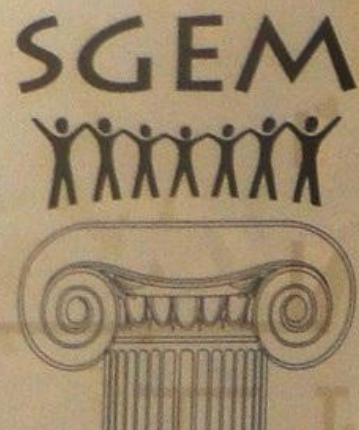


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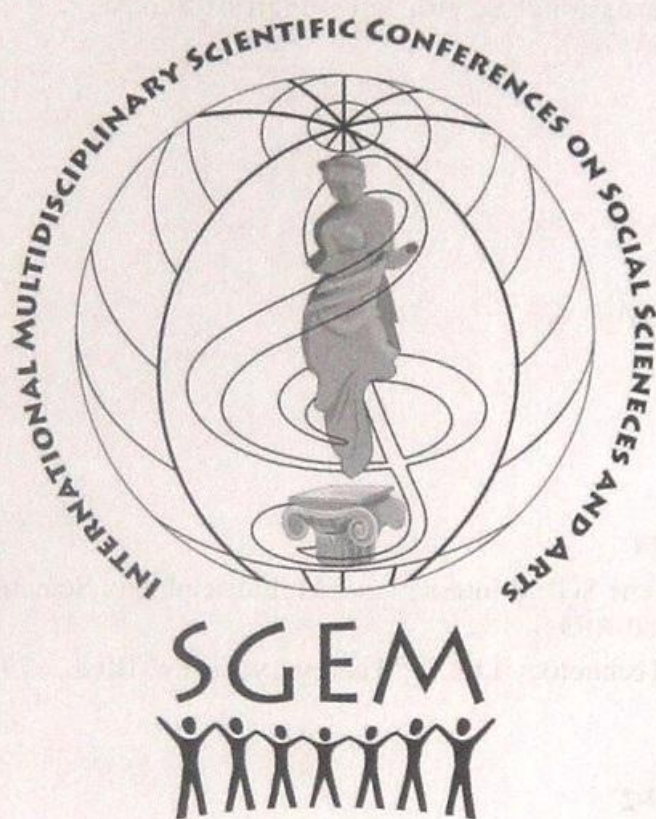
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# THE CONTRIBUTION OF THE SIBERIAN PHYSICISTS' SCIENTIFIC COMMUNITY TO RUSSIAN MODERNIZATION AT THE END OF XIX- FIRST HALF OF THE XX CENTURIES<sup>1</sup>

Assoc. Prof. Alexander Sorokin<sup>1</sup>

<sup>1</sup>Tomsk state university, Tomsk polytechnic university Russia

## ABSTRACT

The article examines the history of Siberian physicists' scientific community. The main stages of Siberian physicists' scientific community formation and development at the end of the XIX – first half of the XX centuries are reconstructed on the basis of the available academic works, documental materials, including the ones introduced into research for the first time, and the printed media. The author analyzes the part of the physicists' scientific and academic corporation consolidation in developing the fundamental and applied research, in forming the significant schools of thought and spheres in the prospective fields of physics. Author characterized especially the relationships between the physicists scientific community and the authorities. Particular emphasis is placed on the importance of consolidation of scientists physicists in the process of Siberia industrial modernization in the XX century. In article considers the first regional conference of physicists of Western Siberia held in April, 1934 on the initiative Siberian physicotchnical institute employees. The significance of the conference was in the consolidation of scientific community and experts of manufacture as well as in the development of scientific community of Siberian physicists. The conference is examined by the author from the point of the implemented state policy of scientific personnel mobilization for the solution of the forced industrialization's issues. The article is intended for those who are interested in the Russian history and the history of higher education and science.

**Keywords:** scientific community, physical science, regional conference, industrialization, Siberia

## INTRODUCTION

Scientific community as a form of social organization of science is of significant interest for studying history of science and technology organization and development. In such a case, the main aspects of scientific community formation and development are schools of thought as effective forms of scientific community functioning, institutionalization (scientific institutions formation) and physicists' cooperation with the allied subjects, first of all with philosophy (as ideology) and defense technology. .

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**Materials and Methods.** The required materials can be found in both published sources and archive funds. The main historical source for writing is materials of Tomsk State University Archive and the State Archives of the Tomsk region (GATO). There is reports documents of the activities of Tomsk universities, minutes of meetings of scientists and engineers, memoranda, appeals to scientists, research topics, etc.

In this paper we used the comparative-historical method which allows to reveal the essence of the phenomena studied and the similarity and difference of their intrinsic properties. In determining the various quantitative and qualitative characteristics of research widely used statistical method, historical and sociological analysis.

