

History of the World Television: Contribution of Russian Scientists and Kazan University

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Abstract: Television as the most accessible and popular mass medium in the world, plays an important role in the development of human society. The scientists and inventors from different countries improve TV technologies and equipment to make a greater impact on the audience. In the context of globalization and information society the interest in historical origins of any phenomenon is natural. In the history of world, television a special place is occupied by the invention of the first color television system and sound-video recording on a magnet tape which belongs to the Russian inventors Alexander Appolonovich Polumordvinov and Alexander Matveevich Ponyatov whose fate was related with Kazan and Kazan University. This study reveals hitherto unknown important facts from their biographies. The researchers consider archival documents which are introduced into scientific circulation for the first time.

Key words: History of television, color television, sound-video recording on a magnet tape, Kazan University, documents

INTRODUCTION

Before the 20th century mankind lived without such means of communication as radio, television, internet, compensating the lack of it by real communication and direct reference to the original information sources. But a man, dreaming about the future, always associated with him, first of all, the qualitative improvement of life. The concept of "improvement" included a lot: the fantastic variety of food and space flights, a rapid movement in distant states, then the galaxies and the victory over the most terrible diseases and a rapid execution of complex tasks. Dreaming and obsessively working on the most incredible projects, as it seemed to their contemporaries a man made this future "happiness" more close. One of such projects was television, the invention of which was performed by many scientists and inventors in different countries. The contribution of Russian designers in the history of the world television received an international recognition, but new names of television pioneers expand the boundaries of our knowledge about this great work.

MATERIALS AND METHODS

The theoretical and methodological basis of this study is based on the principles of historicism, development, system approach, determinism. The observance of historicism principle researchers is considered as the main one as it allows us to consider the phenomenon of the past in connection with the present

and the future. The principle of historicism also requires the study of any socio-cultural phenomenon and the activities of television is understood primarily as a socio-cultural phenomenon in the context of a particular historical situation.

The theoretical significance of this study lies in the fact that it develops the trend which is studied not enough in historical science, enriches it with new facts.

The last decade of the twentieth century may be considered as a significant one in Russian journalism history research as mass media researchers in general and television in particular, started to exempt from mandatory communist ideology. Besides, democratic processes in society led to the elimination of state and party structures, performing the leadership in the field of journalism, a state monopoly on mass media was eliminated. Now, it is possible to provide an objective evaluation without an ideological aspect of the past, to open new historical pages and the names of people who left a big mark in the development of mass media for society.

Among the writers of the 20th century last decade Avraamov (1991), Kuznetsov (2002) and Golyadkin (1996, 2004) should be noted. Two levels of TV phenomenon study are highlighted in this research: technological and socio-historical one, which is reflected somehow in the approach to periodization of Russian TV history. Barantsev and Urvalov (1982) consider a technological issue and release phases of television development, depending on the implementation of certain technical innovations (Barantsev, 1982).

For example, Urvalov (1999) highlights the emergence of TV idea (up to 1920); the creation of a mechanical television (1920-1935); the creation of an electronic black-and-white TV (1936-1966); the creation of an electronic color TV (1967). N.A. Golyadkin also considers technological characteristics, enlarges the steps according to the main trends of Russian television development: a pilot one when the main figures are inventors and engineers; the establishment of a regular broadcast standards, similar to modern ones, the search for optimal organizational forms and the mass distribution of tv sets among population; turning of TV into a leading mass media and the dominance of several major national programs in the air; the introduction of satellite and cable TV, the division of once unified audience and the personalization of a viewer choice. Egorov (1992) demonstrates the same approach in his researches of 1990s. He was the first Russian theorist who stressed the importance of national and local television development: Stage 1: from scientific experiments, inventions and discoveries of Russian scientists in the field of picture and sound transfer at a distance to the regular television broadcasting, i.e., from the early twentieth century to 1930s; Stage 2: from the beginning of regular broadcasting in 1930s, before the creation of a central, republican local TV and the emergence of mass broadcasting in 1960s, Stage 3: from the late 1960s when mass broadcasting became a national one and up to date.

