BY A SINGLE PERSON WAS PROPOSED BY THE AMATEUR INVENTOR ALEXANDER SOVETOV FROM THE VILLAGE OF BOLSHAYA UGREZHSKAYA. NIMI ARCHIVE.



ROOM 13

IX ~ DESTRUCTION OF UTOPIA



PALACE OF SOVIETS. ONE OF THE APPROVED PROJECTS. 1934.

THE STATE AND BUREAUCRACY

> EVERY REVOLUTION EVAPORATES AND LEAVES BEHIND ONLY THE SLIME OF A NEW BUREAUCRACY. <

Franz Kafka

Bureaucratic authoritarian states, regardless of their ideologies, tend to have the same pyramidal structure: a single figure as the national leader, standing above any law at the top, society at the bottom, and numerous levels of bureaucracy in between. The basic functioning of these systems, often referred to in Russia as the »vertical of authority« (the chain of command), is unchanging, conspiring by means of any useful ideology or religion, to create a monopoly for authority and to limit vertical mobility. In many cases, the only effective mechanism of vertical displacement is corruption.

In Russia in the 1920s and 1930s, obtaining support or simply permission to develop a project meant applying to the local authority which, in turn, to avoid responsibility, would apply to the next bureaucratic level and so on. As the higher echelons were almost unreachable, proposals would normally get stuck within the bureaucratic mill, circulating between different levels and offices.

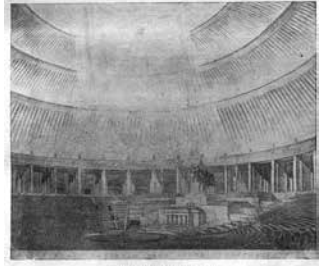
By their very nature, authoritarian states are not interested in supporting ideas that incite society to any activity that might undermine their authority. Any modernization of a system inevitably turns out to involve breakage, isolation and degradation, resulting in demagoguery, fear, apathy and ignorance at best and intimidation, imprisonment or execution at worst. In the Soviet Union, intellectuals who could be brought into line were built into the machine, functioning as components and agents of the system. Upstarts, radicals and loose cannons were targeted by the intelligence services or the police, and were kept down by such repressive structures as losing their jobs, being thrown into prison, or even being put to death. Without effective local self-management, authoritarianism thrived, suppressing the horizontal social and professional creative networks that had emerged despite the oppressive context.

The last phase of Stalin's reign brought an end to much institutionally supported experimentation in music and audio technology.

Они являл. Скоро на белом фоне видна возмужев трубуна Большого зала, поперек означены линия выкладки, и радиаторы, размещенные над Москвою река ораторов.

Иван Артемьевич имел дьявольские...
На фасаде дворца, переживая его со всех сторон, на три километра и далее разбегались, выходящими на станину леса борыбора. После Иваном Артемьевичем проходила история героической борьбы угнетенных всего мира на другом берегу, на счастье человечества. Она была колонна работ, восстановивших против гегемона Рима, предав-дательство марксистов Спиритов; только выжила крестьяне, индустриальных рабочие Якова Федоров под давлением истинного бармана; русоидного великана Никола Болотникова, издателя главы сериальной рать на борисскую Москву; провозглашение Парисской коммуны и в конце Ливинского дворца...

За четверть часа до открытия съезда Иван Артемьевич через 38-й номер вышел на дворца и подвизал на лифт-эспрессо.
Перед ним раскрывалась бесконечная анфилада огромных фойе; аркады, шпаны, аркады, скульптуры. В своем же фойе Иван Артемьевич долго стоял перед бронзовым бюстом своего старого друга, Героя Социалистического труда агитатора Митрофаня Федоровича Замидова.



Большой зал Дворца Советов.

HALL OF ASSEMBLIES OF THE PALACE OF SOVIETS.

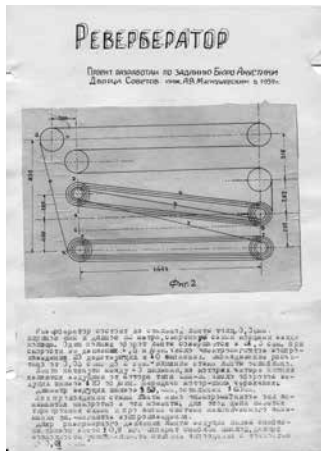
THE MONUMENT OF THE EPOCH

The idea of the construction of a Palace of Soviets was raised in 1922 at the First Congress of Soviets. In 1931, there were preliminary and all-Union competitions, in which architects were invited to embody an image of a »tribune of tribunes« and a »proletarian miracle«. From 1930 to 1950 the Palace was in the process of being built on the site of the demolished Church of Christ the Savior.

