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The 1936–1937 Purge of Soviet Astronomers

More than two dozen Soviet astronomers were arrested between March 1936 and July 1937. Few astronomers or historians are aware of the extent to which Soviet astronomy was devastated. This article investigates the situation in astronomy during these two years. It begins with a brief discussion of Soviet astronomy between 1917 and 1935 and continues with a detailed examination of the events that served as the catalyst for the purge, the arrests themselves, and a discussion of what is known about the fates of the victims.

In the mid-1930s the Soviet Union had approximately two hundred professional astronomers and sixteen astronomical observatories, most of which were associated with universities and had staffs of only two or three people. The most important and best equipped astronomical institution was the Central Astronomical Observatory of the USSR at Pulkovo, just outside Leningrad, with its branch observatories at Nikolaev and Simeis in the Ukraine. In 1935 thirty-three astronomers worked at Pulkovo.[1]

In the 1800s the United States astronomer Benjamin A. Gould called Pulkovo the "astronomical capital of the world." The observatory's first directors, Wilhelm (1793–1864) and Otto (1829–1905) Struve, made Pulkovo famous for precise astrometry. Under the Struves Pulkovo was largely a German institution that happened to be located in Russia, and, although this began to change late in the nineteenth century, the foreign influence remained strong in the twentieth century. Despite its importance to positional astronomy, Pulkovo lagged behind other observatories in expanding its work to include astrophysics. This deficiency became particularly noticeable in the first decades of the twentieth century when astrophysics was making rapid strides in such areas as stellar structure and stellar evolution. By the mid-1920s new "astronomical capitals" in Europe and the United States had left Pulkovo far behind.[2]

Before 1917 Pulkovo had enjoyed a privileged status as a special institution under the direct

Research for this article was supported in part by a grant from the International Research and Exchanges Board, with additional funds provided by the National Endowment for the Humanities and the United States Information Agency. Further support came from the Friends of the Center for the History of Physics, American Institute of Physics. These organizations are not responsible for the views expressed here.

I wish to express my special gratitude to Dr. V. K. Abalakin, the current director of Pulkovo Observatory, whose generous help made it possible for me to conduct extensive research at Pulkovo. Great thanks are likewise due to V. A. Bronshten, A. N. Dadaev, A. I. Eremeeva, B. I. and Iu. I. Eropkin, M. N. Gnevyshev, A. A. and F. N. Kozyrev, N. S. Kardashev, N. I. Nevskaia, A. B. Numerova, V. A. Postoev, A. S. Zherbina, M. S. Zverev, and the staffs of Pulkovo Observatory, the Shternberg State Astronomical Institute, the Leningrad and Moscow divisions of the Institute of the History of Natural Science and Technology, and the Leningrad division of the Archive of the Academy of Sciences of the USSR. The events described in this paper are discussed, in part, in my M.A. thesis. See R. A. McCutcheon, "The Purge of Soviet Astronomy: 1936–37, With a Discussion of its Background and Aftermath" (M.A. thesis, Georgetown University, July 1985), 144–200.

1. The number of astronomers in the country can be gleaned from "Spisok chlenov Assotsiatsii Astronomov RSFSR," *Trudy II, III, i IV astronomicheskikh s"ezdov, 1920–1928 g.* (Leningrad: Assotsiatsiia Astronomov RSFSR, 1929), 172–176, and *Astronomicheskii zhurnal* 13, no. 3 (1936): 265–299 [hereafter *A. zh.*]. For further details concerning the prerevolutionary history of Pulkovo Observatory, see A. N. Dadaev, *Pulkovskaia Observatoriia: Ocherk istorii i nauchnoi deiatel'nosti* (Leningrad: Nauka, 1972), 6–49; and Kevin Krisciunas, "A Short History of Pulkovo Observatory," *Vistas in Astronomy* 22, part 1 (1978): 27–37. Information on the 1935 staffing level comes from *A. zh.* 13, no. 3 (1936): 265–271.