The oldest historian of Russian television A.Ya. Yurovsky takes the most typical trends of Russian TV development at different periods, including the creative ones:

- The first phase (1930-1940s), training and creative development of technical TV base
- The second phase (1950-1960s), the establishment of television programs, the search of forms and determination of broadcasting topic
- The third phase (1970s), the improvement of program genre and thematic structure, a significant expansion of the audience and started centralization of television broadcasting
- The fourth phase (1980s), the final acquisition of political and professional maturity by TV: "it turned into a strike force of the ideological front" (Yurovsky, 1983). Kuznetsov (2003) and Petrov (1999) adhere to the same periodization in general (Egorov, 1980)

As if summing up the previous points of view, Boretsky (2005), identifies two unequal periods of social significance. The researcher calls the first period a prehistory, a scientific and technical experiment when the

search for an optimal path took place expressed in opposition of "mechanical" and electronic TV supporters. He calls the second period the actual history of television as the mass media and mass culture means. During the second period the scientist highlights the end of 1950s and the end of 1960s: "In the history of mass television, i.e. actually applying for the inclusion in the mass media system, the fundamental role is played by the decade of the late 50s and late 60s. It is noteworthy that this period, was a revolutionary one at the global level in different ways".

Gorokhov (1964), Bagirov (1978) and Boretsky (2005), etc., showed some interest to the history of television during the first decades of the Soviet broadcasting system (Gorokhov and Rozing, 1964; Vorobyov *et al.*, 1972).

The magazine "Technique of movie and television" announced about the inventor A.A. Polumordvinov in 1964 for the first time. The researcher of the study Gorokhov (1964) briefly described an optical-mechanical television system developed by Polumordvinov and made a bold conclusion for that period: "In our literature the development of the first color TV system with consistent reproduction of colors is usually associated with the name of the Soviet engineer I.A. Adamian and referred to 1925. But, it turns out that at the end of the last century another Russian engineer worked over the creation of such system and found the real way to solve a complex problem. By his proposal Polumordvinov (1998) initiated the development of technical ideas for color television".

The search for archival materials about the the inventor was performed by a well-known theorist of television, the TV veteran Urvalov (1990). His search was continued by Orlova (1984) who played a particular role. In 1984, the editors of the magazine "Radio" conducted the competition named "Radio 60". The purpose of the competition is the collection of materials about the history of radio equipment development, significant for the development of the national radio. Among the papers sent the magazine, there were also some which told not about radio, but about little-known pages of television equipment history.

Antonina Fedorovna Orlova sent her article for this competition, the teacher of Kazan electronic professional school of communication and the creator of the TASSR Museum within that school during that period. The article was named "Polumordvinov and his "telephoto". The readers we presented with the results about a year long search for information and documents about the creator of the first unit transmitting a color image at a distance. The uniqueness of the material was not doubted, the teacher of electronic professional school managed to

collect the data not only on the Kazan period of Polumordvinov (1998)'s life and his scientific pursuits but also about how his fate during the last decades of his life. The detailed description of the device "Telephoto", a portrait of Polumordvinov, the schemes of three options for light dispersion that the scientist included into the privileged 10738 made the study very valuable and its researcher Orlova (1988) became almost a pioneer.

The same material in detailed form came later into Orlova (1988)'s book "Time and communication" devoted to the history of all forms of communication development in the Tatar Republic.

In 1998, the first edition of the Tatar encyclopaedic dictionary was published, in which the officers of the Tatar Encyclopaedia issued by the Academy of Sciences of the Republic of Tatarstan included the articles devoted to the inventor (Polumordvinov, 1998) and his invention (Anonymous, 1998).

But, the most important recognition of Polumordvinov merits in front of national television was held in 2000. On February 24, 2000 by the initiative of the Russian NTORES Named after A.S. Popov, Moscow NTORES named after A.S. Popov, the Russian Defense Ministry, NI IR, GSPI RTF, the Institute of Applied Research, GTSRT, the magazines "Radio" and "History of Television" a solemn evening dedicated to the 100th anniversary of the first color TV invention by Polumordvinov (1998). The event was held in the Royal Hall of GTSRT excursion premise. The first speech was presented by Orlova (1984, 1988), the chairman of the historical unit at NTORES Moscow department. The main attention in her report was paid to the project of the first color TV system developed by Polumordvinov. The General Director of NIIR Yu.B. Zubareva and other speakers noted the historical role of Polumordvinov's ideas in the development of color TV not only in Russia but also worldwide (Leites, 2000).