**Results.** The origin of Siberian physicists' scientific community was connected with the opening of Imperial Tomsk university (ITU, at present – Tomsk State University) in 1888, the first one in the Asian part of Russia. The university initiated the process of establishing and developing the first schools of thought, the one in physics among them. The origin of physical research dates back to 1888 and is associated with the name of N. Gezekhus, the first professor of physics at ITU. It was him who initiated the opening of the first physical office, purchased facilities and equipment for that office, proposed the program of meteorological research in Siberia. However, the short period of time he worked for Tomsk university which coincided with the first steps of university development did not allow N. Gezekhus to dedicate much time to his research. [1. P. 168]. The further development of physical research in Tomsk university was connected with the work of F. Kapustin as full professor since 1903. In 1896 when the first article about W. Röntgen's discovery of X-rays was published (X-rays were discovered in 1895), F. Kapustin ordered an X-ray tube from Germany. [2]. F. Kapustin was the first scientist in Tomsk who got X-ray photographs. He also mastered glass-blowing and himself blew X-ray tubes. That became the origin of Siberian radiology. F. Kapustin set the beginning of magnetic research in Tomsk university which was of great importance that time. As it is known, magnetic maps are necessary for the activities which magnetic needle is used for: land measuring, railway location surveys, river or north waters floating, etc. Evaluating in general the condition of physical research in Tomsk university in the pre-revolutionary period, one should take into consideration the fact that the chair of physics until 1917 (when the department of physics and mathematics was opened) was accessorial within the faculty of medicine and its staff consisted of one professor only. That professor was in charge of delivering a course of lectures and practical exercises.

The opening of Tomsk Technological Institute (TTI) with the chair of physics headed by B. Weinberg in 1900 gave an impulse to scientific community development. In pre-revolutionary Tomsk no one of professors-physicists created his own school of thought. Nevertheless, radiology originated in Siberia (F. Kapustin), geophysical research was successfully conducted (F. Kapustin, D. Smirnov) [1. P. 171].

The second stage of Siberian physicists' scientific community development came about in 1917 when the department of physics and mathematics at Tomsk university was opened. During the Russian Civil war (1917 - 1922) N. Semenov, a future Nobel prize winner, worked as a teaching assistant at the faculty. The opening of East-Siberian university (present Irkutsk State university) became a significant factor for the Siberian

and Far Eastern academic complex development. Within East-Siberian university in 1919 the department of physics and mathematics was established with two subdivisions – the one of science history and the sub-division of medicine.

However, the massive research in physics started in 1920-30ths. Over that period the state policy of highly-skilled professionals mobilization was actively conducted to solve the problem of heavy deficit of such specialists in the provinces according to the goals of forced industrialization. In the late 1920th s in order to achieve the objectives of industrial modernization and reaching new technological horizons, the peripheral network of scientific institutions in the sphere of physics was extended. Thus, Siberian physicochemical institute (SPhTI) was founded in Tomsk in 1928 as the first scientific research university in the field of physics behind the Urals. Since its foundation SPhTI played its crucial part in consolidation and training of highly-skilled scientists, physicists in Siberia. It also became the institution where the first schools of thought in physics of firm body, and spectroscopy originated. The scientists of SPhTI consulted their colleagues of Siberian scientific research institutions and industrial enterprises on the regular basis. That allowed to create the conditions for Siberian specialists' advanced training as well as direct Tomsk physicists to consult and deliver lectures to their counterparts throughout Siberia.

SPhTI scientists initiated, organized and held the first regional conference of Siberian physicists in the spring of 1934. The aim of the conference was to consolidate the research efforts in the field of physical sciences in Siberia. The idea of conference organization was approved 'in word and deed' by the Soviet People's commissariat of education, the regional and the city communist party institutions. That conference can be regarded as the first successful attempt of the scientists' efforts consolidation aimed at achieving the goals of industrialization in Siberia. In the newspaper articles published prior to the conference opening the conference was proclaimed as 'the beginning of clear fruitful industrial tie between the technological and scientific centers of Siberia aimed at .... 'establishing classless socialistic society on the basis of powerful productive forces development'. 130 delegates took part in the conference, 43 of them came from other cities. Those residents of other cities were the representatives of universities and institutes, technical colleges and research institutes from Tomsk, Novosibirsk, Omsk, Krasnoyarsk, Irkutsk, the employees of factory laboratories from Stalinsk (present Novokuznetsk), Anzherka (present Anzhero-Sudzhensk), Sverdlovsk (present Ekaterinburg) etc. Among the conference participants there were Ural physicochemical institute and Physicochemical institute after L. Karpov (Moscow) [3. P. 51].