2. See Kevin Krisciunas, "The End of Pulkovo Observatory's Reign as the 'Astronomical Capital of the World,'" *Quarterly Journal of the Royal Astronomical Society* 15 (September 1984): 301–305. Gould is quoted in Simon Newcomb, *Reminiscences of an Astronomer* (Boston: Houghton and Mifflin, 1903), 309.

administration of the Ministry of Education. Following the revolution, however, Pulkovo became just one of the many institutions administered by the Commissariat of Education (Narkompros). Twice during the civil war Pulkovo was a battleground, and in 1919 the Cheka arrested and held two Pulkovo astronomers for several days. No photographic plates were available for scientific work, and food supplies were either donated from abroad or cultivated by the observatory staff. Worst of all, the observatory was struck by internal strife. Anton D. Drozd, a young observing assistant who joined the staff in 1917, declared himself a Bolshevik and charged that scientific work at the observatory was not being carried out with sufficient energy. He also pointed to irregularities in the observatory's administration. Narkompros investigated these charges, however, and found them to be groundless. Drozd left the observatory in disgrace at the end of 1920.[3]

In 1919 the Leningrad Astronomical Institute, only a few miles from Pulkovo, was founded to produce annual astronomical ephemerides (tables of the locations of celestial bodies at regular intervals). The founder of the institute was Boris V. Numerov (1891–1941), a vigorous young celestial mechanician who created the new institute almost single-handedly.[4] Numerov believed firmly in socialism and went to great lengths to demonstrate the importance of astronomy to socialist construction. The USSR Academy of Sciences elected Numerov to corresponding membership in 1929, and German astronomers named a minor planet (or asteroid) (No. 1206 Numerowia) for him in 1931. In 1935 the International Astronomical Union (IAU) elected him vice-president of its Commission on the Position and Motion of Minor Planets, Comets, and Satellites. Several times during the 1920s and early 1930s, Numerov traveled abroad (in particular to Germany, which at that time was the center for research in celestial mechanics). In 1930 Pulkovo's Council of Astronomers unanimously elected Numerov director.[5]

By 1930, however, conditions had begun to change. The more or less tranquil existence that Pulkovo had known during the 1920s was being replaced, with the onset of cultural revolution, by new unrest. Instead of confirming the decision of the Council of Astronomers, Narkompros invalidated the election results and appointed as director—Drozd.[6]

One astronomer later described Drozd as a near-maniac who conducted himself more like Pulkovo's conqueror than like its director. Indeed, Drozd's main concern at Pulkovo, other than organizing seminars on dialectical materialism, seemed to be exacting revenge from senior staff who had humiliated him ten years earlier. He did have some support among graduate students and junior astronomers, such as Nikolai A. Kozyrev (1908–1983), Dmitrii I. Eropkin (1908–1939), and Viktor A. Ambartsumian (b. 1908). The dominance of astrometry at Pulkovo frustrated these young astronomers, who wanted a much greater emphasis on astrophysics. With this in mind Drozd invited Boris P. Gerasimovich (1889–1937) to head a new astrophysical sector. A specialist in stellar evolution and galactic structure, Gerasimovich had spent several years

3. See "Otchet za 1917–1918 god, predstavlennyi Komitetu Nikolaevskoi Glavnoi Astronomicheskoi Observatorii ee direktorom," Arkhiv AN SSSR, f. 706 (Belopol'skii), op. 2, ed. khr. 17, l. 29–32; and *Otchet za 1918–1919 (1919–1920, 1920–1921) god, predstavlennyi komitetu Glavnoi Rossiiskoi Astronomicheskoi Observatorii v Pulkove ee direktorom* (Petrograd: 1919, 1920, and 1921).

4. Unless otherwise noted, the biographical information concerning Boris V. Numerov has been summarized from the article and book written by his daughter: Anastasia B. Numerova, *Boris Vasil'evich Numerov, 1891–1941* (Leningrad: Nauka, 1983); and A. B. Numerova, "Boris Vasil'evich Numerov, 1891–1941," *Istoriko-Astronomicheskie Issledovaniia* 16 (1983): 193–218 [hereafter *IAI*]. Numerova provided additional information in conversation with me on 4 February 1988 in Leningrad. Celestial mechanics deals with the interaction of two or more celestial bodies governed by gravitation.