Many publications about Polumordvinov and his invention due to 100th anniversary of "Telephoto" also appeared in Tatarstan (Grigoriev, 1999a). The recognition of Polumordvinov's role in the development of television technology is evidenced by the important fact that there is an exhibition in Moscow Polytechnic Museum dedicated to the television. This exhibition has some material about this inventor. And most importantly "telephoto" can be seen in action which was never implemented during the life of a scientist, but now it is demonstrated for museum visitors.

With regard to the degree of A.M. Ponyatova's life knowledge, the fact that this name was under a strict prohibition for a long time during the Soviet Union period because of ideological reasons draws some attention.

Ponyatov was above all a man who emigrated to America. This was mentioned by the author of the first article about a Russian engineer and an American businessman and inventor Makoveev (1956). It was he who drew his attention to the fact that the founder of the first mass VCRs, who gave own codified name to his brainchild, the founder of the famous company "Ampex" which was the world technological leader in the field of professional magnetic sound, video and many special signals recording for half a century was born in Russia in the village Russian Aisha of Kazan province (now Vysokogorsky District of the Republic of Tatarstan).

A.M. Ponyatov's return to his homeland was a long one. The Soviet Union began to talk about it in the late 1950s. In 1958, a secret decree of the Council of Ministers appeared concerning the beginning of Soviet broadcast video recorder line development. The research in this area intensified after the visit of N.S. Khrushchev to America. When he brought home a presented video record of his meeting with US President Eisenhower, it turned out that it was impossible to play it. The television Department of the Moscow Electrotechnical Institute of Communications received the corresponding order. That's when the Soviet developers turned to Foreign literature and learned about the American company "Ampex" and its founder A.M. Ponyatov. In May 1974 Makoveev managed to meet the A.M. Ponyatov, in 1992 he was the first one in the Soviet Union who told the press about the merits of this man. In 1993, Central Television aired the TV program about Ponyatov in the cycle "America with Mikhail Taratuta". In 2012-2013, the Kazan University and the home of the inventor had the celebrations of A.M. Ponyatov's 100th anniversary and the presentation of the documentary film "Russian triumph on foreign soil: A.M. Ponyatov as a pioneer of the video epoch and an engineer".

RESULTS AND DISCUSSION

Before proceeding to the description of the device, invented by Polumordvinov, you have to tell the main events of the late nineteenth and early twentieth centuries which were important for our inventor. The technical progress stimulated an unprecedented industrial growth in Russia accompanied by intensive scientific research. In a huge complex of research one of the leading places was occupied by the study of electric energy problem during these years. The introduction of electric traction was attempted at railways. Electric light, telephone, radio, electronics are the areas, developed due to the scientific discoveries which were made during this period. The electrical industry started to develop.

One of the major technical problems solved during this period is the preparation and use of electricity, a new energy base of industry and transport. The construction of large industrial enterprises, the growth of large cities and the advances in electrical energy production conditioned the development of electric lighting. Communication equipment was widely developed at this time as the branch of electrical engineering. Telegraph wire equipment is being improved and extensive works are conducted on the design and practical application of telephone equipment. An important event was the invention of radio a wireless telecommunication, based on the use of electromagnetic waves (radio waves), first discovered in 1887-1888 by German Physicist G. Hertz. The task of such a communication practical creation was successfully solved by the Russian scientist Alexander Popov, who demonstrated his first radio receiver in the world on May 7, 1895. Without radio people could not dream about "The radio for eyes" about which a famous Russian Poet Velimir Khlebnikov dream whose roots, by the way are also found in Kazan.