The project was truly grandiose. The height of the construction was to be 420 meters, topped by a 100-meter statue of Lenin. The prospective volume equaled 7.5 million cubic metres, three times that of the pyramid of Cheops. By special decision of the Political Bureau, the interiors of the Palace were to reproduce the official propaganda created by cinematographers. The Palace was considered the main architectural monument of the epoch, and the work undertaken for the project served as a powerful thrust for the development of Soviet architecture: a new style, which has been dubbed Stalin's Classicism, was born.

Construction was supplied with every resource: materials, money, labour. From 1937 to 1941 huge trenches were excavated, and the installation of the building's framework was begun. A special brand of steel, called DS (Palace of Soviets in Russian transcription) was developed for this framework. According to the plans, the sessions of the Supreme Council would take place in a colossal hall with a volume of one million cubic meters, a height of 100 and a diameter of 160 meters, holding up to 21,000 people! To improve the acoustics of the gigantic hall, under orders of the special Bureau of Acoustics of the Palace of Soviets the NIMI institute of the Moscow State Conservatory developed a unique system of artificial reverberation. For ten years prior to the mass production of tape recorders the system of magnetic recording on a 32-meter loop of thin steel tape was utilised and a complex pattern of repeated echoes was formed by means of thirty magnetic heads. The designer of the system was an engineer called A. J. Magnushevsky, who was also responsible for the construction of the apparatus for the performance of the Soviet Anthem from the Spasskaya Tower of the Kremlin.

Many books, paintings and films emerged about the Palace of Soviets; nevertheless, the miracle remained virtual. The construction was never completed, and the Palace became the most arrogant and expensive long-term building in the history of the USSR. Finally, in 1960, in the trenches of the unfinished Palace, the Moscow Swimming Pool was constructed.



THE REVERBERATION UNIT. A SINGLE PAGE OF THE REPORT FROM THE ACOUSTICS LABORATORY AT MOSCOW CONSERVATORY ON THE REVERBERATION UNIT DEVELOPED BY ENGINEER MAGNUSHEVSKY FOR THE PALACE OF SOVIETS. MOSCOW, 1939.

PLATON KERZHENTSEV

>If the party... demands that the colour white is considered as black, I shall accept it and make it my belief.< Georgy Piatakov. 1928.

Platon Kerzhentsev (the pseudonym of Lebedev) (1881 – 1940), was a Communist Party official and Soviet statesman. An enemy of Alexei Gastev, he was the theorist and the organizer of scientific management in the Soviet State, based on the principle of vertical authority.

Kerzhentsev studied in the department of history and philology of Moscow University. He was influenced by Percy MacKaye, Richard Wagner and Alexander Bogdanov. As a result of his revolutionary activism, Kerzhentsev experienced state oppression. From 1910 to 1913, he lived in emigration in London, New York, and Paris. The author of a number of works on history, he was a contributor to and the assistant editor of the newspaper »Izvestia« from 1918, executive director of the Russian Telegraph Agency from 1919 to 1920, plenipotentiary representative in Sweden from 1921 to 1923, a member of the editorial board of »Pravda« from 1923 to 1924, and plenipotentiary representative in Italy from 1925 to 1926. From 1926 to 1927 Kerzhentsev was the Chairman of the editorial board of OGIZ (Association of State Publishing Houses) and one of founders of the Soviet system of censorship.

From 1936 to 1938, he was Chairman of the watchdog All-Union Committee on Arts Affairs. He is said to have been the author of the infamous anonymous article »Confusion Instead of Music« published in 1936 in »Pravda«. With this article he began to purge the Bolshoi Theater administration as part of an ideological campaign against »anti-democratic«, »formalist« experimentation in Soviet art. In the same year, he sent Stalin a report in which he suggested removing the works of Russian avant-garde artists from open exposition at the State Tretyakov Gallery and the Russian Museum. He was responsible for the persecution of Vsevolod Meyerhold, Mikhail Bulgakov, Dmitry Shostakovich, Sergei Prokofiev and many others.

In 1938, he was removed from his position. From 1939 to 1940, he was the deputy editor-in-chief of the Great and Small Soviet Encyclopedias, which introduced the new officially censored version of the history of Russia, rewritten according to the political orders of Stalin's authorities.

TOP SECRET

To Comrade Stalin and Comrade Molotov.

Today I was paid a visit (on his own initiative) by the composer Shostakovich.

In answer to my question as to what conclusions he had drawn for himself from the article in Pravda he replied that he wished to demonstrate through his creative work that he has accepted the directives in the editorial...

When I asked if he fully agreed with the criticism of his work, he said that he did agree with most of it, but had not yet fully grasped all of it...

I instructed him to free himself from the influence of certain docile critics like Sollertinsky, who encourage the worst aspects of his work stemming from the influence of western Expressionists...

I advised him to follow the example of Rimsky-Korsakov and travel through villages of the Soviet Union and write down folk-songs from Russia, the Ukraine, Byelorussia and Georgia and select and arrange the Hundred Best among them. This suggestion appealed to him and he said that he would do this...