5. "Protokoly zasedanii Soveta astronomov (14 avgusta 1926–18 aprelia 1931)," Arkhiv AN SSSR, f. 703 (Pulkovo), op. 1 (1926), ed. khr. 2, l. 91 (meeting of 8 January 1931). The circumstances of A. A. Ivanov's "retirement" from the directorship in 1930 are cloudy. His departure from Pulkovo may not have been entirely voluntary. The Council of Astronomers was formed in December 1917 to help fill the administrative vacuum left in the immediate aftermath of the Bolshevik takeover. It functioned until 1931–1932.

6. N. M. Morin, "Iz vospominanii o Borise Vasil'eviche Numerove," Arkhiv AN SSSR, f. 950 (Numerov), op. 1, ed. khr. 14, l. 1–4.

at the Harvard College Observatory during the 1920s and was well-known in Europe and the United States.[7]

But Drozd was erratic. No sooner had Gerasimovich arrived at Pulkovo than Drozd changed his mind and named Ambartsumian to head the astrophysical sector. Only in 1933, when the cultural revolution was declining, did Gerasimovich and the senior Pulkovo staff succeed in convincing Narkompros to dismiss Drozd. In Drozd's place, Narkompros appointed Gerasimovich director.[8]

Gerasimovich did much to return life at Pulkovo to a more tranquil norm. In particular, he arranged Pulkovo's transfer from Narkompros to the Academy of Sciences, a change that significantly improved the observatory's funding and supplies.[9] Nevertheless, Gerasimovich had a difficult and explosive personality. Even his close friend Harlow Shapley, director of the Harvard College Observatory, once commented that Gerasimovich's "tendency to non-cooperativeness does not make him an extremely useful administrative help."[10] Frank Schlesinger, director of the Yale University Observatory, made the following statement concerning Gerasimovich:

> I have the impression, which I hope is a mistaken one, that his personality is a difficult one. I should guess that it would be possible to live with him on perfectly smooth terms only if things were going well with him and that he will always be slow to see the whole situation at his institution through the situation that surrounds his immediate interests.[11]

One of Gerasimovich's first acts as director was to fire Ambartsumian for alleged "laziness,"[12] and he soon began searching for grounds to dismiss Kozyrev and Eropkin as well. Gerasimovich viewed these young astrophysicists as undisciplined and in too much of a rush to publish untested theories and poorly documented research. Gerasimovich's merciless criticism of what he considered to be poor research became legendary. Ambartsumian, Kozyrev, and Eropkin had no love for Gerasimovich either and did not hesitate to demonstrate their feelings. They appropriated observatory instruments for their own use without informing Gerasimovich and played numerous practical jokes at his expense. Nothing would have pleased them more than Gerasimovich's dismissal.[13]

One final personality must be mentioned: Vartan T. Ter-Oganezov (1890–1963). A pseudo-

7. D. Ia. Martynov, "Pulkovskaia observatoriia v gody 1926–1933," *IAI* 17 (1984): 447–448; *A. zh.* 9, no. 3–4 (1932): 277; Interview with Aleksei A. Kozyrev (younger brother of Nikolai A. Kozyrev). For additional information concerning B. P. Gerasimovich, see A. I. Eremeeva, "Zhizn' i tvorchestvo Borisa Petrovicha Gerasimovicha [k 100-letiiu so dnia rozhdeniia]," *IAI* 21 (1989): 253–301; and Otto Struve, "About a Russian Astronomer," *Sky and Telescope*, June 1957, 379–381. The Struves were an astronomy dynasty. The Otto Struve cited here was the grandson of the Struve mentioned earlier in the text. The younger Struve emigrated to the United States after the civil war and directed Yerkes Observatory in Wisconsin.

8. Martynov, "Pulkovskaia observatoriia," 448–449; and A. N. Dadaev, "Astronom tragicheskoi sud'by (k 100-letiiu so dnia rozhdeniia B. P. Gerasimovicha)," *Problemy postroeniia koordinatykh sistem v astronomii*, Seriia Problemy issledovaniia vselennoi, no. 12 (Leningrad, 1989), 53. According to Dadaev, alleged connections with Trotskyites were another reason for Drozd's dismissal. Except for a brief visit to Pulkovo in 1962, Drozd disappeared completely from Soviet astronomy.