It should be noted that the experiments on "foresight" and the development of the first projects had been already in the 80s of the nineteenth century. The Portuguese Physicist Adriano de Paiva and the French inventor K. Senlek substantiated technically in their works the possibility of "electric telescopes", "telectroscopes" and actually predicted the principles of mechanical television. Three years later, a German student P. Nipkov invented the way of consistent mechanical degradation of a transmitted image into pieces by a rotating disk with holes. This disc received subsequently the name of the inventor and was used then in many systems of mechanical television.

In 1885, the journal "Electricity" published the original television project of the Russian inventor P.I. Bahmetyev called "Telephotographer". 14 years later the same journal will publish the note about First All-Russian electrotechnical congress and people performed there, where A.A. Polumordvinov also took part. A 26 year old Kazan engineer made the report about his "Telephoto".

However, as we know, television finally ceased to be only a distant dream after it moved from mechanical to electronic way when inert and slow-moving mechanical switching systems were replaced by a non-inertia electronic beam. This way was first proposed by Russian scientist B.L. Rosing in 1907 (Grigoriev, 1999b). Four years later, the professor of the St. Petersburg Institute of Technology received the first simple electronic image. He invented a cathode-ray tube which is considered as the television ancestor.

All this will happen in the first decade of the 20th century and the Kazan engineer, a teacher of the Kazan Industrial School Alexander Polumordvinov will invent his system at the end of the 19th century.

Alexander Apollonovich Polumordvinov was born on August 30, 1874 in a small town Slobodskoe of Vyatka province (now a days Kirov region) into an impoverished noble family. It is known that his father Apollon Petrovich came from impoverished nobles. He died when the baby was barely a year old. Alexandra Kapitonovna (in some documents Konstantinovna) was left a widow at 24 year with two children and without any means for living. However, she was born in the family of a Vyatka exile and bore her cross patiently, trying to give a good upbringing and education for her children as much as possible. In 1884, the family moved to Kazan. Sasha entered the first grade of the 3rd gymnasium for boys.

The National Archives of Tatarstan, the fund of the 3rd gymnasium for boys kept the dossier of Alexander Apollonovich Polumordvinov, which were presented by the documents of his studies at the gymnasium (1884-1892): the widow's petition for the gymnasium director to take her son to the first class, an extract from Metric books of Vyatka Diocese Slobodskoe issued in 1874 under the number 38 and the order of 7 August, 1884 about Alexander's entrance to the grade 1 issued by the gymnasium headmaster.

Earlier Alexander was educated at home and Alexandra Kapitonovna wrote about it in her petition. The boy graduated the gymnasium in 1892. The gymnasium certificate, provided for the graduate with the results of 8 year study at gymnasium, shows good progress. It told that the boy studied all subjects with an equal interest, though, judging by the marks, Alexander was better in sciences than humanities.

In 1892, he entered the Physics and Mechanics Department of the Kazan Imperial University which occupied an important place not only in the Russian system of higher education but also in domestic culture as a whole. But Polumordvinov studied there only 1 year he was not satisfied that the university program pays so much attention to theory and so little attention to engineering practice. And, he decides to transfer to Kharkov University.

Since 1893, Alexander Polumordvinov is the student of mechanical department at the Kharkov Institute of Technology. You may get an idea on his study results according to his outstanding characteristics which was sent a little bit later by the professor, the head of his thesis M.P. Mukhachov. In particular, the Kharkov Professor noted the enthusiasm and creativity of the student who was his guiding light in the study of large hammers efficiency. A. Polumordvinov as a student invented the device increasing the efficiency of four-stroke engines.

Alexander Polumordvinov received the technologist diploma and returned to his natives in Kazan with the firm intention to find a job here. On August 16, 1898, he filed the petition to the Director of the Kazan Industrial School: "I have the honor to request Your Excellency to assign me as the teacher of mechanical sciences and drawing at the engineering high schools within the Industrial college entrusted to you". He was accepted, and he begins to teach mechanics, geometry, drawing, technology and he is instructed to conduct practical training in mechanical workshops and provide laboratory equipment.

As you can see, the Kazan Industrial School appreciated a gifted young teacher and provided a lot of work for him. But, even with such an employment, he finds time to engage in scientific research. He appealed repeatedly to the authorities with the request concerning business trips to the capital in order to attend the Electrical Engineering Congress or a technical exhibition.