I proposed that next time he started to compose an opera or a ballet he should send us the libretto and that, while engaged in such work, he should try out some completed pieces in front of an audience of workers and collective-farmers. He asked me to let you know that Soviet composers would like very much to meet with Comrade Stalin for a discussion.

LETTER FROM KERZHENTSEV TO STALIN.
FEBRUARY 7, 1936.



PAGES OF THE THEORETICAL WORK

THE PROFESSOR IMPRISONED FOR PENTATONIC RESEARCH

In 1932, Kliment Kvitka, professor at the Moscow State Conservatory and one of the founders of Soviet musical ethnography, heard that Professor Nikolai Trubetskoy (who emigrated from Russia in 1920 and was teaching Slavic philology at Vienna University), had published a book in which he denied the existence of the pentatonic scale (the five-tone octave) in Western Europe. To check this information, Kvitka decided to find this book, and since it was not available in Soviet libraries, he borrowed it for couple of days from some philologist friends. Soon afterwards these friends were arrested, along with other Slavic philologists, and condemned ostensibly for participation in a »Russian nationalist organization«. Kliment Kvitka was also arrested and sentenced to three years in a Siberian camp. Luckily, he was released after two years for good behaviour – many people condemned for the same reason were executed or died in the GULAG. He was even more fortunate to have kept his job at the Moscow State Conservatory. Like others who had been sentenced, he was forbidden to live less than 100 km from Moscow. For many years, he had to spend hours on trains almost every day to continue his musical research at the Moscow Conservatory.

UTOPIA VERSUS ANTI-UTOPIA

> THE STATE HAS A CUDGEL IN ITS HANDS THAT HITS JUST ONCE, BUT ON THE HEAD. <

Vladimir Putin. 2000.

The Stalin era was characterised by bureaucratic control and the reign of Socialist Realism in all fields of the arts including music. The ideological doctrine of »Socialist Realism« was proclaimed in 1934. It was explained as a »truthful and historically concrete depiction of reality in its revolutionary development«. In musical terms, this demanded the composing of patriotic, elevating scores, preferably with topical or folkloric content, that were supportive of the Communist ideology and the regime, as well as simple and accessible for the »masses«. All experimentation or deviation from these ideals was branded as »formalism«, and condemned together with the »decadent music of the rotten West«.

The early 1930s was a critical moment that witnessed the clash between two powerful cultures – the artistic and scientific Utopia of the 1910s and 20s and the totalitarian, highly centralized anti-Utopia of the 1930s through

to the 1950s. During the ensuing Great Terror, which included the notorious show trials of Stalin's former Bolshevik opponents from 1936 to 1938 and reached its peak in 1937 and 1938, millions of innocent Soviet citizens were sent to labour camps or killed in prison. By the time the terror subsided in 1939, Stalin had managed to bring both the party and the public to a state of complete submission to his rule. Soviet society was so dispersed and the people were so fearful of reprisals, that mass arrests were no longer necessary. Stalin ruled as absolute dictator of the Soviet Union throughout World War II and until his death in March of 1953.

ONE MONTH IN THE LIFE OF EVGENY SHOLPO

To get funding for his Laboratory Evgeny Sholpo had to present music created by means of Variophone to NIMI experts and professors from the Moscow State Conservatory. For this purpose on 10th of June, 1937 he has arrived to Moscow. His purpose was:

1. To arrange a hall;
2. To check equipment;
3. To invite experts;
4. To make a presentation;
5. To get official review with all necessary signatures.

To realize this plan, he has spent one month, during which he was compelled to spend many hours a day traveling between numerous offices and queues. Although everything was finally completed, and Sholpo received very positive review, he didn't get any funding, since the secretary at the Committee on Arts Affairs forgot to include the Laboratory for Graphical Sound in a final list. All processing was carefully documented by Sholpo in his diary. Courtesy of Marina Sholpo.

IGOR TEREENTIEV

In 1923, the painter and art theoretician Kazimir Malevich founded the new Research Institute of the Highest Art Knowledge, as a branch of the Museum of Art Culture in Petrograd. The staff of the Institute included, among others, Malevich himself, Vladimir Tatlin, Mikhail Matushin, and Nikolai Suetin. The poet and artist Igor Terentiev (1892–1937) was appointed head of the Phonological Department, which offered a strong basis for the development of new poetic forms, especially visual poetry and sound poetry – the basis of subsequent text-sound composition.

The main field of work of the Phonological Department was language, espe-



EVGENY SHOLPO'S DIARY.



IGOR TEREENTIEV. PHOTOGRAPH FROM HIS NKVD FILE. 1937.



THE SUKHANOVO TORTURE PRISON.

cially the possibilities of sound applications in the process of the creation of an international language. Among other subjects of research were: new music and non-figurative art; the connections between contemporary music and contemporary language; the importance of recondite language; the analysis of intonational relationships; and the interaction of languages, whether scientific, philosophical, religious, bureaucratic, infantile, poetic and so forth.