The conference meetings were held from April 16 to April 18 in 6 sections: physics of metals, physics of carbon, physic chemistry, general physics, radiotechnics. And physics education. On the meetings they discussed a wide range of issues of theoretical and practical significance. Thus, professor V. Kuznetsov held the work of physics of metals section. The employees of SPhTI, the delegates of Siberian Institute of metals (SIM), Siberian institute of chemistry and technology (SICHT, present Tomsk Polytechnic university) participated in the work of that section, 5 section meetings were held, 15 conference reports were presented. The section work resulted in establishing personal ties between the scientists as well as in highlighting 27 topics relevant to 'rapidly growing' metallurgy industry of West Siberia, the topics of great practical and

theoretical significance. [4]. Later those topics were actively investigated by SPhTI scientists in close cooperation with the representatives of Siberian universities and institutes, technical colleges and industrial enterprises. In order to achieve those goals, several economic contracts and agreements of social emulation were signed. Due to the ties with the representatives of industrial enterprises established by SPhTI scientists in the conference in 1934 the economic contract was signed between SPhTI and Kuznetsk Iron and Steel plant to elaborate physical methods of flaw detection and another contract with the head office of Tomsk railway to investigate the issue of railway steel cold capacity. Those contracts contributed to enrichment and diversification of SPhTI scope of topics. Thus, in the department of solid state physics they began the research of the topic 'Solid state diffusion'. To investigate the issue of railway embrittlement since 1936 SPhTI scientists formed research and technology teams to examine railway with the participation of Siberian universities and technical colleges representatives [5].

The conference resulted in establishing personal contacts, scientific, industrial and communicative ties between the scientists and the employees of scientific, educational and industrial organizations. On the basis of those ties and contacts the community investigation the issues of Siberia industrial development was created. [6. Pp. 135-136]. The active support for the conference can be explained by the state policy of highly-skilled professionals mobilization which was actively conducted to solve the problem of heavy deficit of such specialists in the provinces according to the goals of forced industrialization [7. Pp. 120-121]. The practical significance of the conference was in physicists' efforts consolidation in order to enhance the industrial development of Siberia and to solve the problem of turning Kuznetsk Basin into one of the country largest coal mining areas, 'the second Donets Basin'. Further the consolidation of the scientists, the employees of research institutes, university and technical colleges professors developed in two distinct ways: contracts and agreements of social emulation and joint investigation of scientific issues stemmed from Siberian industry needs. Thus, the mentioned conference was the evidence of science turning into 'the additional industrial force .... A leverage, means of implementing socioeconomic programs' [8], [9].

The conference emphasized the significance of SPhTI as a center of consolidation and training highly-skilled staff of Siberian physicists. Further, in spite of the overall wish of conference participants to hold scientific events of that kind on more specified spheres in future, that did not happen till 1947. That fact can be explained by the social and political conditions of the 1930ths that affected greatly the lives of Russian intelligentsia, as well as the beginning of Great Patriotic War (Eastern Front of World War II) which called into being other forms of science-industry collaboration.

The part of physicists' consolidation center performed by SPhTI during Great Patriotic War was crucial. The wartime required truly new forms of scientific research organization to reduce the terms of research and implementation of research results and to aim the scope of research at fulfilling the orders according to defense and economy interests. At the war beginning, V. Kuznetsov, the director of SPhTI, initiated the foundation of Tomsk scientists committee of aid rendered to industry, agriculture and transport in wartime, SPhTI became the committee headquarters. SPhTI altered the scope of research and got focused on solving the problems relevant to the army and

national industry demands. They conducted research into armour piercing, substitute of deficit materials for the ones of local raw materials, working out new type of muzzle break of higher efficiency, the device detecting metal inclusions in wounded body, new methods of spectral and luminescent analyses, etc. The research conducted in SPhTI laid the foundation of several schools of thought and research areas in physics. The institute became the center of consulting and scientific and technical aid rendered to the plants of Siberia [10].

**Conclusion.** In the post-war period one could witness the progressive increase of human resources connected with physicists' scientific community extension. That extension was stipulated by widening the scope of research provoked by massive 'physics-consuming' projects demanded by Soviet military industrial complex. That led to the origin and development of educational and scientific institutions network aimed at training highly-skilled professionals in physics. Thus, formation and development of scientific community as a unique form of Siberian physicists' consolidation at the end of XIX-XXth centuries made a significant contribution to strengthening the scientific and educational potential of Tomsk region which manifested in developing fundamental and applied research, formation of large schools of thought and research areas in the prospective fields of physics. Later, with the collapse of the Soviet Union in 1991, the crisis period in the history of Russian science started.

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