Polumordvinov (1998)'s correspondence with the director of the college preserved. It should be noted that this correspondence was of a different character. Director was not enthusiastic about the frequent absences of his teacher if we put it mildly. The curious document preserved proving that Gruzov using his connections in the capital scientific circles, wrote a letter to one of the professors, where he, apparently, asked the opinion about scientific research performed by A.A. Polumordvinov. And he got an answer, the essence of which was the following: many tried but failed, advise that person to do something different.

Unfortunately, it is not known whether Alexander Appolonovich knew about this letter. Perhaps, N.G. Gruzov showed it to his inventor and this letter influenced the subsequent decision of the inventor to become a student again, now at St. Petersburg Electrotechnical Institute. But, it will be then and for now Polumordvinov continues his work. It is evident for the management of the Kazan Industrial College that science, i.e., electrical engineering which at that time started to be popular in Russia, was more significant for Alexander Appolonovich than teaching. Orlova in her book describes in detail the scheme of A.A. Polumordvinov's device. According to her information, he developed it in <2 years (Makoveev, 1956). But then he improved it several times.

So the design of the device called by the inventor as "Telephoto" would send images at a distance with all colors and shades. The system was based on the theory of three component color vision using an optical-mechanical system. A.A. Polumordvinov made the distributor of light the basis of his device which allows us to decompose a color image into three primary colors and to synthesize them in a receiver.

The inventor proposed three options of a light distributor design. The first version offered to use two disks with holes which were located on one axis and rotated with different angular velocity. The first disc had some cracks along radial lines and the second one had sloping arched cracks. During rotation, the disk cracks crossed and created a through-hole of a diamond shape. The number of slots on the disks is divisible by three. The slots of one disk were fixed alternately by red, green and purple glass. It was intended to link the disks by a double gear and rotate them in the same direction at different speeds. Each such slot will scan one image line. By the time when the first slit runs the first row, a new slot begins to operate which, in its turn, will read the second row, etc. The light passed through a rhombic opening was converted into an electrical signal using a photo cell which was intended to transmit to a receiving station and use to control the brightness of light in a similar scanner.

The second option of a light distributor was distinguished by the fact that it was offered to use concentric cylinders instead of disks one of which rotated inside the other one. In the third option of the device, two prisms with the same number of mirror facets rotated on mutually perpendicular axes.

The documents of the dossier concerning the teacher of the Kazan Industrial School A.A. Polumordvinov evidenced that at the end of December 1899, he appealed for a vacation and went to St. Petersburg in order to patent his invention. He arrived to the northern capital on December 23 and first of all he visited the Department of Trade and Manufactures of the Russian Ministry of Finance and applied for a device he invented. On December 27, he announces his invention at the first All-Russian Electrotechnical Congress in St. Petersburg on December 29, 1899. Even, a small article was published about this announcement in the newspaper "Electricity" (Tovmasyan, 1971).

In general, this trip played an important role in inventor's life. Not only, because his speech at the first All-Russian Electrotechnical Congress aroused a great interest and he was offered to speak second time with a more detailed message on the next meeting of the 6th (electrotechnical) Department of the Russian Technical Society. And on April 28, 1900 at the meeting of the Russian Technical Society department A.A. Polumordvinov introduced an improved system of his "telephoto". The core element of the device was a "light distributor", giving the opportunity to obtain a color image scanning and a distant image transmission. The report was called "The current state of the issue about an electric vision at a distance (television)".

Yet, the main result of this trip was the acquaintance of Alexander Appolonovich with such scientists and experts in the field of electrical engineering, experiencing the first stages of development in Russia as A.S. Popov, P.S. Osadchy, B.L. Rozing, K.D. Persky, E.V. Kolbasyev who left later a significant mark in the history of Russian radio and television equipment. By the way, an outstanding inventor of the Ist All-Russian Electrotechnical Congress A.S. Popov held his speech. A.A. Polumordvinov listened to his report "Wiring without wires". In fact, during this trip Polumordvinov was admitted to the community of national physicists, electrical engineers and this event was to inspire and encourage his further work concerning the device.

