

UDC 069:549 (1)

A.E. FERSMAN'S CONTRIBUTION TO THE SYSTEMATIC COLLECTION OF THE MINERALOGICAL MUSEUM OF THE RUSSIAN ACADEMY OF SCIENCES

Vyacheslav D. Dusmatov

Fersman Mineralogical Museum of the Russian Academy of Sciences, dusmatov@fmm.ru

The geography of A.E. Fersman's mineralogical collections, including samples surrendered to the systematic collection of the Mineralogical Museum of the Russian Academy of Sciences is described.

4 references.

«... stone owned myself, my ideas, desires, even dreams...» A.E. Fersman

Alexander Evgen'evich Fersman, during all the half-century period of scientific activity, after each trip to any region of Russia and Europe, brought interesting mineralogical material and mainly surrendered it to the Mineralogical Museum of the Russian Academy of Sciences. Besides, he handed collections to the Shanyavsky University, Simferopol Museum, and Moscow University. He maintained an intensive exchange of minerals with various scientists and museums of other countries. The only work devoted to the analysis of his activity in this direction is the work by V.I. Kryzhanovsky (1965), who worked with Fersman in the Mineralogical Museum for a very long time.

The illuminative chronicle of his trips begins in the childhood. Since being six-year old, Fersman almost each year took part in travels with parents, during which he collected minerals in Crimea, on Caucasus, on Black Sea coast, in Turkey, Greece, Italy, France, Switzerland, Czechia, Germany, Austria.

Recollecting these years, Fersman wrote: «... I have taken a great interest in mineralogy in original conditions of Crimea mountains, with scientific interests of a scientific family; yet a seven-year boy, for the first time having received as a gift a fine mineralogical collection, I have taken a great interest in stone, and down to 1912 was engaged in collecting mineralogical collection, which I then surrendered to the Shanyavsky Public University, in which I was the first figure in mineralogy...» (Fersman, 1927).

The student of the Moscow University since 1905, he visited open pits of Podolsk, stone quarry of Dorogomilovo, outcrops of Khoroshevo and Myachkovo. In the Podolsk open pit he has found palygorskite.

Fersman began the earliest independent scientific collections of minerals on the Elba Island in 1908. He wrote about this period: «for

the first time I have taken a great interest in gems when the destiny has brought me to the far Elba Island. Here, among caressing nature of the Mediterranean Sea, a wondrous pink tourmaline was so perfectly in harmony with gray granite rock, and the sparkling red hematite blinded eyes with the shine» (Fersman, 1974). From the Elba Island, Fersman has brought the biggest collection of samples, mainly from pegmatites. He studied and described these samples during five years and in 1913 has handed them to the Mineralogical Museum (Collection 1069 = 166 samples).

Being abroad in 1909, he studied diamond crystallography together with M. Goldschmidt. During studying, he bought diamonds in various shops, as it was impossible to visit the deposits. At that time he has got diamonds and carbonado from Brazil, black diamonds from German possession in Africa – Jagersfontein and common diamonds from Luderitz Bay (Coll. 562 = 18 samples).

During his trip to the Taurian province (Crimea, 1909), combining recreation in a manor of his relative E.A. Kessler with collecting minerals in vicinities of Simferopol, Fersman has visited stone quarries in Kurtsy and Cheshmedusi, where he has collected analcite, heulandite, prenite, leonhardite, wolchite, in which studying he was engaged earlier (Coll. 561 = 13 samples).

In May 1911, Fersman carried out excursions with students to Moscow area – Podolsk, Tsementny Zavod, Ratovka-Nikitskoye (Verepectu Mountain) where has collected *ratofkite*¹ (earthy fluorite), quartz, *ferriallophane*, *shanyavskite*, beraunit, calcite and, certainly, beloved palygorskite (Coll. 733 = 11 samples).

At the end of 1911 and in the beginning of 1912, he has finished one of stages in the study of magnesium silicates collected by him in the Nizhniy Novgorod province. These are mainly palygorskite and *spherosiderite* (botryoidal siderite) from the Buklovsky mine at Vyksy,

¹ Italic designates the names given by A.E. Fersman, but currently not having the status of a mineral species. The accepted names of minerals are in brackets.

near the city of Gorbатов. He has also surrendered to the Museum sepioliths, *tsilerites* (rock cork), *tsermatites* (matted-fibrous chrysotile) from Switzerland, collected by him and sent by V.I. Vernadsky (Coll. 825 = 25 samples).

