

Nikolaus Riehl (1901–1990)

"A very nice man, expert in radiochemistry, former Director of Research of Auer-Gesellschaft." (Paul Rosbaud, the master spy, to Samuel A. Goudsmit in 1945.)

Stalin's Captive ***Nikolaus Riehl and the*** ***Soviet Race for the Bomb***

Nikolaus Riehl

Frederick Seitz
The Rockefeller University

History of Modern Chemical Sciences
Jeffrey L. Sturchio, SERIES EDITOR
Merck & Co., Inc.





Chapter 8

In Sungul in the Urals (1950–1952)

By 1950, our work at Elektrostal was completed. The production of uranium was proceeding smoothly and no longer needed the cooperation of the German team. However, the time was not yet ripe for a return to Germany. A preliminary attempt on my part to achieve this was unsuccessful. Thus, the question arose as to what to do with us next. Zavenyagin proposed that I take over the directorship of an institute in Sungul, east of the Ural Mountains (see figure on page 84), that would be devoted to the handling, treatment, and use of radioactive materials produced in reactors, the "fission products." Related to it would be radiation biology, dosimetry, and radiochemistry, as well as problems in technical physics. In other words, it would be an exceedingly many-sided institute. I had gained experience and confidence in more or less all of these areas during my years at the Auer Company. Hence, Zavenyagin's proposal seemed to be justified and even enticing.

My decision to take the offer was made easier by the fact that three colleagues with whom I had very close and friendly relationships were already at the institute. They were the physicist and radiation biologist K. G. Zimmer, mentioned in Chapter 2; the radiochemist H. J. Born, a student of Otto Hahn (later a professor of radiochemistry at the Technical University of Munich); and the physician and radiation biologist A. Katsch, who would later become a professor at Karlsruhe. Although these individuals had been close to the Auer Company, they actually had been on the staff of the Kaiser Wilhelm Institute in Berlin-Buch and, indeed, in the section led by the geneticist N. V. Timofeyev-Ressovsky, about whom more will be said presently. The Russians brought these scientists to Elektrostal and initially placed them in my group. It was, however, very difficult to do justice to them professionally within the

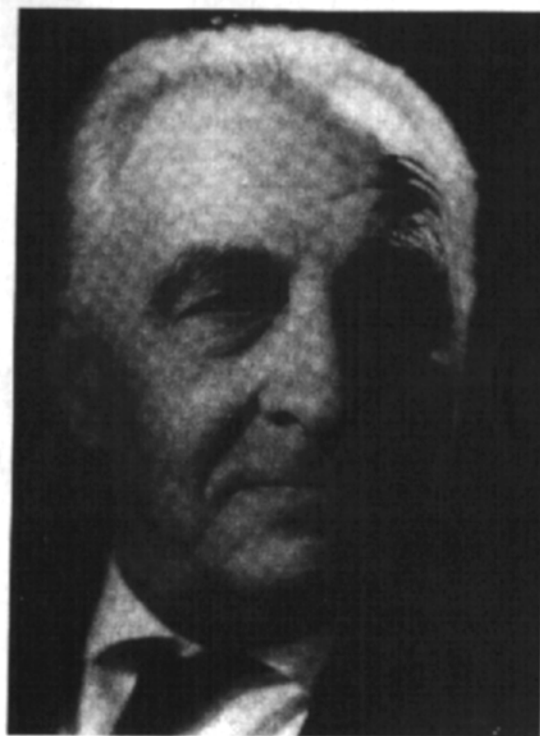
framework of a uranium factory. I tried frantically at the time to prove that radiochemistry and radiobiology had a place in the factory; however, it took years for so questionable a concept to become believable. As a result, all three went to the institute in Sungul as soon as it was founded. They would be able to work in their own professional fields there.

Timofeyev-Ressovsky¹ came to Sungul. His fate deserves a special presentation because it is representative of events in the postwar years when Stalin was the dictator. Timofeyev was a Soviet citizen. In the 1920s he was invited by the brain physiologist Vogt to the Kaiser Wilhelm Institute for Brain Research in Berlin. Vogt incidentally had studied the brain of Lenin at the request of the Soviet Union. Timofeyev remained in Berlin until the end of the war without giving up his Soviet citizenship. His research, particularly that with Delbrueck and Zimmer, on the influence of radiation on genes, that is, on genetic properties, gave him an outstanding reputation. The Nazi regime did not bother him during its years in power. His son, however, was arrested for making contact with Soviet prisoners and was sent to a concentration camp.² Timofeyev believed that he had nothing personal to fear from the Russians. For this reason, and because of emotional attachment to his homeland, he decided to remain in Berlin when the Soviet troops entered the city. He was, however, arrested after a brief period and given a 10-year prison term. The same fate befell his colleague Tsarapkin, who also worked in Berlin-Buch as a Soviet citizen. Both are mentioned in Solzhenitsyn's *The Archipelago Gulag* as fellow sufferers.