9. *Vestnik Akademii Nauk*, no. 9 (1934): 47–49, and "Pulkovskaia Observatoriia na novykh putiakh. Vozvratit' prezhnee rukovodiashchee znachenie," *Za sotsialisticheskuiu nauku*, no. 20 (22 July 1934) 1.

10. Harlow Shapley to Frank Schlesinger, 17 February 1928, Harlow Shapley director's correspondence, Harvard College Observatory Records, Harvard University Archives. All quotations from materials in this collection are by permission of Harvard University Archives.

11. Schlesinger to Shapley, 22 February 1928, Records of the Department of Astronomy (YRG 14-E), Yale University Archives, Manuscripts and Archives, Yale University Library. All quotations from materials in this collection are by permission of Yale University Library.

12. Shapley to Otto Struve, 20 December 1937, director's papers, Yerkes Observatory Archives, Williams Bay, Wisc.; and Donald Menzel to Otto Struve, 8 August 1946, Shapley papers.

13. Kozyrev interview. According to one anecdote that was related to me by, among others, Mstislav N. Gnevyshev in an interview on 9 December 1987 at Pulkovo, Kozyrev and Eropkin once sent a telegram to the Academy of Sciences informing the academy of Gerasimovich's sudden death and asking the academy to make funeral arrangements. Gnevyshev also describes this incident in M. N. Gnevyshev, "Sversheniia i tre-

astronomer who barely graduated from Petrograd University in 1916, Ter-Oganezov actively embraced the Bolshevik cause.[14] He held posts in Narkompros and was a delegate to the All-Union Central Executive Committee, but his inflated self-image earned him the enmity of nearly all professional astronomers. His revolutionary image made him popular, however, among amateur astronomers, of whom there were several hundred in the Soviet Union. Many astronomers (for example, Kozyrev) who had entered the profession in the early 1930s had started as amateurs; Ter-Oganezov used his position to advance the amateur societies as promising routes for the rapid *vydvizhenie* of young astronomical cadres.[15] In 1930 he became editor of the amateur astronomy journal *Mirovedenie,* which under his direction became a militant vehicle for the rapid introduction of dialectical materialism into all aspects of astronomical research.[16] In addition, Ter-Oganezov was the driving force behind the founding, in 1934, of the All-Union Astronomical-Geodesical Society (VAGO).

Finally, two particular research areas appear to have been connected to the purge of 1936–1937. The first was the Catalog of Faint Stars. Proposed by Gerasimovich and Numerov along with the Pulkovo astrometrists Nikolai I. Dneprovskii (1887–?) and Petr I. Iashnov (1874–1940), this catalog differed from previous catalogs in that it was to be based on faint, distant stars and the origin of its coordinate system was to be determined by the statistical sampling of minor planet observations. (Previous catalogs had used observations of the sun and major planets.) Numerov, working with Schlesinger, organized an international program to observe minor planets.[17]

The second area connected to the purge was solar research. In 1932 the Academy of Sciences' Commission for Study of the Sun (KISO), which included Ambartsumian, Kozyrev, Eropkin, and Evgenii Ia. Perepelkin (1906–1938), organized a service to provide daily monitoring of solar activity. The solar service provided data to establish the connections between solar activity and terrestrial phenomena, but Ter-Oganezov and others made more fanciful claims. For example, they claimed that the solar service would improve the state of Soviet agriculture by supplying data to be used in making long-range weather predictions.[18]

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vogi Pulkova," *IAI* 21 (1989): 349–350. An example of Gerasimovich's criticism of poor research can be found on 345–346 of Gnevyshev's article.