At the same time Fersman has finished studying of bought abroad diamonds and surrendered them to the Museum. These were diamonds from Kimberley and Jagersfontein, South Africa, and also diamonds from Brazil and from Bingara, Austria (Coll. 816 = 19 samples)

In the spring of 1912, Vernadsky, Fersman and engineer-geologist A.G. Kitaev have visited the Blyumov mine (Southern Urals), from which they have extracted 10 pounds of samarskite for M. Curie, who worked at that time in Paris. Local miner Andrey Lobachev greatly helped them showing the richest zones.

Later, the Imperial Academy has sent Fersman, as a member of Radium Expedition headed by Academician V.I. Vernadsky, to the Urals since May 25 till August 25, 1912 for studying radioactive minerals within the limits of Perm, Ufa, and Orenburg provinces. During this time, they have visited Troitsky Stone, stone quarries on the Tura River, Verkhoturie and vicinities of the female monastery. From this trip Fersman has surrendered to the Museum orthite, biotite, microcline, chalcopryrite (Coll. 832 = 5 samples, Coll. 835 = 17 samples).

In the autumn of 1912, Vernadsky, Fersman, and Kitaev have visited Kochkar gold mines and Semenovskiy mine. They have examined monazites and in mines along the Kamenka and Sanarka rivers have collected blue euclases, amethysts, aquamarines, pink topazes, rock crystal. At the Proroko-Il'insky mine, they have collected and partially bought pink topazes, in the region of Sokolinye Sopki – beryl.

In the same year, together with V.I. Kryzhanovskiy, he has visited Murzinka: Buzheninov Log, Mokrusha, Yuzhakov mine, villages of Shaitanka, Kaltashi, and Komarovo. As a result of this trip, they have brought beryls, tourmaline and other minerals of pegmatites (Coll. 844 = 10 samples, Coll. 846 = 12 samples, Coll. 868 = 15 samples).

In the beginning of 1913, Fersman and A. Sergeev have collected *ratoffkite* and calcite near villages Korotnevo and Nyushchino in the Tver province (Coll. 1032 = 12 samples), and since June 25 till July 25, 1913, Fersman and B.A. Lindener have made a trip to the Urals and visited Verkhoturie, Vysokaya Mountain, Lebyazhinsky mine, Kipovka, Adui, Alapayevsk and other regions. Fersman managed to visit the village of Reshety and has collected stilbite in an intergrowth with feldspars from

gabbroids and near the village Palkino – primary and secondary laumontites and leonhardites (Coll. 868 = 15 samples).

In addition to own collecting, Fersman has bought calcite brushes, *green vitriol* (melanterite). He and B.A. Lindener, in the region of Podenny mine, have collected chromites, uvarovites, chalcedonies, *orthites* (allanites), serpentines, have visited a maximum number of mines with pegmatites and have collected a lot of samples to replenish the collection of Urals minerals already available at the Museum (Coll. 1043 = 102 samples)

In 1913, Fersman has presented a collection of minerals and a collapsible human skull from his personal collection to the Shanyavskiy Public University. For this, of April 2, 1913, the Board of Guardians and Board of University have expressed him the acknowledgment.

During visiting Crimea in 1914, he, during vacations, has collected from the Kurtzy stone quarry, near the summer residence of Golovinsky (Kastel), palygorskite and calcite, and from the region of Eski Orda – *anthraconite* (calcite polluted with bitumen) and *apheroiderite* (Coll. 1104 = 12 samples). Then, during June and July, he has visited Urals within the Orenburg province: Tsarevo-Alexandrovskiy mine, Iletskaaya Zashchita, village of Klyuchi, where has collected and bought minerals. Here we shall note that prices for minerals, according to records in Fersman's diary, was as follows: tourmaline from Savvateyev – 1 Rbl; brookite, topaz from Kochkar – 4 Rbl, rhoduzite (crossite), chalcedony, tourmaline (Shabry), clinocllore and rutile – 21 Rbl, beryl and *volosatik* (quartz) (Sherlovaya Gora) – 18 Rbl (for comparison – the ticket to Miass costed 26 Rbl 40 copecks) (Coll. 1169 = 25 samples). Then, on July 3 – July 16, he, accompanied by M.E. Vladimirova, visited Tel'kosskiy and Garevoznenskiy mines, where have collected pyrite, *limonite* and *kaolin* (Coll. 1170 = 5 samples). After that, he has left for Sweden, where has visited mainly pegmatites at Falun, Finbo, Skarpo, Uto, Langban, Stromsberg, Ytterby, etc. Here he has collected very extensive collection of minerals, first of all gadolonite, fergusonite, petalite, langbanite, yttrantalite and other minerals of pegmatites (Coll. 1165 = 45 samples).