Timofeyev was treated as an ordinary prisoner and had to bear the severest deprivations. His health was completely undermined. However, leading individuals in the NVD noted that they had in their hands a distinguished scientist who could be useful in studies of the hazards related to radiation in the atomic energy program because of his experience in the field of radiation biology. He was located in a work prison, and a major was sent to release him and Tsarapkin. They were given much nourishment and brought to Sungul. Unfortunately, Timofeyev had lost most of his eyesight because of the deprivation. He could see the outline of individuals but could not read. I learned of this while still in Elektrostal and bought two large books on vitamins and their action

¹Riehl, Timofeyev-Ressovsky, and Zimmer had cooperated in research on the biological effects of ionizing radiation before being rejoined in the Soviet Union. See, for example: N. Riehl, N. V. Timofeyev-Ressovsky, and K. G. Zimmer in *Die Naturwissenschaften* (1941, 42/43, 625).

²The son of Timofeyev-Ressovsky died under mysterious circumstances in a German concentration camp. He was probably murdered by the Gestapo.



N. V. Timofeyev-Ressovsky, the Russian geneticist who, while retaining Soviet citizenship, remained active in his research laboratory in Berlin during World War II. He was arrested by the Soviet police in 1945 and sent to a Gulag. He was ultimately rescued and allowed to continue to work in Sungul as a political prisoner. He and Riehl were close friends. He was appropriately honored after the downfall of Khrushchev and Lyсенko starting at the end of 1964. (Courtesy of Zhores Medvedev.)

and learned that a deprivation of one vitamin (nicotinic acid amide, as I recall) can cause detachment of the myelin sheath of the optic nerve and damage the vision. I acquired the vitamin in Moscow and had Zavenyagin send it to Timofeyev, but it was too late. The damage was irreversible.³

³Otto Westphal, a now retired German immunochemist, informs me that part of the damage to Timofeyev-Ressovsky's eyes occurred near the end of the war, while he was still in Germany, when he was served an alcoholic drink contaminated with methyl alcohol (sometimes called wood alcohol). The Westphal family had very close relationships with Timofeyev-Ressovsky. In the meantime, I have been told that Timofeyev-Ressovsky did recover much of his vision.

Timofeyev retained the status of a criminal prisoner; however, he was accommodated very well in Sungul. He obtained a house fully as fine as those planned for the German group. He received a post as head of the biological division of the institute in Sungul, and he was allowed to bring his family from Germany—and all that for a prisoner under punishment! It was especially grotesque for him to find a wreath of flowers put out as a greeting when he first arrived at his home. This incident does not in itself give me any stimulus to request greater humane treatment of prisoners in our country. How humane and chivalrous it would be for our female prisoners to find a bouquet in their cells upon arriving in jail.

Although I knew that I would meet several friendly colleagues in going to Sungul, I wanted to inspect the institute and its associated facilities before agreeing with Zavenyagin's proposal. It would still be feasible at this stage of events to make special requests and conditions. As a result, I undertook a trip to Sungul to see the state of affairs. I also took my eldest daughter and a German girl along to give them an interesting journey in the Urals.

The cheerful reunion with Timofeyev and the other colleagues as well as the special things we experienced at Sungul removed all doubts about taking over the post as head of the institute. There was only one matter on which I wanted additional clarification: the head of the chemical division was S. A. Vosnessensky, who was also a prisoner and had the same privileges as Timofeyev. I did not yet know him and wanted to learn during my visit to Sungul whether he was a trustworthy individual. The initial atmosphere for our conversation was very icy. I pressed him in order to stimulate him to a more open-hearted discussion. He remained, however, very reserved. He did not know me, and the golden star on my breast gave him doubt that he really could be open. (On journeys and official visits, I always wore the star and the medal going with the Stalin Prize because they opened many doorways.) Finally he came free and told me of his misfortunes. He had spent perhaps half a year at a scientific institution in Germany before Hitler took power and had gained a great deal from the stay. At the outbreak of the war in 1939, and after he had returned home, he was taken prisoner by the Russians and given a 10-year sentence for being "a potential member of a fifth column." He said that he had never said or even thought of anything that could not be shouted out loud at Red Square. We became good friends.