14. Unless otherwise noted, the information regarding Ter-Oganezov was obtained from V. A. Bronshten, "Zhurnal 'Mirovedenie' v moskovskii period," *IAI* 20 (1988): 373–396. Additional information was obtained from Bronshten's unpublished manuscript, "Professor V. T. Ter-Oganezov i ego vliianie na razvitie sovetskoi astronomii (istoriko-publitsisticheskii ocherk)," which I read while in the Soviet Union. V. A. Bronshten was acquainted with Ter-Oganezov for many years and worked alongside him in the All-Union Astronomical Geodesical Society. Bronshten indicates that this information is documented in the Leningradskii gosudarstvennyi istoricheskii arkhiv, f. 14, op. 3, d. 52535 (memorandum to Robert McCutcheon from V. A. Bronshten, 27 November 1987).

15. See, for example, B. A. Vorontsov-Veliaminov, "K desiatiletiiu Kollektiva nabliudatelei MOLA (1921–31)," *Mirovedenie* 21 (January–February 1932): 94. A history of amateur astronomy societies in the Soviet Union is in V. K. Lutskii, *Istoriia astronomicheskikh obshchestvennykh organizatsii v SSSR* (Moscow: Nauka, 1982). See also the 24 February 1931 circular letter from Ter-Oganezov in Arkhiv AN SSSR, f. 708 (Kostinskii), op. 3, ed. khr. 45, l. 23.

16. See, for example, V. T. Ter-Oganezov, "Na perelome," *Mirovedenie* 19 (May–August 1930): 3–18.

17. B. P. Gerasimovich to Shapley, 12 April 1932, Shapley papers; Numerova, *Numerov,* 88–92; and Numerova, "Numerov," 204–206.

18. "Protokol zasedaniia Komissii po issledovaniiu Solntsa Akademii Nauk SSSR ot 28 noiabria 1930 g.," *Biulleten' Komissii po issledovaniiu Solntsa,* no. 1 (1932): 15; M. N. Gnevyshev, "Evgenii Iakovlevich Perepelkin," *IAI* 10 (1969): 243; and "Soveshchanie po organizatsii Gornoi astronomicheskoi observatorii i Konferentsiia Komissii po issledovaniiu Solntsa (KISO) pri Akademii Nauk SSSR," *Mirovedenie* 20 (January–February 1931): 148–150. For the claims made for the solar service, see V. T. Ter-Oganezov, "Ob astronomicheskom s″ezde," *Mirovedenie* 20 (May–August 1931): 92; and "Obrashchenie I Vsesoiuznogo astronomo-geodezicheskogo s″ezda k trudiashchimsia i nauchnym rabotnikam Sovetskogo Soiuza," *Mirove-*

Gerasimovich became chairman of the commission in 1934, and thus he, Ambartsumian, Kozyrev, and Eropkin found a second forum in which to display their antipathies. Furthermore, when the Academy of Sciences established a commission to prepare for observing the total solar eclipse of 19 June 1936, it named Gerasimovich chairman and Ter-Oganezov his assistant.[19] The catalyst that moved all of these ingredients into a more explosive state was soon provided by the Voronov scandal.

Nikolai M. Voronov (1913–?) began his career as a teenaged amateur who demonstrated an aptitude for celestial mechanics. In 1931 the eighteen-year-old Voronov was invited to join the staff of the Tashkent Astronomical Observatory (TAO).[20]

The cultural revolution had led to a major reorganization at the Tashkent Observatory. I. A. Teplov (1884–1954), a nonastronomer, was named director in 1930, and most of the observatory's senior astronomers transferred to other institutions. By 1931 the observatory had fewer than ten staff members, most of them younger than thirty.

At Tashkent Voronov worked in celestial mechanics—primarily on double star orbits and on ephemerides assigned to him by the Leningrad Astronomical Institute. Promoted to junior astronomer in 1933, Voronov began to attract attention by using a complicated method to determine the orbits of minor planets. Unlike experienced celestial mechanicians who worked years to produce one definitive orbit, Voronov produced several in a matter of months. The observatory administration boasted of Voronov's feats in the pages of *Mirovedenie,* and the Council of People's Commissars of the Uzbek Republic took special note of the observatory's "major theoretical works in the area of celestial mechanics."[21] Voronov's career was rising.