At last, his dream has come true – he has visited the Transbaikalian region in 1915. During this trip, Fersman has visited along the line Nerchinsk, village of Savvateyeva on the Urguchan River, village Gutai on the Chikoi River, village Utochkino on the Selenga River, many villages on the Khilka River, the Malkhan

Range, and Ust'-Kyakhta. All collection can be divided into two groups: minerals of pegmatites (Coll. 1343 = 66 samples) and minerals of zeolite group (Coll. 1344 = 85 samples).

So as Russia needed titanium, Fersman has organized prospecting of titanium ore on the Urals and for the Museum he has visited mines of Adui and Karas'e Lake, where has collected euxenite, *orthite*, beryl, and spessartine (Coll.1341 = 10 samples). In the summer, he has arranged time for rest and has gone to visit relatives in the town of Borovichi, where was situated the manor of his wife (village of Proshkovo). He has combined the rest with collection of minerals in this area. He has found sphalerite, galena, pyrite in coals on rivers Msta and Krupa, near the villages of Bolshoi Porog and Bobrovik (Coll. 1345 = 25 samples, Coll. 1388 = 5 samples). In 1916, Fersman and Vernadsky have gone on excursion to Altai, they have visited various mines: Ridder, Zmeinogorsk, Bolshoi Raznos, Cherepanovsky, and Zavodinsky, respectively, the collection basically included sulfides and oxides. (Coll. 1399 = 25 samples). After returning, A.E.Fersman, V.I.Kryzhanovsky and L.A.Kulik have collected *ratoffkite*, palygorskite and quartzes in the Tver province at villages Korotnevo and Fomino Gorodishche (Coll.1494 = 22 samples) and samples from Rezh factory (Coll. 1398 = 19 samples). Later this year Fersman has visited Crimea; close to Feodosiya (Opuk Mountain) and Karadag (Kara-Agach Mountain) he has collected sulfur, calcite, celadonite (Coll. 1398 = 18 samples).

Because of intensive work, the Fersman's health deteriorated and in 1917 he went to Crimea to join his family staying there. However, in process of recovery, he was charged to inspect the chemical plant of I.P.Balashov in Saki to get acquainted with bromine and bromine-benzil production. In addition, with Professor P.A.Kashinsky, he has visited the Saki Lake, where has collected gypsum and halite. After that, in vicinities of Feodosiya, on the Lysaya Mountain, he has collected strontianite, quartz and calcite (Coll. 1518 = 10 samples).

Since 1918 till 1920, he made no trips and was only engaged in organizational affairs. Unique minerals which he has surrendered to the Museum were sulfides from the Urals and bought earlier five topaz crystals from Mongolia and pink fluorite (Coll. 1519 = 5 samples and Coll. 1547 = 5 samples).

In the beginning of 1920, the governmental Commission was formed to resolve the further destiny of the Murmansk railway under the presidency of A.P. Karpinsky, A.E. Fersman

and J.M. Shokal'sky, and in May that year they have gone to Murmansk; geologist A.P. Gerasimov has joined them. At Imandra Station, during the compelled stop, they have made a reconnaissance itinerary, examined rocks and minerals, among which they have discovered apatite. At Kandalaksha, they have collected pegmatite minerals (Coll. 1576 = 5 samples).

Closer to summer, A.E. Fersman and E.M. Bonschtedt have visited the Tver province and along Vazuza and Derzha rivers, near villages Lesnichina and Vysokina, have collected *ratoffkite*, flint and quartz (Coll. 1577 = 10 samples). From earlier collection from villages Lipovka and Bayevka (the Urals), Fersman has surrendered aquamarine, fluorite with zinnwaldite and phacolite (chabasite) from the Selenga River basin (Coll. 1578 and Coll.1583 = 3 samples).