In January 1931, Igor Terentiev was arrested. On February 24, he admitted that he was a French spy, but soon after, on March 13, he corrected himself: »In all my previous statements I have admitted a very essential discrepancy, namely, instead of English counterespionage, I indicated French«. He was sentenced to work on the construction of the Belomorkanal, where he supervised a theatrical propaganda team of prisoners. In 1933 he was released from the camp ahead of schedule. After that time he was the head of the central propaganda team of the NKVD Dmitrov camp on the construction of the Moscow-Volga Canal. Terentiev did not succeed in his attempts to find another job. On May 28, 1937, he was arrested again on false charges of planning the attempted murder of leaders of the communist party and the government.

On June 17 he was shot in Butirskaya prison in Moscow.

VSEVOLOD MEYERHOLD

Vsevolod Meyerhold was strongly opposed to socialist realism, and in the beginning of the 1930s, when Joseph Stalin clamped down on all avant-garde art and experimentation, his works were proclaimed antagonistic and alien to the Soviet people. In December 1937, Platon Kerzhentsev, the chairman of Committee on Arts Affairs published an article entitled »Alien Theatre« in »Pravda« which effectively wiped out the Meyerhold Theatre. In January 1938 the theatre was closed down and Meyerhold was arrested in Leningrad on June 20, 1939. His wife, actress Zinaida Raich, was found dead in their Moscow apartment on July 15, 1939. Later that year he was brutally ill-treated in Suhanovka – a prison specializing in torture – and forced to confess that he worked for the Japanese and the British intelligence agencies. This he later recanted in a letter to Vyacheslav Molotov, writing:

»The investigators began to use force on me, a sick 65-year-old. I was made to lie face down and beaten on the soles of my feet and my spine with a rubber strap... For the next few days, when those parts of my legs were covered with extensive internal hemorrhaging, they again beat the red-blue-and-yellow bruises with the strap and the pain was so intense that it felt



VSEVOLOD MEYERHOLD. PHOTO-GRAPH FROM HIS NKVD FILE. 1939.

as if boiling water was being poured on these sensitive areas. I howled and wept from the pain...

I was beaten on the back with this rubber strap; they towered over me to slap my face and in addition to this, I was subjected to »psychological violence«, which altogether evoked such immense fear in me that my whole being was stripped bare.

Lying on a floor, face down, I discovered that I had ability to wriggle and writhe, and to squeal like a dog beaten with a lash by its owner...

When I lay down on the cot and fell asleep, after 18 hours of interrogation, in order to go back in an hour's time for more, I was woken up by my own groaning and because I was jerking about like a patient in the last stages of typhoid fever... I falsely accused myself (I incriminated myself with absurd charges, as you surely realize if you study my file), I slandered innocent people. I could not resist either the physical pain or the moral humiliation that I suffered at the hands of my interrogators. I agonized in fever and signed the confession blindly.«

Vsevolod Meyerhold was sentenced to death by firing squad on February 1, 1940. He was executed on February 2, 1940.

ALEXEI GASTEV

On September 8, 1938, Alexei Gastev was arrested and brought to Lefortovo prison in Moscow. According to an NKVD reference, he was involved in anti-soviet terrorist activities. In the first interrogation report, dated 5.01.1939, he admitted his guilt. Judging by the dates, statements and typical NKVD practices we can presume that Gastev was brutally tortured for almost four months, but the main pressure was exerted upon him in January 1939. On January 26, he changed his statements and essentially named a circle of people whom he called »participants in the underground anti-soviet organization«. On March 14, 1939, the final report on the investigation and its termination was signed. Inspectors were to destroy the documents and personal effects of the prisoner. On March 19, the bill of indictment was signed. On April 8, a decision was made by the Political Bureau to execute by shooting 198 people accused as the leaders of »the right-trotskyite, conspiratorial organization«. On April 13, Gastev signed the bill of indictment. The next day the session of the Military Board of the Supreme Court of the USSR accepted the indictment. Gastev declared that he »deeply repented and asked the



ALEXEI GASTEV. LATE 1930s.

court to grant him his life«. On April 15, 1939, he was sentenced to execution with confiscation of all personal property. The same day he was one of a group of 48 people who were shot in the suburbs of Moscow.

LEON THEREMIN

Having been rescued from creditors and the U.S. immigration service in late 1938, Leon Theremin returned to Soviet Russia. On August 31, 1938 he was illegally and secretly (even from his own wife) taken on board the Stary Bolshevik, on which he transported over 1000 kilograms of electronic equipment. His intention was to develop an electronic music studio in Soviet Russia. Not surprisingly, all the equipment was confiscated by Soviet customs. Leon Theremin started to search for a job, visiting his former colleagues who, however, avoided him as if he was carrying the plague. It came as no surprise when on March 10, 1939, he was finally arrested and condemned »for espionage and participation in the fascist organization« to eight years of hard labour in the stone quarries of the GULAG. Fortunately, after one year in Kolima (a brutal area in Siberia) he was moved to the Moscow »sharaga« – a special NKVD prison for scientists.