Satisfied with the investigation in Sungul, I started back with the girls. It is difficult to travel in the Russian provinces without making an excursion into the field of entomology (the study of insects). Our automobile broke down on the way to Sverdlovsk, and it became necessary to spend half the night in a primitive farmhouse. The girls played cards

with the escort, whereas I lay down on a wooden bench and slept. Later the girls had countless flea bites on their legs, but I had none at all. The reason lay not in the fleas' taste for nourishment but was a result of the fact that they could not jump as high as my bench. The recorded height for such a jump is about 35 cm (14 inches). In any event, this was the case before the start of consistent requirements for performance in competitive sports in the Socialist countries.

My family and I moved to Sungul in September 1950. Essentially all members of the group in Elektrostal left to go to other places. Only Ortman came with me because, as an expert in the field of luminescence he would fit in well at the institute.

The atmosphere at the Sungul Institute was entirely different from that at the Elektrostal uranium factory. The cultivated environment was set by the Soviet and German scientists. Almost all the former were more or less prisoners, or at least exiles, for political reasons, without exception.

There were criminal prisoners within the service staff. There was even a murderer whom we referred to as "Our Murderer."

If it were possible to choose the life course of either a political or criminal prisoner, one would be advised to select the latter. The criminals became fully entitled citizens after being released, whereas the political ones had to continue suffering under a stigma. Some of the political prisoners whom I knew had a number on their identity passes. (I believe it was the number 39.) This meant that they were not allowed to settle in a large city. The scientist-prisoners could get their terms cut to half as a result of good working behavior. In this way, most became free from the status of being prisoners in about half the time of their initial sentence.

In order to get to more cheerful things, I should say that Sungul was situated in a region with a beautiful landscape. The institute, the homes, and all auxiliary buildings were in a beautifully wooded, partly cliff-lined, narrow peninsula a few kilometers long. There were many islands dispersed in the surrounding lake. There was a magnificent view of the Urals on the west. The pretty house in which my family and I lived stood on the lakeshore above a steep rocky cliff. If the feeling of being restricted had been absent, one could have resided there cheerfully. The peninsula was barricaded on the land side by a barbed wire fence, and there were even guard posts with alert guard dogs distributed along the lakeshore. The Germans needed an escort if they wished to leave the area. The criminals could not leave the compound unless they were very ill. As a result, we were able to enjoy noble nature only under very restricted conditions.

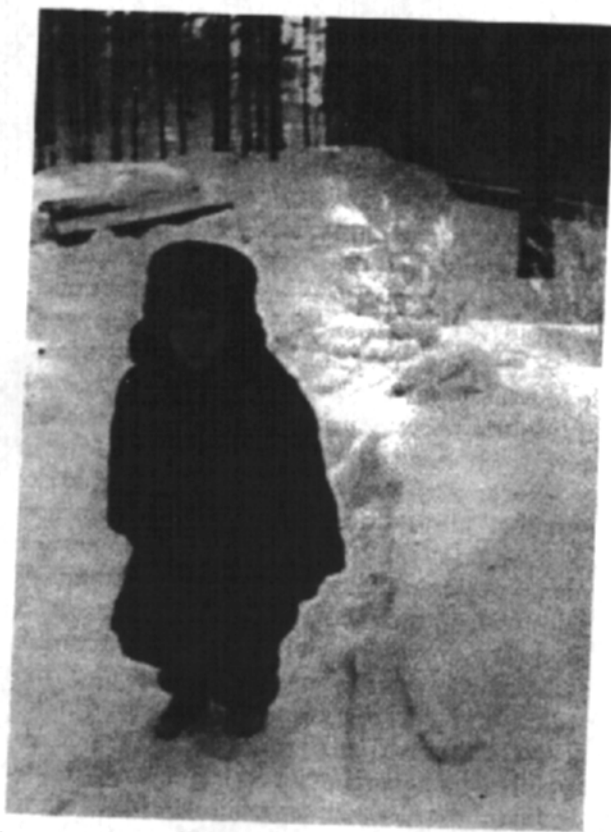
The climate there was intensely continental. The very cold winter lasted somewhat longer than we would have liked. The winter temperature frequently dropped below -40°C (-40°F). I can never forget a trip



Riehl, his wife Ilse, and youngest daughter on the steps of their home in Sungul in the Urals during their brief summer stay there. (Courtesy of the Riehl family.)