In the autumn of that year, an expedition to Khibiny was organized, which began grandiose study of this area. It is necessary to note the fact, that all collections were only surrendered to the Museum in the name of Khibiny Expedition, irrespective of who has collected the material. This rule was observed for many years (till 1930), therefore, not so many samples from Khibiny are attributed to personally Fersman, though he has collected very large material. After 1930, Fersman has surrendered titanomagnetite, fluorite, sphene, nepheline from Khibily (Coll. 2383, 2455, 2519 = 11 samples)

In May 1921, the Commission on Study of Natural Productive Forces of Russia under V.A.Vernadsky's initiative, sent Fersman for one month to the Urals for studying pegmatite veins and collection of samples in the region of Rezh factory and Emerald Mines. E.E.Kostyleva accompanied him in this trip and this time they have visited Lipovka (have collected vorobyevite, topazes, quartz), Lyublinsky mine, Sarapulka, Troitsky mine, etc. They have casually visited asbestos mines and collected a lot of minerals – part of them was left for studying and the other part has got to the Museum (Coll.1599 = 34 samples).

1925 for Fersman was the most abundant in expeditions. January – inspection of some mines on the Urals: Emerald Mines, Kyshtym, Bazhenovo, Shadrinsk, Bogdanovichi. During this fortnight mission, Fersman has found time and has collected some minerals – emeralds, beryl, corundum and others (Coll.1699 = 10 samples, Coll.2004, 2048, 2250 = 3 samples).

Two summer months he spent in a mission abroad – in Germany and Scandinavian countries. The primary goal was to familiarize with the organization of scientific work in institutes. During this short time, Fersman has visited

Norwegian pegmatites and gletschers, pegmatites of Sweden and has organized, speaking in Fersman's words, «a big supply» of samples (Coll. 2018 = 168 samples), twice as much as he has brought from the Elba Island. All samples can be divided into two groups: granite pegmatites mainly from the region of Langesundfiord and Krageroe and alkaline pegmatites of Norway. Collection of alkaline rock minerals has allowed discovering many minerals later in Khibiny. In 1928, he has added orangite (thorite), cryolite, xenotime, zircon, fizeilyte (Coll. 2275 = 10 samples) to the earlier surrendered Norway material.

After that, Fersman has visited radioactive occurrences in Karelia, Kyshtym group of deposits on the Urals and in the autumn, from Leningrad through Tashkent, has left for Fergana, where, together with D.I. Shcherbakov, has visited radium deposit Tyuya Muyun, sulfur deposit Shor Su, celestine deposit Lyakkan and chert outcrops at the village of Tul'. Naturally, the basic collection of minerals was specific – *uzbekite* (volborthite), celestite, barite, sulfur (Coll. 2065 = 18 samples).

In the same year the Museum received minerals, which he collected earlier – three emeralds from Habachtal (Austria), seven topaz crystals from Gorikho (Mongolia) (Coll. 2058 = 10 samples) and zeolites from Transbaikalia (Coll. 1344 = 24 samples)

In the period 1925-1929, Fersman has surrendered minerals from Sarapulka, Monetnaya Dacha, Kyshtsm and other regions of the Urals (Coll. 2044, 2053, 2113, 2198, 2250, 2256, 2324, 3164 = total of 25 samples)

In 1926, passing by the Military Georgian Road, he has collected antimonite and molybdenite near the Kazbek Station, and after visiting Murzinka in the Urals he has brought amethysts, corundums, and garnets (Coll. 2104 = 21 samples).

Multiple visits to Turkmenia (1928-1935) have replenished the Museum's collection with samples of sulfur, gypsum, witherite and some sulfides (Coll. 2252 = 12 samples, Coll. 2364 = 16 samples, Coll. 2600 = 2 samples, Coll. 2653 = 1 sample, Coll. 3056 = 3 samples). Fersman has visited Naboshar, Adrasman and Lyakkan in Tadjikistan and Kuperlisai and Maili-Su in Kirghizia and has collected torbernite, thorite, and carnotite (Coll. 2361 = 4 samples, Coll. 3056 = 8 samples, Coll. 3065 = 5 samples).

