

# Contribution of the scientific and technical intelligentsia of the North Caucasus to the victory over fascism (1941–1945)

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**Abstract.** The history of the Great Patriotic War is multifaceted, and the disclosure of the role of the scientific and technical intelligentsia of the North Caucasus during the war years allows us to give an objective picture of the processes taking place in the country at the regional level. The intelligentsia, that consists of various socio-professional groups, made a feasible contribution to the defeat of the enemy. The scientific and technical intelligentsia played a big role in ensuring the country's defense capability, helped supply the army with high-quality military equipment, weapons and ammunition, their developments increased labor productivity. The efforts of scientists and constructors ensured progress in the creation of military equipment, the continuous growth of the combat performance of Soviet weapons, which became the most important condition for the victory of the Soviet people in the war. An important condition that ensures a quick and comprehensive approach to solving actual problems in the implementation of scientific developments to meet the needs of the front was the creation of new management structures, the broad involvement of the country's leading scientists to work in the departments and committees of the State Defense Committee, the Council of People's Commissars of the USSR, in key People's commissariats. This made it possible to optimally direct scientific activity to solving the tasks that the war set for Soviet science. The creation and organization of serial production of advanced military equipment was carried out according to the «science-technology-production» system. The extreme difficulty and scale of the tasks that were solved by the state executive and administrative bodies during the Great Patriotic War was the timely training of scientific and technical personnel. On the instructions of the SDC and the CPC of the USSR, the Academy of Sciences of the USSR in 1943–1945 did a lot of work on the main directions of their further development. At that time, the main directions in the development of a number of areas in science and technology were determined – chemistry, rocket technology, nuclear energy. The war made adjustments to the training of intelligentsia personnel. Universities and technical schools of the region had to solve the most difficult task of training technical intelligentsia.

## 1 Introduction

The restructuring of industry in a military manner required the solution of a complex of organizational and technical issues. Specialists had to develop new production technologies, technical documentation, establish production of military products and goods for the population as soon as possible. The activity of scientists in the development of scientific and technological progress, when the country has suffered significant material and technical damage, is undeniable. The scientists were tasked with creating military equipment, weapons and ammunition better than the enemy's. In solving this problem, the scientific and technical intelligentsia, the rationalization movement, which covered almost the entire country, played an important role. The Central Committee of the Party and the Soviet Government adopted the most important decisions contributing to the strengthening of higher and secondary specialized educational institutions that trained personnel of scientific and technical intelligentsia.

The chosen topic is of practical relevance, because it allows us to analyze the scientific and technical potential in extreme conditions of war. The relevance of the chosen research topic is due to the need to rethink the role of the scientific and technical intelligentsia of the North Caucasus during the war years. The problem of studying the role of the scientific and technical intelligentsia of the North Caucasus, its role and place in the formation of scientific and production centers in the South of the country during the Great Patriotic War has not yet received coverage in historical literature.

The methodological basis of the work is the principles of historicism and scientific objectivity, which involve the study of the activities of scientific institutions of the North Caucasus in 1941–1945, taking into account the specific historical conditions of the war. According to the tasks outlined in the subject of the study, the author predetermined the problem-chronological approach. The application of the dialectical method in the coverage of historical processes allowed a multidimensional and

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comprehensive approach to the analysis of the facts under consideration, taking into account their totality and inconsistency. Systematic presentation, generalization and analysis of the material implies multifactorial approaches characteristic of historical science. Methodological techniques such as analysis, synthesis, comparison and generalization, historical and typological method, the principle of logical selection of factual material, as well as methods of historical description and actualization were used in the work.

## 2 Findings

During the Great Patriotic War, the Soviet Union won not only a military, but also an economic victory, moreover, without an economic victory, a military victory over an unprecedented powerful enemy would have been impossible. The Great Patriotic War of the Soviet people was characterized by the widest and most comprehensive use of the scientific and technical potential of the country. The role of science, which has always occupied a prominent place in the life of socialist society, increased even more during wartime. The role of the intelligentsia in the Great Patriotic War, its contribution to the victory over the enemy attracted scientists during the war years. The role of the Soviet intelligentsia during the war years becomes the subject of special researches. Historians were attracted by the study of the contribution of scientific and technical intelligentsia to the strengthening of economic and defense potential. A special chapter of the monograph by A.I. Lutchenko highlights the training of engineering and technical intelligentsia during the war years, shows the solution of tasks to restore the network of universities [1].