A serious drawback to Numerov's plans for using minor planets in determining catalog corrections was the fact that very few minor planets had orbital theories of the necessary accuracy. Only one minor planet, 4 Vesta, had an orbit as well determined as those of the major planets. This orbit, the result of twenty-five years' labor by the French astronomer M. G. Leveau, was considered a classic, and any improvement upon it seemed impossible.[22] In early 1935 Voronov published two major articles in the *Astronomische Nachrichten* in which he claimed to have extended and improved upon Leveau's theory.[23] Voronov emphasized that he had undertaken the improvement of Vesta's orbital theory for use in Numerov's program of catalog corrections.

Voronov's work produced an immediate international sensation. The IAU praised his work and made him a member of IAU Commission No. 8 on Meridian Astronomy. No longer an

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denie 23 (May–June 1934): 158. A cartoon criticizing the commission appeared in one newspaper with the caption: "The sun rises and sets . . . but the solar commission has not caught a single calorie" (*Za sotsialisticheskuiu nauku,* no. 1 [April 1932]: 3).

19. *VAN* 5, no. 6 (1935): 75, and *Za sotsialisticheskuiu nauku,* no. 31 (27 November 1934): 4, and no. 10 (15 April 1935): 2.

20. *Russkii Astronomicheskii Kalendar'* (1931): 236, 246, and opposite table of contents; *A. zh.* 10, no. 3 (1933): 369–370.

21. *A. zh.* 10, no. 3 (1933): 361–363; *Tsirkuliar TAO,* no. 37 (26 January 1935): 1–3. N. M. Voronov's works from this period include, among others, "Absolute Perturbations from the Minor Planet 48 Doris," *Biulleten' TAO,* no. 4 (31 December 1934): 91–93; and "Theory of the Motion of 55 Pandora," *Biulleten' TAO,* no. 5 (10 March 1935): 109–157. The observatory's boasts can be found in S. M. Selivanov, "Shest'desiat let TAO," *Mirovedenie* 25 (March–April 1936): 117–118. The Council of People's Commissars' statement is in "Postanovlenie No. 468 Soveta Narodnykh Komissarov Uzbekskoi Sovetskoi Sotsialisticheskoi Respubliki," 5 May 1935. A copy of this decree was provided to the author by V. A. Postoev.

22. M. G. Leveau, "Théorie du mouvement de Vesta," *Annales de l'Observatoire de Paris* 15 (1880); 17 (1883); and 20 (1892).

23. N. Voronov, "Investigation on the Theory of the Motion of the Minor Planet 4 Vesta," *Astronomische Nachrichten,* Band 254, no. 6092–6093 (1935): 329–362, and Band 256, no. 6128 (1935): 157–166. Voronov's article was in English.

anonymous amateur astronomer, Voronov had become an internationally recognized specialist in less than four years. In early 1935 Gerasimovich invited Voronov to come to Pulkovo as a scientific specialist in the theoretical sector run by Naum I. Idel'son (1885–1951). Immediately after his arrival Voronov published his new work on the orbital theory of the minor planet 13 Egeria, and once again he stated that he had developed this new theory to aid in determining systematic catalog errors.[24]

In 1935 the Academy of Sciences awarded Voronov his *kandidat*'s degree "without defense of a dissertation." Then, on 20–24 May, Voronov presented a paper concerning the orbital theories for Jupiter, Saturn, Uranus, and Neptune to the Conference on Celestial Mechanics and Theoretical Astronomy. The paper produced such an impression that Numerov compared Voronov to Leveau and the famous astronomers Simon Newcomb and George William Hill.[25]

Voronov's career came to a sudden halt, however, with the following announcement in the February 1936 issue of the *Poulkovo Observatory Circular:*

> To my greatest regret I have to announce that my paper on the minor planet (13) Egeria . . . has been written by me in a state of great mental fatigue, approaching the state of a nervous breakdown, and that all of its results . . . are erroneous and should not be taken into consideration.[26]