Fersman has visited Silesia in 1927, mainly the Striegau deposit (nowadays Strzegom, Poland), whence he has taken *strigovite* (chamoisite variety), smoky quartz, sulfides, etc. (Coll. 2367 = 30 samples).

He has brought xonotlite and talc (Coll. 2387 = 2 samples) from Lopansky region of South Ossetia in 1931 and has also collected garnet (Coll. 2415 = 3 samples) on the Dzirul Range (Transcaucasia).

In the same year, Fersman has surrendered to the Museum some samples from Czechoslovakia – Jachymov, Linnwald – and Germany – Harz and Saxony (Coll. 2525 = 14 samples).

Fersman was in Czechoslovakia three times (1934, 1936, and 1939), mainly on treatment, but despite of illness, he repeatedly went to brief excursions on vicinities of Karlovy Vary and has visited Pribram, North Bohemia, Moravia, Remnitsa, etc. On the Jahimov deposit, he has collected radioactive minerals: uraninite, zippeite, *uranothallite* (liebigite), and cuproklodowskite, from other places he has collected sulfides, carbonates, zeolites, and tourmaline (Coll. 2744 = 42 samples, Coll. 2746 = 35 samples, Coll. 2822 = 21 samples).

For the period 1929-1934, minerals from Transbaikalia, mainly from the Belukha deposit – wolframite, *lavrovite* (vanadium-bearing diopside), garnet, and pyrite (Coll. 2031, 2329, 2440, 2528 = only 29 samples) came from Fersman to the museum.

A.E. Fersman and V.I. Kryzhanovsky, making part of a small group, have made in 1935 a automobile route over the Urals (Fersman, 1936). Except for acquaintance to industrial facilities, a small number of minerals were collected, from which Fersman has surrendered 20 samples to the Museum (Coll. 2542, 2600, and 2646).

During treatment in Kislovodsk (1938), he has found celestite 4 km south of the Castle «Wiliness and Love» and was so enthusiastic in collecting minerals, that has brought 40 samples of only celestite, but he also collected associated sphalerite, pyrite, and chalcedony (Coll. 2807 = 74 samples).

In Kiev, in May 1939, a conference on Ukrainian pegmatites was held. Fersman with a group of colleagues – E.E. Kostyleva, K.A. Vlasov, V.I. Gerasimovsky and V.V. Shcherbina – took active part both in the meeting and in excursion to pegmatites of Volhynia – Volodarsk-Pisarevka near Zhitomir (Korosten' pluton) and pegmatites on the Teterev River near the village of Shumsk. After Kiev, he has visited Monchetundra (Kola Peninsula) and has collected pentlandite and pyrrhotite (Coll. 2907 = 8 samples).

In 1940, after an automobile trip to the Tyrnyauz deposit and Malka River on Caucasus and Adrasman, Maliysai and Uigurrsai deposits in Central Asia, Fersman has

brought tuyamunite and sulfides (Coll. 3065 = 17 samples).

From a big expedition on inspection of Pechora-Ukhta deposits in 1940 (Coll. 2994), he has brought some minerals – amethyst, analcite, calcite and others.

These were the last receipts of minerals from Fersman. In 1941 – 1945, because of war and poor health, he was engaged basically in generalization of materials on mineral resources of the country being of strategic importance for needs of defense.

Currently the Systematic Collection of the Mineralogical Museum of the Russian Academy of Sciences has 102 thematic collections including 304 mineral kinds and their varieties (1658 samples), which came from Fersman.

Total number of samples surrendered personally by Fersman to collections of the Museum counts over 3000 samples.

In closing, the author expresses his most sincere gratitude to M.E. Generalov and E.A. Borisova for the help in preparing and writing this work.

Geography of Fersman's Mineralogical Collections

(names of geographical regions are given by Fersman's records, in brackets – numbers of a thematic collection registered in the Systematic collection of the Museum, bold figures – number of samples)

AFRICA [562, 816, 2525-7]

ALTAI, Tomsk province [1399-25]

AMERICA [562-18, 816-2]

AREA of the DON ARMY [2146-2]

ARKHANGELSK province [1576-5]

AUSTRIA [816-19, 2058-4]

BURYATIA-MONGOLIA [2058-4]

CAUCASUS [2104-17, 2387-2, 2415-3, 3065-14]

CHELYABINSK oblast [2600-1, 3164-1]

CRIMEA [561-13, 825-15, 1104-12, 1398-38, 1519-5]

