The alumni of the Siberian geological school

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in the development of mineral resource base

The National Geological Service of Russia was instituted in 1882 with the Geological Committee opening in St.-Petersburg. Besides the director there was only six geologists on the staff. The first permanent geologist was appointed in Russia in 1888 in Irkutsk Mining Authority. At 25 V.A. Obruchev (1863-1959), a graduate of Petersbourg Mining Institute, became first permanent geologist in Siberia. Later he organized the Mining Department at Tomsk Institute of Technology and became its first dean (1901-1909). V. A. Obruchev won Lenin Prize (1926), was academician of the Russian Academy of Sciences (1929). Hero of Socialist Labour (1945), twice a winner of State Prize (1941, 1950).

V.A. Obruchev and his follower M.A. Usov (1883-1939) who was the first academician in Siberia (1939) founded the Siberian Geological School which has played the outstanding part in exploration of geology and minerals of Siberia and other regions of the former Soviet Union. Industrialization of Siberia was originated and developed in that school, in particular, reclamation of such giants as Kuznetsk and Kansk-Achinsk coal deposits, Kuznetsk Metallurgical Combine and Norilsk Mining-Metallurgical Combines, West Siberian oil and gas complex, and also creation of powerful mineral resource base in Asian part of the country.

The position of mineral resources in Russian economy is defined by the development of oil and gas industry, coal industry, metallurgical industry, and chemical industry.

Oil-and-Gas Resources. There are 12 oil-and-gas-bearing fields in Russia. West Siberian field is of great importance which includes 49 fields (47 in Tumen and 2 in Tomsk regions) out of 65 largest and unique fields of Russia. The largest fields are Samotlorskoe, Mamontovskoe, Fyodorovskoe, Priobskoe, Yamburgskoe.

West Siberian field ranks first among the both Russian hydrocarbon fields (the initial explored oil stocks are some 60% of the entire Russia, current stocks are more than 70%) and oil-and-gas fields (almost 70% of the entire Russia fields).

The perspectives of oil-and-gas-bearing in West Siberia were initially connected with oil and gas exploration in palaeozoic deposits. In 1920 M.A. Usov indicated the possible oil-bearing of papaeozoy deposits in Kuznetsk field, which is the largest field in the West Siberian plate. In 1925 Y.A. Kuznetsov discovered bitumen of asphaltitum type there.

In 1932 academician I.M. Gubkin, the initiator of oil and gas exploration in West Siberia, gave following reasons for the possible oil-and-gas bearing in Kuznetsk field:

1) Lytoploliolium coals and combustible shales in the north-east deflection in central parts are possibly changing to oil-bearing veins;
2) Bitumen in devon deposits;
3) Certain similarity of the geological construction of Kuznetsk deflection and Appalachia oil-bearing region of the USA where rich oil and gas fields coincide with devon and carbon deposits.

The integrated exploration of geological structure and oil-and-gas-bearing in West Siberian plate began only in 1948-53. Abstracts on results of drilling test holes and conducting regional geophysical work allowed in detail to explore the stratigraphy and outline principal laws of changing veins of meso-kainozoy deposits; carry out tectonic division; reveal geochemical and hydro geological laws of a deposit case; and set about finding out the laws of oil-and-gas formation and accumulation.

Oil-bearing exploration in South-West regions of West Siberia was intensively conducted by M.K. Korovin and V.P. Kazarzinov. In 1964 they were awarded Lenin Prize for the predicted oil-and-gas bearing of the West Siberia plate on the basis of its tectonic construction.

G.P. Bogomyakov, First Secretary of Tumen Regional Committee and a member of Central Committee of the Communist Party, was awarded Lenin
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Along with Kuznetsk coal field M. Korovin actively explored another coal field of Siberia, namely: Kansko-Achinsky, Tungussky, and Irkutsky. He was the first one who set a question on reclamation of Kansko-Achinsky field and described Tungussky coal field. These coal fields are the largest in Russia. Annual output amounts to 36.4 million tons; coal security comes to 800 years.

Today Kansko-Achinsky hydrogenous coal field with its cheap fuel stocks of 81.4 billion tons is the resource base of Kansko-Achinsky fuel-energy complex which is the main energy base in Siberia.

Hydrogenous coals in that region were discovered in 1876. However, more or less regular exploration of it began in the early 30s. In 1931-32 A.V. Aksarins discovered Saiano-Partisan field; in 1936-37 I.A. Zvonarev and I.I. Molchanov discovered Balakhinskoe field, and in 1947 I.P. Zhukov discovered Abansko deposit.

Ferrous Metallurgy Resources. Iron ore, quartz, refractory clays, moulding sands and other metallurgical resources deposits discovered by M. Usov and A. Kuzmin served as a basis for Kuzbass metallurgical industry. Today here operates not only Kuznetsk Metallurgical Combine, the first five-year-period giant, but also West-Siberian Metallurgical Plant.