The contribution of the engineering and technical intelligentsia of the North Caucasus to the defeat of fascist Germany is highlighted in the work of D.N. Sudavtsov [2]. The new Russian historiography is distinguished by the revision of traditional concepts and schemes based on new views. More attention was paid to humanization and universal human values during the war [3]. Some foreign researchers objectively approached the coverage of the contribution of Soviet science to the military economy. The work of the American researcher L. Graham [4] objectively shows the superiority of Soviet science during the war years. The rivalry between German and Soviet scientists in the creation of atomic weapons was reflected in the work of D. Irving [5].

The war from its very first days determined the direction of the work of Soviet scientists. Already on June 23, 1941, at an expanded extraordinary meeting of the USSR Academy of Sciences, it was decided to switch all its departments to military topics and provide collectives that would work for the army and navy by all necessary means.

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Military mobilization issues and the most important measures to strengthen assistance to the Red Army were brought to the fore. The regional committee's branch departments – oil production, oil refining, construction,

transport, light and local industries – took direct control of all military orders. The regional committee's branch departments, city committees and city district party committees were headed by experienced party workers with higher technical education.

Of great importance was the increase in oil production in the Grozny oil district. Engineers and technicians of the oil industry in a short time have developed ways to produce high-octane gasoline necessary for aviation.

Measures to transfer engineers and technicians from the management apparatus to production and some reorganization of the leading personnel of industrial enterprises were taken. As of January 1, 1942, 2870 specialists worked at the enterprises of the Grozny Oil Processing Plant, 41% of them were certified [6].

Scientists of the Ordzhonikidze Institute of Non-Ferrous Metals were involved in the development of instructions from the Technical Council of the Ministry of Non-Ferrous Metallurgy of the USSR. Professor A.M. Karpov of the Novocherkassk Industrial Institute was looking for ways to increase the production of defense raw materials in North Ossetia.

V.I. Popov, working as an associate professor at the Novocherkassk Industrial Institute, on the instructions of the command, was engaged in military-geological mapping of Donbass, Southern Bug and Crimea.

During the war, employees of the Novocherkassk Industrial Institute completed 2710 works. Scientists of the university stubbornly dealt with the problems of the production of mortar weapons, materials for aircraft construction, increasing the production of defense raw materials. At Rostov University, on behalf of the military departments, various materials were tested for strength, special-purpose devices were designed and manufactured. Scientists of the Ordzhonikidze Institute of Non-Ferrous Metals, in close cooperation with specialists of enterprises, worked on improving the technology of extracting strategic raw materials from dump products of mining production.

To fill the lack of specialists, educational institutions have switched to shorter training periods and accelerated graduation. The curricula and programs of universities were revised in order to provide intensive training of specialists. The Central Committee of the Party and the Soviet Government adopted the most important decisions contributing to the strengthening of higher and secondary specialized educational institutions. On May 5, 1942, the resolution of the Council of People's Commissars of the USSR and the Central Committee of the CPSU (b) "On the plan of admission to universities in 1942 and measures to strengthen higher educational institutions" was issued.

Benefits were granted to persons who returned from the ranks of the Soviet Army and Navy after injury, concussion, illness, as well as dependents of ordinary and junior commanding officers who received benefits. Some categories of students were provided with a state scholarship. On July 18, 1942 the CPC of the USSR abolished the curricula introduced in 1941 with shortened terms of study, and already in the 1942/43 academic year, students studied according to the pre-war curricula. In July 1942, the Soviet government took similar measures for technical schools. In this regard, the party and Soviet bodies of the republics have developed specific measures to improve the work of special educational institutions. The

authorities of Dagestan appealed to the heads of educational institutions with instructions to pay special attention to the admission of students from indigenous nationalities, strengthen the material base of educational institutions, improve living conditions for students and teaching staff when implementing the recruitment plan for universities and technical schools (colleges). People's commissariats and executive committees of city and district Councils of Workers' Deputies received orders prohibiting the mobilization of students and teachers of universities and technical schools for various jobs.