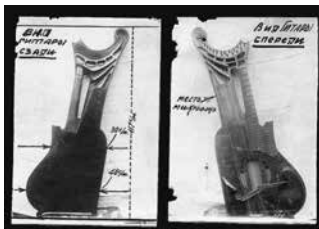
After his release in 1947, he continued working for the NKVD/KGB until his retirement in 1962, when he moved to the Acoustics Laboratory at Moscow State Conservatory (formerly NIMI), where in an unpaid position as the head of a research group, he tried to revive his American inventions and research. In 1967, he was dismissed following a scandal after the publication of an article about him in the New York Times. He spent the rest of his life working at Moscow State University as a technician in the Physics Department. Leon Theremin died in Moscow on November 4, 1993.

THE STORY OF THE MAN AND THE 23-STRING ELECTRIC GUITAR

In 1932, Comrade Shtrianin, Communist Party organizer and amateur musician from the Bessonovka village of the Giant collective farm in the Bessonovsky area of the Kujbyshevsky region, decided to build a 23-string electric guitar. To improve its acoustic properties the body of the instrument was made out of the deck of an old, discarded piano. Shtrianin had to buy some parts for the pickups and electronics. By 1935 his wife was already unhappy with her husband's hobby because of the costs that it incurred. Shtrianin asked his local communist chief, comrade Voskoboinikov, for financial support. He applied for 500 rubles – around the cost of a radio receiver



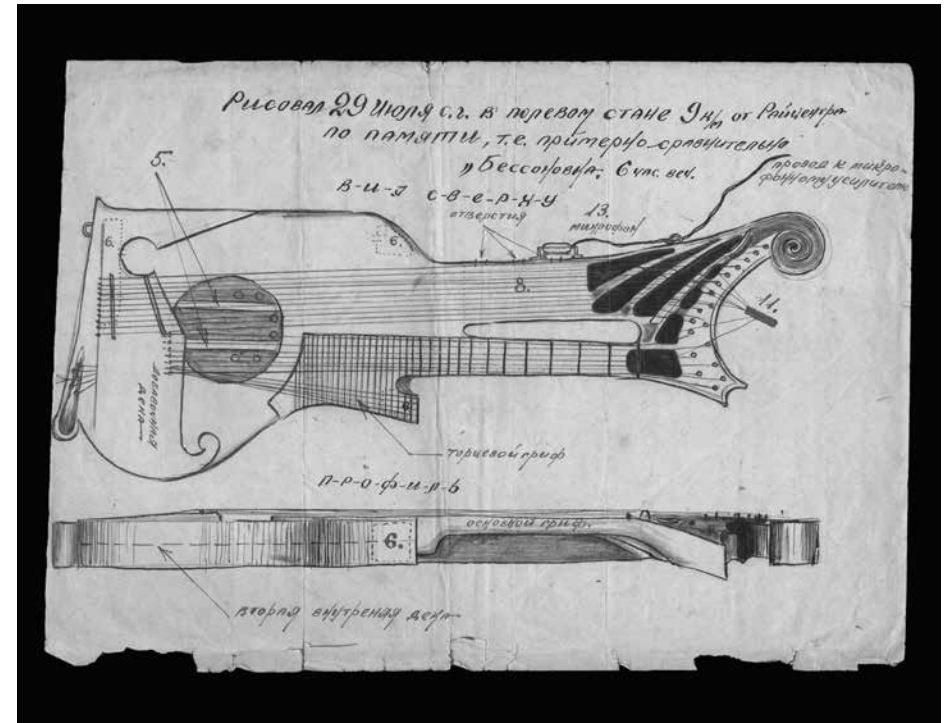
LEON THEREMIN'S PHOTOGRAPH FROM HIS NKVD FILE. 1939.



FRONT AND BACK VIEWS OF THE 23-STRING GUITAR, JUNE 4, 1936.