In 1931 Tashtagolskoe and Shaimyskoe deposits were discovered (Y. Kuznetsov and K. Radugin) and included in the most important industrial Kondomsky group of iron ore deposits. P. Budkov and M. Usov took an active part in prospecting and geological exploration of Telbess group of iron ore deposits. A. Kuzmin and A. Sivov organized prospecting of Tashheinogo-Maiasakaya group (for the first time boulders and fragments of black iron ore A. Kuzmin were discovered in 1929).

In 1930 Teiskoe deposit was discovered in Kuznetsk Alatau (I. Bazhenov, A. Kuz). In 1932 M. Anasiev and K. Filatov carried out first counting of Abakan deposits. Iron deposits of Krasnokamsensky, Anzassk and Volkov groups and a series of other deposits were discovered. In 1960 N. Dashkevich and G. Starodubov discovered Sredne-Angarsky iron ore deposit.
A. Kuzmin provided fluxes and refractory clays for Kuznetsk Metallurgical Combine.

Black Iron Ore Resources. Kuzbass' demands for manganese account for about 2 million tons yearly at its 17-19% content in ore and may be fully satisfied by Usinsk deposit which is situated in the central part of Kuznetsk Alatau and still is not reclaiming for the high costs of the branch-line building. In 1939 K. Radugin opened Usinsk black iron ore deposit and was awarded State Prize for that. Total stocks of that deposit with regard for off-balance ores (5-10 per cent of manganese) amount to 150 million tons.

Nonferrous Metallurgy Resources are presented by complex ores, aluminum resources, cobalt, mercury, tungsten, molybdenum, and other minerals.

Systematic prospecting of non-ferrous metals was started in 1919 after the establishment of the Siberian Geological Committee at TIT's Mining Department. Its founder and first director was P.P. Gudkov, academician of California Academy of the United States. During the first years of the Soviet Power prospecting included small-scale mapping of Salair and Altai territories and examination of some known ore deposits. To geological works on complex ore deposits of Salair belong Usov's investigations. B. Speransk, V. Kuznetsov also conducted research in complex ore and zinc deposits.

The main achievement of the Siberian Geological Committee was Norilsk copper-nickel region discovered by N. Urvantsiev in 1919-22. Ores of that region contain also cobalt, gold, silver, and platinum. Today this region includes such deposits as Norilsk-1, Norilsk-2, Talnakhsky, Oktiabrsky, and others. G. Rempel was one of the discoverers of Oktiabrsky deposit. All these deposits form the resource base of 'Norilsk Nickel' Company.

Y. Glazyrin, E. Vrublevich, and A. Stebueva were awarded Lenin Prize for the discovery and prospecting of the large complex ore deposit in Krasnoyarsk Krai.

The importance of complex deposits discovered by the alumni of the Siberian Geological School is characterized by the following figures: Krasnoyarsk Krai delivers 86.9% of nickel, 72.1% of copper, 75.6% of cobalt, and 98.1% of planitoids of the gross output.

K. Satpaev, a 1926-year graduate, academician and first President of Kazakhstan Academy of Sciences, academician of the Academy of Sciences of the USSR, winner of Lenin and State Prizes explored and reclaimed the largest in the world Dzezkazgan copper-and-ore deposit. Besides, he formulated the methodology and the unique metal-genetic prediction map for Central Kazakhstan, which allowed opening more than 330 deposits of ferrous, non-ferrous, and rare metals being the basis of economy and production sphere of independent Kazakhstan.

Nefelin rocks is one of the kinds of aluminum resources. First information about them in West Alautsky region belongs to S. Ilienok. Y. Kuznetsov was first scientist who paid attention to nefelin rocks as possible alumina resources. Today ores of Kishaltinsky deposit discovered by A. Prusevich, A. Bulynnikov, and I. Bazhenov refer to the richest nefelin deposits of Russia and are used for getting alumina in Achinsk alumina plant without the preliminary concentration.

V. Nudner discovered black iron ores high in cobalt for the first time in Siberia in 1933 (in Altai Krai).

The largest Khakasia deposits of copper and molybdenum were discovered by V. Tomashpolskaya, I. Tseiklin, G. Pospelov, A. Mesyanikov in Corsk (1936), and N. Mishko in Ippulsk (1953).

It should be noted that the founders and alumni of the Siberian Geological School actively participated in exploration of Siberian gold-bearing regions (V. Obruchev, P. Gudkov, M. Usov, N. Gornostaev, A. Bulynnikov, I. Bazhenov, I. Molchanov, F. Shakho, A. Kuzmin, and many others). N. Khabarova was awarded the title of Hero of Socialist labour for opening and exploration of gold deposits in the North-East of the country.