from Sverdlovsk to Sungul in a scarcely insulated jeep when the temperature was -42°C and a stiff wind was blowing. It took the entire night because of the snow, and we nearly froze in spite of warm clothing. Only when the upper edge of the rising sun appeared, donating little heat but the promise of deliverance, did we feel somewhat warmer. I often wondered about this purely psychological effect. The cold winter is followed by a very brief but exhilarating spring. The summer was brief and predominantly beautiful. The plant world thrived more rapidly and more luxuriously than in Central Europe. The flowers were intensely colored; many plants that we knew only as low weeds shot up two meters high; the wealth of wild strawberries in the woods was enormous.

The activities in Sungul were primarily focused on problems related to radiation chemistry and radiation biology. Let me describe the most prominent. Alongside the development of methods of dosime-



The Riehl's youngest daughter Irene dressed for a typical winter day in Sungul.

try were investigations of the absorption and subsequent release of radionucleotides by various organs (the uptake of radioactive isotopes by organs). We also studied, on a statistical basis, the biological effects induced by the incorporation of nucleotides and by penetrating radiation. In addition, we determined the highest permissible doses allowed as a result of exposure to radiation and to nucleotides.

The general public is too little informed of the great rigor and care that goes into the determination of such safety factors. As a result, much of the concern that laymen express about these topics is quite unjustified. Those concerns arise, of course, from the very real dangers that must be taken into account when dealing with nuclear reactors. The same problems in that area are, indeed, exceedingly serious and must be dealt with by trained experts and not by amateurs and half-professionals who wish to be benefactors of mankind.

At Sungul, both Zimmer and Born were able to work on the same type of problems with which they had been involved in Germany. Zimmer worked in radiation dosimetry, a field in which he gained distinction over many years. Born, in turn, dealt with radiochemistry. Whereas he had worked with very low concentrations of radio nucleotides in Germany, in our Russian institute he was dealing with preparations that had far higher activities. In addition, he acquired a wide variety of radionucleotides, obtained from a factory associated with a nuclear reactor not far from Sungul, that were produced as fission products. Another colleague, A. Katsch, focused primarily on the problem of developing methods to extract radionucleotides that had been incorporated in various organs. This involved the use of chemicals that would form complexes with the radioactive atoms as well as the use of other substances. Members of our German group were very fortunate in being able to work in areas of interest so closely related to their previous ones during this postwar period. It made it possible for all of us to continue our work when we eventually did return to Germany.

Timofeyev-Ressovsky was not able to work in his normal field of research, genetics, at that time because of the unfortunate Lysenko affair that I discuss briefly in Chapter 17. The same was true for all of the very earnest Russian geneticists. As a result, Timofeyev-Ressovsky changed areas, investigating the influence of the emissions of radioactive materials on the growth of useful plants. He was able to return to the field of genetics only after Lysenko's downfall.

In contrast to Timofeyev, his long-time colleague Tsarapkin refused in a hard-necked way to find an alternative program that would fit into the program of the institute. He closed himself off and worked exclusively on theoretical problems in genetics. He was not reprimanded in any way for this, but his posture could cause him to risk forfeiting his right to have his prison sentence cut in half as a result of doing "useful"

work. I had a long discussion with Tsarapkin, trying to convince him to do something that was at least peripherally "useful," because a shortening of his period of confinement would be of advantage to his career and to his family. I promised him all the support and other things that he would need to make the transition easier. He thanked me for the sympathy and the offer of help, but he was inclined not to accept a pragmatic stance. He felt that there would come a time when someone would take his work on genetics out of its treasure chest and appreciate its value. Only that was of importance to him. In order not to destroy his will to live, I could not bear to tell him my fear that his work would most probably be removed from his treasure chest by one of the members of the security staff, numbered, tied up, sealed, and put away so "safely" that a professional who could read it and understand it would never see it. I could understand Tsarapkin's position but could not agree with it. There are occasions when it is better to render unto Caesar what is Caesar's. I left his room with a feeling that was a mixture of admiration and pity. After we left Sungul, he was transported to a place somewhere in central Asia where he died soon thereafter.