CZECHOSLOVAKIA [825-2, 2525-21, 2744-43, 2746-36, 2822-23]

DENMARK [2275-10]

ELBA [1069-166]

SW part of Luderitz Bay (samples were bought in Europe)

Mines: Ridder, Zmeinigorsk, Nikolaev, Cherepanovsky and Bolshoi Raznos

Brazil, Uruguay (samples were bought in Europe)

Dolomitic Quarry, Yama

Kemsky district, Kandalaksha, Murmansk, Alexandrovka

Bingara, Habachtal

Selenga River

Kabardino-Balkariya, Tyrnyauz, Malka River, Kazbek Station, South Ossetia, Lopansky district, Chargany village, Dzhirul Range,

Vishneviye Mountains, Shabrovskoe deposit

Kurtsy, Cheshmedusi, Katel, Eski Orda, Feodosiya, Opuk, Lysaya Mountain, Karadag,

Karagach, Saki Lake, Bulganak, Koktebel North Bohemia, Rothan near Falkenan, Slavkov, Podolya Prahy, Karlovy Vary, Muhebrum, Vridlo, Repcice Litomerik, Zalesly, Marianska hora, Seeberg, Haguenstein, Cerhoviccka, Pribram, Jachymov, Oelsnitz hinwald, Cerniky, Beloves, Nachoda, Turnov, Krandorf, Kastalora, Zelechavsre udol, Kladio Kremnica, Chomutov Liliana, Liboris u Chomutova, Lebeik, Kozakov, Caslan, Riden, Cyrilov, Denica, Elbogen

Ivigtut

St. Mario, Grotta Doeci, Cava della Speranza, Rio Marina, Penta della Cannelle, Terranera

Capo Bianco, Punta in Sansoni Calanita, S. Piero in Campa, Biodola golfo, Pontoferraio, Monte Bello, Lamaia golfo Biodala, val Valdana, Procchio, Porto feraio, Jamaio, Punto de Calamite, Capo Bianco, Ferranera, val Agwa viva, Marina in Campo, Spiaggio di Margidor, Scoglietto focta stella, Spiaggia del Liolo, Capo Calamita, Terre del Rio, Capo Norsis, San Jllario, Forte Falcole, Loll di, Palombia

- EKATERINBURG province [1599-39, 2004, 2044-3, 2113-8, 2198-5, 2250-2, 2256-3]
- EMERALD MINES, Monetnaya Dacha, Adui, Sarapulka, Bayevka, Troitsky mine, Nizhneiset' Dacha, Lipovka, Voznesensk mines, Corundum mine, Rez factory, Lyublinsky mine, Nauruzova village, Asbestos mines, mines of Poklevsk, Kamyshinsk, Bazhenovo
- FINLAND [2600-4]
FRANCE [733-1]
GERMANY [2525-7]
HUNGARY [733-1]
ITALY [558-6]
Khibiny [2383-2, 2415-3, 2455-2, 2519-4, 2907-8, 3036-2]
KIRGHIZIA [2065-15, 2361-4, 3056-11]
KISLOVODSK [2807-59]
KOLA PENINSULA [3036-2]
KOMI [2994-4]
MONGOLIA [1547-1, 1583-1]
MOSCOW OBLAST [733-12, 793-3, 1699-4]
NIZHNI NOVGOROD [825-6]
NORWAY [2018-156, 2048-13, 2275-5]
Gierrestad Fogue, Tvedestrand, Jarvik, Jangen-Kragere, Laven, Lagesund fiord, Fredrikkvarn, Baule, Srudesundes Kjar, Kjeo, Stoko, Ovre ako, Arendal, Eker, Piratholmen, Srudesundskjan, Eikaholmen, Bergen, Halvossrod, Raade, Oelegaardens, Kristiasand, Erje aarvold ost, Bergen ulro Reumassiv, Tonsen plads, Linderm jstle, Giallebaek, Felemarken, Odegaardens
Borovichi, Msta River, Krupa River, Vittsy rifle, Coal Mine, Svyatoslav Mine, Veliky Porog village, Bobrovik
Troirsky mine, Kosaya Mountain, Tsarevo-Alexandrovsky mine, Iletsk Zashchita, Klyuchi village, Plissova Mountain
Kyshtym, Kasli, Verkhoturie, Troitsky Stone, Adui River, Garevoznensensky, Tel'kosky, Solikamsk, village Komarovo, village Kaltash, Murzinka, Mokrusha, Shaitanka village, Bayevka, Alabashka, Reshety village, Palkino village, Khrustalnaya Station, Alapayevsk, Krivki village, Vatikha, (Murmanka village), Evropeiskaya Station, Susana, Sizikovo, Repevnya, Neivo-Shaitanka factory, Lebyazhensky mine, Lipovka, Byzovaya village. Saranka, Bisert factory, Rezh factory, Kamentka village, Tochil'naya Mountain, Alunite mine
Pavlodar, left bank of the Irtysh River, Eki-bastuz, Kalkan Lake
Kuznetsk Ala Tau, Tel'bes
Striegau
Falun Korarfet, Uto, Jaugbau Nerike Janna, Stromsberg or Ebro, West manland Sala, Fahlum Frinnbo, Srapo, Ytterby, Alno Poltang, Alno Smedegarden, Hollandi, Smedsgarlen, Alno Langorsholmen, Fahlung Ammeberg
- NOVGOROD [1345-25, 1388-5]
- ORENBURG province [1043-50, 1169-28, 1519-2, 2053-1]
- PERM province [832-5, 835-12, 844-10, 846-166, 868-15, 1043-54, 1170-5, 1341-10, 1578-2, 1699-2]
- SEMIPALATINSK Oblast [5]
- SIBERIA [1398-12]
SILESIA
SWEDEN [1165-45]