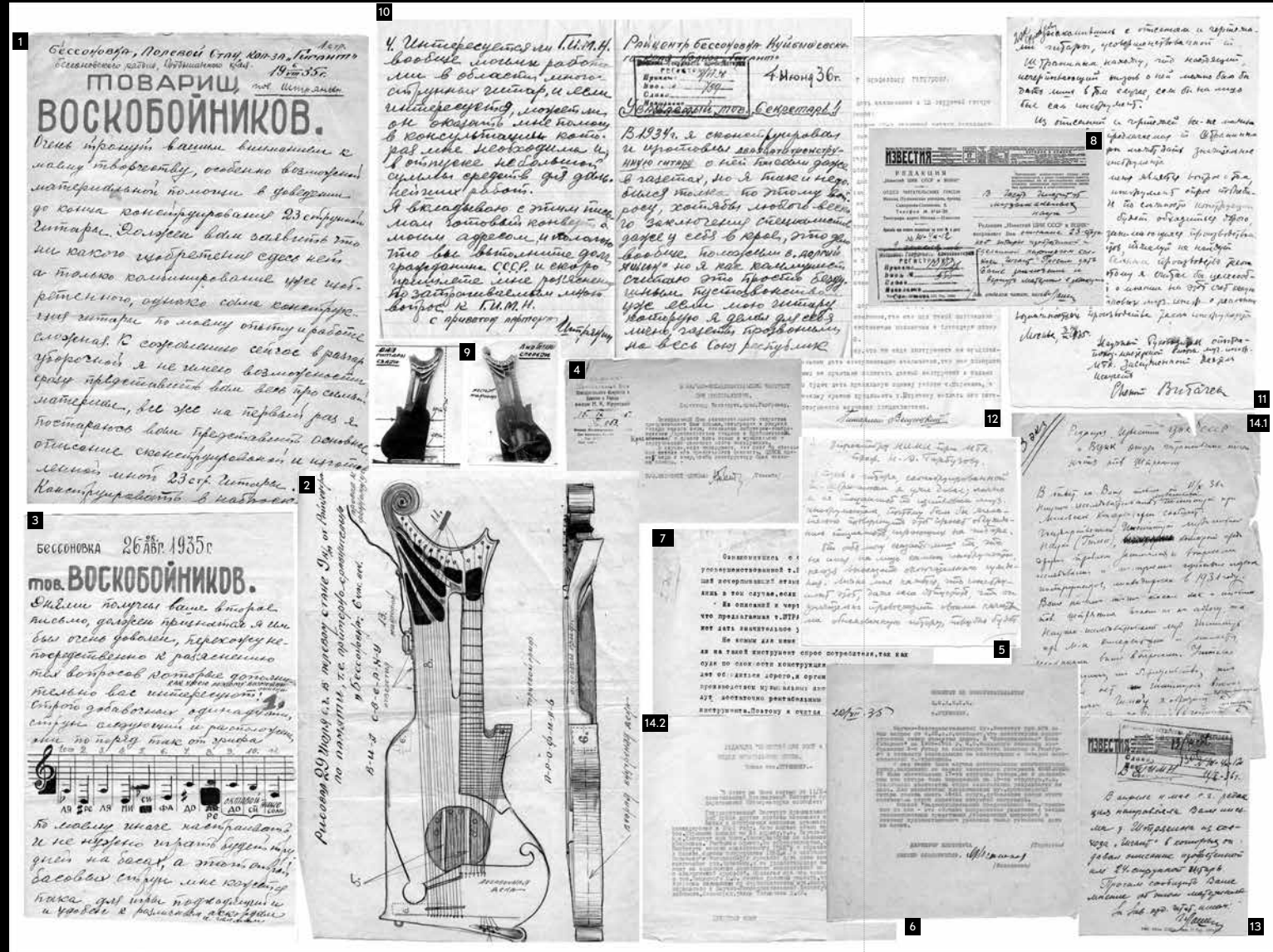
at the time. According to Shtrianin's letter, his only intention was to complete the instrument and give a concert with it in his local village club. However, Comrade Voskoboinikov felt unable to take responsibility for such a decision, so he passed the request to the local House of Culture. The staff there could not take so much responsibility either, and passed the request further up the chain. The process took almost two years. Numerous institutions and bureaucrats at all levels became involved in the discussion. Meanwhile, the subject of inquiry gradually changed. In official correspondence the discussion already concerned the invention of comrade Shtrianin. No final decision was ever reached, and Shtrianin never received the 500 rubles. He completed the instrument at his own expense in late 1936, according to his final, angry letter. Official correspondence about the application ground on until 1937. The last letter was sent from the central daily Izvestia, with a request for a »review on the 24-string guitar invented by Comrade Shtriakin«.

CONSTRUCTION OF THE TWENTY-THREE-STRING ELECTRIFIED GUITAR. 1935.