As a result of being director of the institute, I could personally work on topics of interest to me that were just on the edge of the agenda of the institute. Our library contained an excellent collection of the latest journals, including the foreign ones, so that I could follow more or less contentedly what was happening in related fields. What was missing, however, was personal contact with individuals who were correspondingly informed. In fact, I had first come to know many of my Russian colleagues as a result of participation in international conferences. When I first came to the Soviet Union, the ongoing president of the Soviet Academy of Sciences of the Soviet Union, S. I. Vavilov, who had also worked in the field of luminescence and had written a preface to the Russian translation of my book, had attempted to make contact with me and have me give a lecture. However, even this highly placed individual was refused contact with me on the basis that it threatened security.

The pleasant personal atmosphere that prevailed in Sungul was not the result of my actions as director of the site. It stemmed primarily from those of the local NKVD colonel named Uralets, a warm-hearted and wise individual. Most of his inmates never learned of the steps that he took to make their lives easier—steps that could lead to punishment for him. I knew of many of his actions because he undertook them within my area of authority and I had to provide auxiliary support. Free of all ideological stolidity, he handled everything pragmatically and elastically. He was not of Slavic-Russian ethnic origin; his background was Tatar or Georgian. As far as physical features, he resembled the famous Russian path-finding scientist Przhivalsky. Along with his



Sergei I. Vavilov, president of the Soviet Academy of Sciences, chairing a meeting at the academy. He was a physicist involved in research in radiation-induced luminescence and, as a result, was professionally interested in Riehl's research in that field. (Courtesy of Patty Ratliff and the Russian Pictorial Collection of the Hoover Institution Archives. Photo by B. Velyashev.)

organizational talent, he had another characteristic that is rarely found in Russia. Most true Russians have little interest in the state of their natural surroundings. They frequently neglect their gardens and cemeteries and the surroundings of their homes. This behavior became even worse during the period of rapid industrialization. Uralets, in contrast, spared no effort to preserve the natural surroundings of the settlement while it was being constructed. He fought to preserve each tree when the builders wanted to uproot them out of hand. If I place Colonel Uralets in my list of good Russians, I do so not because he had typical Russian attributes in these respects but because he did not.

In concluding this chapter, I must mention a very sorrowful incident that occurred in the area where we had lived in the Urals many years after we left. It is related to the "Kyshtym catastrophe," an explosion in 1957 or 1958 that contaminated a considerable area with radioactivity.⁴ Kyshtym is a railroad stop on the Chelyabinsk-Svedlovsk Line, close to Sungul. The small town of Kasli and the first nuclear site are also nearby. The Soviet authorities kept the incident secret, but there is much testimony to support the conclusion that a disaster did occur. The scientist Z. Medvedev, who now lives in the West, collected all the available material on the subject and published it in a book cited in footnote 4. I can affirm from my own knowledge of some of the facts that everything in it is reliable.

What happened? It was clearly not caused by an operating reactor. Instead it was a less serious event, an explosion or venting of material from a dump containing nuclear refuse that had the effect of hurling radioactive material into the air. It was, however, a serious accident that involved the loss of lives, probably including those of some of the individuals who had worked with us. Because the results of the study of the cause of the accident by Soviet scientists are not publicly available, we must guess at the origin. In as much as the Kyshtym catastrophe was a single event, one is inclined to believe it was related to special circumstances involving local geographic, geological, or climatic conditions. Perhaps the hectic conditions under which the first

⁴The Kyshtym disaster occurred on September 29, 1957, and was the result of a thermal explosion of a large underground storage facility for radioactive waste. The cooling system that carried off the heat generated by the radioactive material failed, and the tanks containing that material exploded. The explosion was thermal and chemical, not nuclear, in nature, but the effect was, nevertheless, a major disaster because of the radioactive material in the tanks. The plume rose about one kilometer and contaminated a large area, exposing perhaps 100,000 individuals to serious levels of radiation. See, for example, Steven J. Zaloga's *Target America* (Presidio Press: Novato, CA, 1993, pp 219-224) and Z. A. Medvedev's partial account of the disaster in *A Nuclear Disaster in the Urals* (Vintage Books: New York, 1980).

nuclear reactors were built that I mentioned earlier played an important role. Because an open factual analysis and report concerning the source of dangers associated with nuclear reactors would be valuable for all nations, I appeal to the Soviet Union to provide the most open and detailed account⁵ of the accident to the professional community. Perhaps the beginning of "Glasnost" will do some good.

⁵An account of recently released studies of the consequences of the Kyshtym disaster and related problems resulting from careless dumping of very large amounts of radioactive waste in the Techa River alongside the Kyshtym plant appears in Michael Balter's "Filtering a River of Cancer Data" [*Science* (Washington, DC) **1995**, 267, 1084].