Besides, the inventor's report about this trip, written to the director of the Kazan Industrial School N.G. Gruzov evidences that Alexander Appolonovich took part in the meeting of industrial schools representatives, held in the framework of the congress. The issue of the subject "Electrical Engineering" introduction in the curriculum of commercial schools was actively discussed during the meeting. The Kazan teacher held his speech at this meeting and we may assume that his performance fully expressed the approval to that innovation. In a nutshell, Polumordvinov returned to Kazan, full of hope.

But, there were two serious problems that impeded the inventor's work of the inventor concerning the "telephoto": the first one is the lack of finance and the second one is the inability to devote all his time to his hobby. It was necessary to earn a living. To solve the first problem Polumordvinov wrote a letter to the Minister of War Mr.A. Kuropatkin where he appealed for a subsidy for the manufacture of a device prototype. The inventor was full of joy when he got not a refusal, but the General's decision to give 2000 rubles to the inventor, as evidenced by the letter written from that department to the director of the Kazan Industrial School.

Thus, Polumordvinov had the opportunity to realize his ideas. However, it turned out that the necessary elements for "telephoto" were absent not only in Kazan, which did not have any electrical companies, but also in St. Petersburg, where he had had his time off from the director of the school once again. Orlova wrote that in St. Petersburg Polumordvinov appeals to several electrotechnical plants of Siemens and Halske, Glebov, Geysnera, but without any results. The head of the shops at the physics laboratory of the Technological Institute Peterman decided to help Alexander Appolonovich according to the recommendation of the Electrotechnical Institute Inspector M.A. Shatelen. However, the work in workshops was a slow one for objective reasons. The manufacture of parts with rotating mirror prisms and the

unit for photographic images provision was possible there. The light distributor with rotating disks with slots for the transmission of an image given by a lens directly from the subjects was made at E.V. Kolbasyev's phone production studio opened in Kronstadt. But the rest elements could be provided only from abroad: selenium plates and optical-electric element from Paris, silvered mirrors and glasses from Germany, galvanometer, screw gears for mirror prisms, optical condensers from England.

The holiday period of the teacher A. Polumordvinov ended and he had to return to Kazan. The inventor sent a telegram to the school and asked to extend the holidays but his appeal was denied by the authorities as there were no teachers to hold oncoming exams. He has to leave actually the unfinished production of "telephoto" and his speech at the meeting of the Russian Technical Society on 28 April 1900 could be cancelled. Fortunately, Polumordvinov's report about "telephoto" was presented by N.M. Sokolsky, so the invention of the Kazan teacher was highly appreciated by the members of the Russian Technical Society. In particular, the participants of the meeting, comparing A.A. Polumordvinov's device with the scheme of an image transmission over a distance proposed by Pole Schepanik recognized the advantage of the former one.

A.A. Polumordvinov returned to Kazan and continued to work with "Telephoto". He developed a new type of device, in which he proposed to apply oscillating mirrors and increase the illumination of an image and facilitate the correction of synchronism instead of rotating mirror prisms. The inventor makes the following conclusion: it is necessary to transmit more than one image point at the same time for complex images by dividing an image into the corresponding number of units and applying for each such part separate selenium plates and individual electromagnetic receivers.

In Summer of 1900, the world expo was held in Paris. This expo usually attracted many scientists around the world. A.A. Polumordvinov appeals to the director of the industrial school to allow him to travel again in order to view the manufacture of "telephoto" device. The trip was allowed. The inventor got a great opportunity to see firsthand the latest achievements of European Science and technology to meet modern electrical engineering successes. He managed not only to visit the exhibition, but also to participate in the I World Congress of Electrical Engineers, which took place in Paris at the same time. Besides in Paris, Polumordvinov met Mr. Ducretet and agreed with him about making the necessary parts for his device.

The term of his trip ended and Polumordvinov faced the dilemma: give up the work concerning the started unit

halfway and return to Kazan or to devote himself fully to his hobby. He took a radical solution: he wrote the letter to the director of the Kazan Industrial School to release him from his post. At the same time, A.A. Polumordvinov sent another letter to Electrotechnical Institute of St. Petersburg where the inventor asked to attend the 3rd course as a volunteer.