SWITZERLAND [793-3, 825-5]
TADJIKISTAN [3056-11, 3065-14]
TVER province [1032-13, 1494-22, 1577-10]

TURKMENIA [2252-12, 2364-17, 2600-7, 2653-1,
3056-11]
TRANSBAIKALIAN REGION [1343-61,
1344-82, 1699-6, 2031-1, 2324-3, 2329-26]

UFA province [2152-3]
UKRAINE [2907-8]
URALS [2542-5, 2646-8]

UZBEKISTAN [2065-3, 3056-10, 3065-17]

Willis Zermatt
Taboshar, Adrasman, Lyakkan
Zubtsovsky district, villages Korotnevo and
Fomino Gorodishche, Vazuza River, village Le-
snichina, Derzha River, Rzhev, villages Vyso-
kina and Tyushchino
Cheleken Island, Gaurdak, Sary-Bugor, Dar-
vaz, Kara-Bogaz, Chemmerli Hill, Arpaklen
Khilka River (Kupalei village), Chikoi River
(Beregovaya village), Slyudyanka, Ust'-Ky-
akhta, village of Malyshevo, Myl'nikovo and
Novonikolskoye, Yamarovka spring, villages of
Utochkino, Korotkovo, Savvateyeva, Urguchan
River, Ivkova village, Selenga River, Small
Soktui. Belukha Mountain, Gutai, Bakhal
Range, Bukuka, Onon-Borzya, Kara-Nor, Za-
vitaya River, Mandryk Rock, Malkhan Range
the Chuvash steppe, Zlatoustovskoe deposit
Volodarsk – Pisarevka
Adui, Nizhneisetskaya Dacha, Karas'e Lake,
Alabashka, Gumbeika, Khalilovskoe, Magni-
tka, Kochkarskoe deposit
Uigursai, Katta-Dali, Kara-Chagyr

References

Kryzhanovskij V.I. 90 kollektzii (90 collections)
// Alexander Evgen'evich Fersman. Zhizn' i
deyatel'nost' (Alexander Evgen'evich Fers-
man. Life and activity). In Russian M.:
Nauka, **1965**. P. 221 – 230.
Fersman A.E. Sovetskaya strana dolzhna znat'
svoikh uchenykh. (Avtobiografiya) (The So-
viet country should know the scientists.

(Autobiography) In Russian //Ogonek. **1927**.
8. P. 9.

Fersman A.E., Kryzhanovsky V.I. Nash avto-
probeg po Yuzhnomu Uralu (Our automo-
bile itinerary in the South Urals). In Russian
M.: Publishing House of AN of the USSR,
1936. 120 p.

Fersman A.E. Rasskazy o samotsvetakh (Sto-
ries about gems). In Russian M.: Nauka,
1974. 254 p.