Voronov's apparently brilliant career was a hoax. Idel'son, speaking in October 1936 at a meeting organized by the Academy of Sciences, stated that he had had suspicions concerning Voronov from an early date but that he "did not have the temperament to act against him [Voronov] openly when everyone was talking about his exceptional talent."[27] Gerasimovich officially dismissed Voronov on 9 March. Voronov's superior, Idel'son, submitted his resignation the same day, but Gerasimovich refused to accept it. After a brief interval working at the Stalinabad Observatory, Voronov was drafted into the Red Army and was never heard from again.[28]

At the height of the Voronov scandal, Gerasimovich discovered a way to rid himself of Kozyrev and Eropkin. During a 1935 expedition to Mt. Elbrus, Kozyrev and Eropkin had appar-

24. Gnevyshev, "Sversheniia i trevogi Pulkova," 350; *A. zh.* 13, no. 3 (1936): 265; Dadaev, "Astronom tragicheskoi sud'by," 55–56; and notes from interview conducted by N. S. Kardashev with Iu. M. Slonim, 3 April 1989, in Tashkent. These notes were given to me by Kardashev. Voronov had worked at Pulkovo as a *praktikant* in 1934 (see Arkhiv AN SSSR, f. 708 [Kostinskii], op. 3, ed. khr. 35, l. 69, 70, and 72). Both Slonim, who was on the staff of the Tashkent Observatory in the 1930s, and Gnevyshev attribute the invitation to Pulkovo directly to Gerasimovich. According to Gnevyshev, both Numerov and another well-known celestial mechanician, M. F. Subbotin (1893–1966), enthusiastically supported Voronov's transfer to Leningrad. Voronov's paper on 13 Egeria is "The Theory of the Minor Planet (13) Egeria (first paper)," *Poulkovo Observatory Circular,* no. 14 (March 1935): 25, and no. 16 (December 1935): 4–29.

25. *VAN* 5, no. 7–8 (1935): 103. Gerasimovich was on the Academy of Science's qualifications committee charged with granting degrees in the physical sciences. B. V. Numerov, "Konferentsiia po teoreticheskoi astronomii i nebesnoi mekhaniki," *Mirovedenie* 24 (July–August 1935): 238.

26. "Concerning the Minor Planet (13) Egeria," *Poulkovo Observatory Circular,* No. 17, February 1936. The title of this periodical was in English.

27. Statements by N. I. Idel'son in "Preniia," in "Materialy sessii Fizicheskoi gruppy Akademii Nauk SSSR po voprosam organizatsii astronomii, 23–30 oktiabria 1936 g.," *Izvestiia AN SSSR, Otdelenie matematicheskikh i estestvennykh nauk, seriia Fizicheskaia,* No. 6 (1936): 753–755. The details of Voronov's downfall are documented in "Doklad prof. N. I. Idel'sona, pis'ma-otzyvy inostr. uchenykh i perepiska po delu N. M. Voronova o fal'sifikatsii nauchnoi raboty," Arkhiv AN SSSR, f. 703 (Pulkovo), op. 1 (1936), ed. khr. 58, l. 1–42, as cited in Eremeeva, "Zhizn' i tvorchestvo Borisa Petrovicha Gerasimovicha," 292. I did not have access to most of f. 703 in the Arkhiv AN SSSR and instead used Eremeeva's work to document its contents.

28. "Perepiska po lichnomu sostavu," Arkhiv AN SSSR, f. 703, op. 1 (1936), ed. khr. 55, l. 5 and 7, as cited in Eremeeva, "Zhizn' i tvorchestvo Borisa Petrovicha Gerasimovicha," 292. "Materialy sessii Fizicheskoi," 756.

ently each received two salaries: one from Pulkovo and one from the Academy of Sciences. On 8 March only one day before dismissing Voronov, Gerasimovich used this circumstance as grounds to dismiss Kozyrev and Eropkin.[29]

The Academy of Sciences had already noted the tense situation at Pulkovo and in November 1935 had sent a commission to investigate. On 2 February 1936, the academy's permanent secretary, N. P. Gorbunov, asked Gerasimovich to respond to an article in which Ambartsumian and Eropkin had accused the Pulkovo director of being influenced by foreign science, of acquiring outdated foreign equipment, and of other failings. Two months later, in May 1936, Gerasimovich offered to resign his post, but the academy did not accept his resignation.[30]