Unfortunately, as soon as Polumordvinov left Paris, the works concerning the device ceased, the author of drawings had to be present. Mr. Ducretet reported that he had to abandon the work. At the Electrotechnical Institute A.A. Polumordvinov studied deeply telephony, telegraphy and electrical engineering. He was engaged in scientific work. According A.F. Orlova, he performed a really huge work during three years of study. In addition to several types of devices for distant image transmission he suggested several schemes for the use of DC dynamic machines and altoristers as a relay; the duplex turning on of differential electromagnets during the transmission of sound and images and the branching of a chain for these cases; telephone relays with the replacement of a permanent magnet by an electromagnet, connected via a reaction coil; the application of repeatedly transmitted images and sound by wire and wirelessly, etc.

The creator of "telephoto" was the first one who proposed the device project for the demonstration of sound television (1903), that is a quarter of a century before the sound was first used in remote viewing and cinema. At this time Polumordvinov develops an additional "system for repeated transmission of an image and sound by wire and wirelessly" in the "light distribution" project. The possibility of simultaneous image and sound transmission was solved theoretically by the inventor using the multiple voltage and current resonance phenomenon in closed or several circuits. To prove the possibility to hear and see an image using a single electric circuit he developed several options. Noone offered such a scheme prior to A.A. Polumordvinov.

Unfortunately, the officials did not understand the scientific and practical value of his new work and denied the privilege for him. However, A.A. Polumordvinov attempted to make this unit. He turned to the company Erickson and K. But the company was unable to complete this project for the same reason that proved the previous attempts as unsuccessful ones, the lack of detail.

After the graduation from the St. Petersburg Electrotechnical Institute (the second higher education in 1903), he was hired to the General Directorate of Posts and Telegraphs as an assistant-manager of phone compartment. A year later Polumordvinov entered the graduate school of the St. Petersburg Electrochemical

Institute within the topic "The apparent resistances in AC circuits with ramifications". In 1908, he was attached to the Institute of Electrical Engineering and worked in the laboratories for 2 year, made a series of discoveries that were important for the development of the telephone business in Russia.

It is known that in 1913, he offered an improved devices for the transmission of color images at a distance once again. He found out that his works were recognized only in 1915 when he went to petrograd during his vacation. When several patents were received, he tried to interest Russian industrialists with the project "telephoto" but they did not support it. Polumordvinov had no choice but to sell this patent abroad.

The English scientist and inventor G. Baird who bought Polumordvinov's patent improved the device. In 1928 its demonstration was held.

Let's pay your attention to the fact that 20s - 30s years of the 20th century were the period of active scientific research in this direction. In 1925, the Armenian physicist and engineer O.A. Adamyan designed an original machine which allowed to see through an opaque barrier and then developed the idea of color images transmission using the cylinders or discs that decompose an image into separate secondary colors. The author of the book about Adamyan A.K. Tovmasyan writes the following: "Modern television is based on this principle" (Galeev, 1995).

In 1926, an unusual defense of the thesis named "Electrical foresight" was held at Physico-Technical Institute (Petrograd). During his defense the researcher of the project L.S. Termen demonstrated the active device samples for "wireless" transmission of images at a distance. The parameters of Termen's "TV" screen made 1x1.5 m. And if other inventors were working with "Nipkov disk" (used the system with a "spotlighting"), Termen was one of the first who applied the original mirror scanning which allowed to transmit a tv program directly on the street under natural light, not only with static objects, but also with moving ones. Subsequently, the action of Termen device was demonstrated at the People's Commissariat of Defense. A special commission decided to use foresight at a state border. The unit was classified ad a secret one for many years. This event postponed the development of mass television in the Soviet Union until the end of the 30s when the process of electric television development started with an image decomposition into 343 lines (first in Leningrad, in Moscow and then in Kyiv). Many years later, the grateful descendants called L.S. Termen the pioneer of electronic art.