A difficult situation developed with the training of personnel in Kabardino-Balkaria, North Ossetia, on the territory of which in the summer and autumn of 1942 there were fierce battles with the Nazi invaders, then these territories were under temporary occupation. Educational institutions in these republics have been closed or evacuated.

Higher and secondary specialized educational institutions had to face enormous difficulties caused by military actions. This is, first of all, the weakness of the material base and the reduction of the teaching staff.

A lot of damage was done to the city of Grozny. The report of the Extraordinary State Commission for the Establishment and Investigation of the Atrocities of the Nazi Invaders "On the material damage caused by the Nazi invaders to state enterprises" states: "... in the oil fields of Grozny and in the Krasnodar Territory, the Nazi invaders, with the help of aerial bombers and other methods, ruined and destroyed more than three thousand oil wells with the production of up to 5 million tons of oil per year. Fascists blew up an atmospheric vacuum plant with an annual capacity of 660 thousand tons of petroleum products and a cracking plant with an annual processing of 227 thousand tons of oil in Grozny [6].

During the Great Patriotic War, the Grozny Oil Institute rapidly trained oil engineers for the exploration of new oil and gas fields in the eastern regions of the country, Siberia and Central Asia, which made it possible to fully provide the Red Army with all types of fuel and lubricants. The evacuation of the Grozny Oil Institute, which was actually carried out in front-line conditions, under fire from enemy aircraft, led to the loss of training equipment, human losses. Nevertheless, it allowed to keep the teaching staff and students. In September 1942, the Institute was evacuated to Kokand, Uzbek SSR. After returning to the republic, the institute quickly established the educational process and actively engaged in solving defense and economic tasks [7]. At the beginning of 1943, when the fascists were expelled from the North Caucasus, the activities of universities and secondary specialized educational institutions resumed. On October 1, 1943, the academic year began at the Grozny Institute and Technical School. 700 people were accepted for the first year of the institute, 500 people were accepted for the first year of the technical school. The decision of the Bureau of the Chechen-Ingush Regional Committee of the CPSU (b) "On the work of the Grozny Oil Institute" dated November 9, 1943 established scholarships for successful students. This significantly increased the number of students of the Grozny Oil Institute. Excellent students were entitled to a 25% surcharge [8]. Students of all courses of the Grozny Oil Institute, as well as students of the penultimate and last courses of all other higher educational institutions and students of all courses of technical schools,

Narkomneft, Narkomkhimprom, etc. They were exempted from conscription into the Red Army [9]. The staff of Grozny Research Institute in 1941, in connection with the receipt of tasks of defense significance, had to change the subject of research several times. The Institute was entrusted with solving tasks aimed directly at increasing oil production and developing new types of fuels and oils, obtaining special products and substitutes from local raw materials. As of January 1, 1942, there were 306 people on the staff of the Institute, as of January 1, 1942, 2870 engineers and 1359 technicians worked in the "Grozneftekombinat" [10].