THE TWENTY-THREE-STRING ELECTRIC GUITAR

CORRESPONDENCE 1935-37



- 1 6.08.1935 The first detailed letter from comrade Shtrianin to his local communist chief Comrade Voskoboinikov with his proposal to build a twenty-three-string electrified guitar and with a request for support.
- 2 6.08.1935 The drawing and construction of the twenty-three-string electrified guitar. Appendix to the letter from 6.08.1935.
- 3 28.08.1935 The second letter from Shtrianin to Voskoboinikov with extra details regarding his twenty-three-string guitar. No inventions were proposed. The only intention of Shtrianin was to finish the instrument and to perform a concert in the village club.
- 4 15.09.1935 Official request for expert review of the invention from the Central House of Amateur Culture addressed from N. Krupskaya to the NIMI Institute and professor Garbuzov.
- 5 3.10.1935 First review by E. Vitachek – the head of the Experimental Workshops of String Instruments at Moscow State Conservatory with a note that the instrument needs the expertise of guitar players. As of this point the subject of the discussion is shifted – all exchange is now about the new invention.
- 6 22.12.1935 Official reply from N. Garbuzov to the Committee for Inventions in which he gives a negative conclusion regarding the proposed invention.
- 7 16.06.1936 Review and reply by E. Vitachek to N. Garbuzov.
- 8 10.04.1936 Official request to review Shtrianin's invention by the central newspaper Izvestia to the NIMI Institute.
- 9 4.06.1936 Front and back view of the twenty-three-string guitar which by now had finally been built. Appendix to the letter.
- 10 4.06.1936 Last letter from Shtrianin to the NIMI Institute with his indignation and surprise at such un-communist behaviour and notice that he had finished the instrument at his own expense and had started a new one.
- 11 3.10.1936 One more round of correspondence with Vitachek. Discussion of the commercial angle of the production of the instrument and note that for any conclusion they need the finished instrument for review by experts.
- 12 1936 Review of the twenty-three-string guitar by guitarist Veshitsky in which he reports that he can't give any conclusion unless Shtrianin finishes the instrument and sends it for expert testing.
- 13 11.10.1936 A further request to GIMN [sic] by the newspaper Izvestia to review the invention by Shtrianin [sic] – the twenty-four-string guitar [sic].
- 14.1 Early 1937 Last official reply from N. Garbuzov (NIMI) to the newspaper Izvestia with a note that the GIMN Institute was closed in 1931 and that the NIMI Institute is unable to offer expert review.
- 14.2 Handwritten draft of 14.1.

MUSICAL MURDER BUS

On February 11, 1948 the newspaper »Pravda« published the »Resolution of the Political Bureau of the Central Committee of the Communist Party« about the opera »The Great Friendship« by composer Vano Muradeli. In it, they condemned him for »musical formalism« and his opera was declared anti-artistic. As a result of this resolution the pressure on the composers Dmitri Shostakovich, Sergei Prokofiev, Nikolai Myaskovsky, Vissarion Shebalin, Aram Khachaturian and others reached its peak. It was soon followed by the infamous auto-da-fé of the meeting of the musical workers at the Central Committee under the chairmanship of a member of the Political bureau, Andrey Zhdanov. At this meeting, Zhdanov compared music by Prokofiev and Khachaturian with the sound of a dentist's drill and a »musical murder bus«.

A meeting of the First Congress of the Composers' Union which took place from April 19 - 25, 1948, added another nail to the coffin of composers with avant-garde ambitions. At the congress, the Organizational Committee of the Composers' Union was replaced by communist party functionaries, and Tikhon Khrennikov was chosen by Zhdanov and Stalin for the post of general secretary. He held this position for 43 years until the collapse of the Soviet Union in 1991. The historical circle closed up: it is quite symbolical that the official news-reels »Novosti dnia N23« (Daily News), regarding the Congress were produced in April 1948 by Dziga Vertov. It was the final blow for the musical avantgarde in Soviet Russia.



THE LYRICAL DUET FROM THE OPERA
»THE GREAT FRIENDSHIP«. SOVIET-
SKAYA MUZIKA MAGAZINE. N1, 1948.

A violin has no choice -
It is replaced by dredger's voice.

To break a soul with sonority
A drill extends the harp's authority.

No flute will pierce the darling's heart
without stone-crusher's stab.

Despise the cello, innovator!
The theme be played by excavator.

What to expect from old tubas,
When plants and factories have
hooters?

Hey musicologists, lift up your cups,
For the musical mass-murder-bus!

CURATORS

LIUBOV PCHELKINA

is an art historian, teacher and curator of international projects of contemporary art and music. She studied at the Department of History of Arts at the Humanitarian University (St.-Petersburg). Postgraduate at The State Institute of Art-History. She is a scientific employee and curator of the State Tretyakov Gallery – Department of Painting of the first part of the 20th century.

ANDREY SMIRNOV

is an interdisciplinary artist, independent curator, collector, writer, composer and researcher. He is a senior lecturer and the Head of the Sector for Multimedia at the Center for Electroacoustic Music at Moscow State Conservatory and a lecturer at the Rodchenko School for Modern Photography and Multimedia where he teaches courses on history and aesthetics of electroacoustic music, sound design and composition, new musical interfaces and physical computing. In 1992–2012 he was the founding director of the Theremin Center in Moscow. He has conducted numerous workshops and master classes in the U.S., Europe and Russia, and participated in various festivals and conferences. Since 1976 he conducts research on the development of electronic music techniques and gestural interfaces. His collection of historical

documents and original electronic musical instruments has been combined with extensive research into the history of music technology with broad experience in composition, interactive performance and curatorial activities.