It is interesting whether Alexander Polumordvinov knew about all this. Did he know that during 30s, the

official date of the first experiments on the television in the USSR, the country created several groups of scientists, specifically dealing with this theme? In 1932, a new principle of transmitting tubes was proposed for the first time. These tubes were developed and perfected by P.V. Shmakov and P.V. Timofeev which allowed to create television transmitters with a significantly higher sensitivity. I.V. Kuznetsov, N.M. Gopshteyn, P.V. Braude, L.A. Kubetskoy, S.A. Vekshinsky also contributed to the TV development.

The fate of another famous Russian inventor is also related to Kazan and the territory of modern Tatarstan. Alexander Matveyevich Ponyatov was born on March 25, 1892 in the Village Russian Aisha of Chepchugovskaya parish at Kazan Province. After the study at the 2nd Kazan Real School he entered the Physics and Mathematics faculty of Kazan University, but in 1910, he entered the Moscow Higher Technical School to the Mechanical Department. Makoveev recalled that during the meeting with him Ponyatov said that he considered himself the disciple of Professor N.E. Zhukovsky and his influence made him to love aircraft. However, in 1911, Ponyatov feared the punishment after the participation in student demonstrations and went to continue his study in Germany with the recommendations from N.E. Zhukovsky. He studied there at Polytechnic college in the city of Karlsruhe.

During the First World War, he was drafted into the army from Kazan, graduated from the Pilot School and served as an officer in the aviation industry. During the Civil War Ponyatov was fighting on the side of the White Army. He ran into China through Siberia and at the end of the 20s he moved to France and then to the United States.

Here, in 1944, he created the firm "Ampex", the name of which stands for Alexander Matveyevich Ponyatov- Excellence (in translation from English, the highest quality). The company produced the components for radar, was on the verge of collapse after the war. Ponyatov takes the most difficult task to put on an industrial basis the captured magnetic recording technologies exported from Germany. However the experts of the company RCA, headed by David Sarnowski and Vladimir Zversky refused from it ("It can not be done!"). The giant American Radiocorporation (RCA) led by the native of Russia David Sarnov, i.e., its subsidiary company of gramophone recording "Victor" occupied a dominant position during that period. Several companies were engaged into the development of tape recorders after the war. In the competitive environment "Ampex" developed high quality standards in the industry of magnetic record from the start. Besides, the memory of

first computers was based on the principle of magnetic record. The special equipment "Ampex" was used in medicine, aviation, aerospace. This famous company brought color for TV. In 10-15 year Ponyatov's Empire developed from an obscure handful of improved by P.V. Shmakov and P.V. Timofeev, which allowed to create television transmitters of significantly higher sensitivity. The television was also born due to the contribution made by I.V. Kuznetsov, N.M. Gopshteyn, P.V. Braude, L.A. Kubetsky, S.A. Vekshinsky, the enthusiasts prior to a world leader, an industry giant. Starting with the playing tape recorders Ampex company focused very quickly on more profitable special technology having mastered the method and equipment of accurate magnetic recording according to the market demands.

Almost half a century (from 1946-1995) the company Ampex held scientific-technical leadership in the professional equipment of magnetic recording for broadcast and special signals. It also held the patents on many fundamental techniques and devices within this area that helped to restrain the persistent attempts of American, European and Japanese rivals to destroy a company and buy it in parts. However, a really outstanding achievement of the company and its founder was the creation the first professional broadcast recorder in the world. In a number of countries, the term "ampexing" was used in the characterization of the videorecord process for some time.

CONCLUSION

Thus, one can not say that the contribution of Russian inventors. A.A. Polumordvinov and A.M. Ponyatov in the history of world television is not appreciated. However, the historical facts relating to their personal formation and development of their scientific interests, is not widely known to the world scientific community. A.A. Polumordvinov may be considered as the progenitor of the color TV and modern television is obliged to A.M. Ponyatov by the developments of sound and videotape equipment development, without which it is difficult to imagine the modern electronic media. This article is one of the attempts to fill this gap. The archival documents of A.a. Polumordvinov's Kazan period of life were published for the first time.

ACKNOWLEDGEMENT

The research is performed according to the Russian Government Program of Competitive Growth of Kazan Federal University.

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