In accordance with the instructions of the Minister of the Oil Industry of the USSR Sedin, exploration drilling by the Grozny Oil Combine of new areas of Khasav-Yurt was launched. The staff of the deep drilling of the trust office of the «Grozneftazvedki» in the days of the war mastered the drilling of ultra-deep exploration wells without lowering safety columns. The study of wells and the establishment of the correct technological regime allowed to get the maximum oil from wells, to achieve an increase in its production. In total, in 1943, 2152 well studies were carried out on all the production areas of the Grozny Oil Processing Plant, which made it possible to obtain additional 5200 tons of oil from the old wells trust of the «Starogrozneft» in excess of the plan, and the «Oktyabrneft» trust – 8000 tons [11]. Under the leadership of a senior researcher at the Grozny Research Institute B.K. America, for the first time in the Soviet Union, a new process for obtaining high-grade aviation gasoline from low-quality raw materials was mastered. Candidate of Technical Sciences V. S. Baranov in 1943 solved the most important problems of chemical treatment of clay solutions. He solved the problem of combating the absorption of clay solutions when drilling wells in the Bori-Su field. The group of Doctor of Technical Sciences, Professor V. K. Shchelkachev, made a deep scientific analysis of the working conditions of reservoirs with a water pressure regime in the «Oktyabrneft» trust [6]. Due to the approach of the front to Grozny, drilling operations were completely stopped at the beginning of August 1942. The evacuated to the eastern regions drillers of Grozny quickly got used to the unusual conditions for them and every day picked up tempos of drilling in new oil fields. The remaining machine-building, mechanical plants and mechanical workshops of «Grozneft» completely switched to the production of products for the front. The oilmen of «Starogrozneft» have mastered two new research methods: measuring levels with a Lindtrop echo sounder and dynamography of the operation of deep pumps. In 1943, half of the oil was obtained from deep-pumping wells. Deep pumps manufactured at the «Krasny Molot» plant were one of the important mechanisms that improved the operation of wells. Research work on the «Starogrozneft» trust gave an increase in only one field from the old wells of 5200 tons of oil. The restoration of cracking plants, coke cubes, the preheating of raw materials before coking, as well as the commissioning of processes such as alkylation and thermocatalytic cleaning, allowed not only to process the planned low-grade raw materials, obtain B-70 aviation gasoline, increase the production of gasoline, kerosene, but also to start the production of B-78 aviation gasoline [6].

The introduction of these processes required an increase in technical culture, constant systematic work on the issues

of mastering new technology, improving it. In this regard, the party organizations of the Stalinsky district, business executives organized technical training, research work in the laboratories of the plant, initiative groups of engineers and technicians who worked tirelessly on the restructuring of technological processes, production schemes, etc.

After the expulsion of the Germans from the North Caucasus, a new period began in the work of the Grozny oil industry – the period of restoration of the oil economy and its further development. April 20, 1943. The State Defense Committee of the USSR set a task for the Grozny party organization and oilmen – to restore production in the shortest possible time, to develop drilling, exploration, energy and mechanical engineering at a high pace. The war brought a lot of new things to the technique of the oil industry. The issues of improving the technology in the work of «Grozneft» became more acute during its recovery. It was necessary to study the operation mode of the wells more thoroughly. Scientists of the Institute, in the face of a sharp decline in oil production, began to conduct research wells. Keeping the total production level, selectively stopping individual wells from several hours to several days, the scientists put them back into operation. This method of stopping and starting wells made it possible to control the redistribution of reservoir pressure, changes in their flow rates and bottom-hole pressure.

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In 1944, the construction of the installation (first stage) for pumping gas into the reservoir in the Bori-Su field was completed. The issue of the gravel filter, which was a long-standing problem for the oilmen of the Soviet Union, was also resolved. The production of new high-quality pumps for oil production has begun at the «Krasny Molot» plant. In 1944, a plant for the production of cementing materials was built.

In the field of oil refining, 1944 was the year of almost complete restoration of dismantled oil refineries, increasing the production of oil products and improving their quality.

Despite great difficulties, the oil industry of the republic has managed to increase oil production and refining. In 1944, oil was produced by 41.2 % more than in 1943 and gas by 26.5 %. Oil refineries increased the production of aviation gasoline by 60.1 %, light products by 20 %. The annual drilling plan was fulfilled by 124.1 % [12].

### 3 Conclusion

Thus, the scientific and technical intelligentsia of the region played a major role in ensuring the country's defense capability, helped supply the army with high-quality military equipment, weapons and ammunition, their developments increased labor productivity. Of great importance was the increase in oil production in the Grozny oil district. Engineers and technicians of the oil industry in a short time have developed ways to produce high-octane gasoline necessary for aviation. To fill the lack of specialists, educational institutions have switched to shorter training periods and accelerated graduation. The curricula and programs of universities were revised in order to provide intensive training of specialists. The oil refining industry of Grozny occupied a significant share in the production of light oil products in the country. The Grozny oil refiners, realizing their place and role in the Patriotic War, worked with doubled and tripled energy to give more light oil products to the front. The creative initiative of scientists, engineers, technicians was supported by the inquisitive thought and ingenuity of factory workers – innovators of production.

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