PETER AIDU

is a musician, curator, leader of The Music Laboratory. He graduated as pianist and organist from the Moscow Conservatory and the Hochschule für Musik Theater und Medien (Hannover). A laureate of several international contests, he teaches piano, harpsichord, and chamber orchestra groups at the Moscow Conservatory. In 2007 he established The Piano Shelter – a collection of specially conserved pianos. In 2009, within the framework of The Music Laboratory, Aidu initiated the revival of PerSimfAns – Symphony Orchestra without a Conductor. The »Reconstructing Utopia« performance, which takes place under his direction, is highly acclaimed in Moscow, France, and Norway, as is the touring exhibition project, »ReConstruction of Noise«, which took place in Moscow, St. Petersburg, Vladivostok, and other Russian cities. Aidu has created a number of sound installations, and has written music for several stage productions at The School of Dramatic Art (Moscow).

KONSTANTIN DUDAKOV-KASHURO

is a scholar, assistant professor at Lomonosov Moscow State University, member of The Music Laboratory, and DJ. In 2006 he completed a Ph.D. in Cultural Studies, comparatively studying Italian Futurism and German Dada poetics. His main research interests – cultural philosophy, modernism, and avantgarde aesthetics – motivate his involvement in curatorship and performance activities such as PerSimfAns, »Reconstructing Utopia«, and »ReConstruction of Noise«. He is a member of the European Network for Avant-Garde and Modernism Studies and The Centre for Avant-Garde Studies (University of Iceland), and is currently writing on the history of noise music of the early Soviet era.

EVGENIA VOROBYEVA

is a curator, producer and musician. She graduated from the Moscow Conservatory, where she holds now a position as Head of External Relations Department. Since 2010, she is in charge of various concert and exhibition projects: »Icarus at the Edge of Time« multimedia performance, »Music Universiade« festival, and such exhibitions as »Noise Orchestras of the 1920s« at the Moscow Jewish Museum and »ReConstruction of Noise« at Polytechnic Museum (Moscow) together with Peter Aidu and Konstantin Dudakov-Kashuro.

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The exhibition revolves around the archives and collections of Marina Sholpo, Andrey Smirnov, Leon Bolotsky, Lydia Kavina, Sergei Zorin as well as the Russian State Documentary Film & Photo Archive; the Central State Museum of Musical Culture, named after Mikhail Glinka; the Theremin Center and the Center for Electroacoustic Music at Moscow State Conservatory; Russian State Archive of Literature and Art (RGALI).

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The exhibition premiered under the title »Sound in Z« in Paris at the Museum of Modern Art Palais De Tokyo in the framework of the exhibition of the British Turner Prize winner – Jeremy Deller, titled »From One Revolution To Another«, 25.09.08 – 22.01.09.

For the first time ReConstruction of Noise was shown in Moscow at the Polytechnic Museum in 2012. Since then, it has become a touring exhibition. Instruments from the exhibition are played during »Reconstructing Utopia« performances.

Text by Andrey Smirnov, Liubov Pchelkina, Konstantin Dudakov-Kashuro. Editing by Oliver Baurhenn, Christina Wheeler and Taïca Replansky.

Most quotations refer to the book »Sound in Z. Experiments in Sound and Electronic Music in Early 20th Century Russia«, Walther König, Cologne, 2013, unless otherwise indicated.

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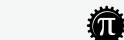
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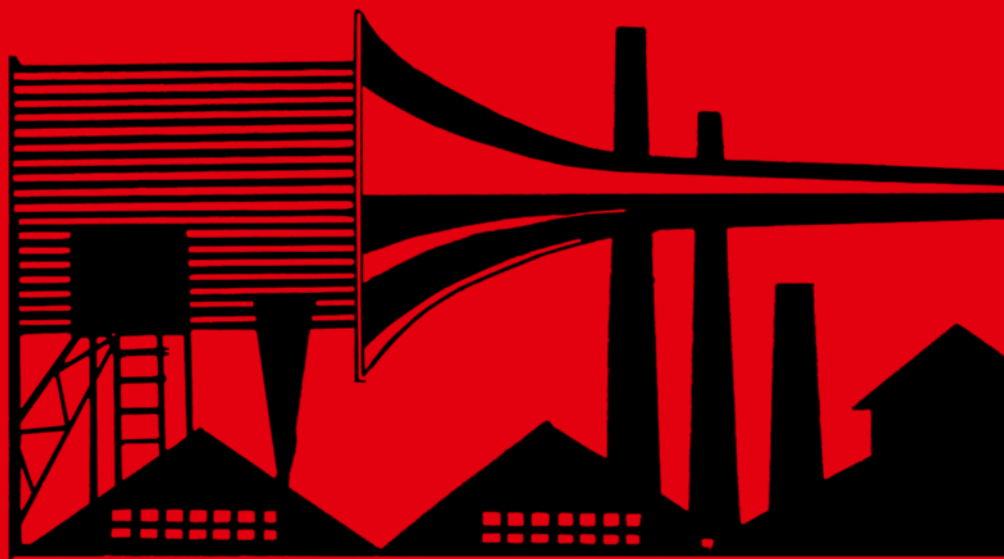
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