Meanwhile, questions were, evidently, being asked about the Tashkent Observatory, where Voronov had worked "undetected" for more than three years. Although coincidence cannot be ruled out, it is nevertheless striking that the Tashkent director, Aleksandr I. Postoev (1900–1977), was arrested in February 1936, almost simultaneously with Voronov's unmasking, while on a trip to Leningrad.[31] As Postoev later recalled, "Early in 1936 my career came abruptly to an end: I was arrested, accused of membership in a counterrevolutionary group (imaginary) and of 'counterrevolutionary intentions' and without any legal proceedings sent to a concentration camp."[32] Although Postoev's arrest was certainly the most dramatic event to occur in the immediate aftermath of the Voronov scandal, two other events are worth noting: First, while Numerov had corresponded extensively with Schlesinger and W. J. Eckert of Columbia University throughout 1935, on 15 February 1936 the Numerov portion of the correspondence ended with a letter to Eckert. The Second All-Union Astrometry Conference, which took place in April at Pulkovo, is the second event indicating that the positions of Numerov and other senior Leningrad astronomers may have been intentionally undermined. Gerasimovich, Dneprovskii, and Iashnov delivered the main papers devoted to the Catalog of Faint Stars, but their proposals met with greater criticism than they had previously.[33] In fact, the entire catalog project appears to have been called into question.

On 28 April 1936 a Harvard eclipse expedition, led by Donald Menzel, arrived in the Soviet Union. For the first time since before World War I, large numbers of foreign astronomers converged on the Soviet Union; they were to observe a total solar eclipse on 19 June. In May Gerasimovich and five other members of the Pulkovo staff accompanied the Harvard expedition to the observation site near Orenburg.[34]

Kozyrev and Eropkin apparently used the Voronov scandal and Gerasimovich's absence to begin a campaign for their reinstatement and for Gerasimovich's dismissal. This campaign took place on the pages of *Leningradskaia pravda,* which made the Voronov scandal public in a 4 June article. *Leningradskaia pravda* blamed Pulkovo Observatory and, in particular, Gerasimovich for this scandal and characterized Pulkovo as an institution with no interest in training young Soviet cadres. The article accused the observatory of inviting Voronov to join its staff only because his

29. "Perepiska c Prezidiumom AN SSSR . . . ob obrazovanii Astrosoveta," Arkhiv AN SSSR, f. 703, op. 1 (1936), ed. khr. 25, l. 19, as cited in Eremeeva, "Zhizn′ i tvorchestvo Borisa Petrovicha Gerasimovicha," 285; Gnevyshev interview; and *Front Nauki i tekhniki,* no. 2 (1936): 132.

30. Eremeeva, "Zhizn′ i tvorchestvo Borisa Petrovicha Gerasimovicha," 291–292. Arkhiv AN SSSR, f. 703, op. 1 (1936), ed. khr. 25, l. 15–20, as cited in ibid., 291. This article apparently existed in manuscript form only.

31. Slonim interview; *Tsirkuliar TAO,* no. 66, 25 April 1937; and *A. zh.* 13, no. 3 (1936): 284. A. I. Postoev had replaced I. A. Teplov as director of TAO on 7 January 1935. Unlike Teplov, Postoev was a true scientist who had studied at the Leningrad Astronomical Institute.

32. "Excerpt of letter received from Prof. Postoiev [*sic*], January 6, 1946," Shapley papers.

33. Numerov to Eckert, 15 February 1936, Schlesinger papers. M. S. Zverev, "Nikolai Ivanovich Dneprovskii," *IAI* 15, 1980, 52–53; and *VAN* 6, no. 8–9 (1936): 43–47.

34. Florence Menzel to H. Shapley, 30 April 1936, Shapley papers; Menzel to Shapley, 4 May 1936, Shapley papers; Menzel to Shapley, May 1936 (undated, on train to Ak-Bulak), Shapley papers; and Gnevyshev interview.

work had acquired a "foreign stamp" by being published in a German journal. To the newspaper, those "who have pretensions of enjoying authority" at Pulkovo and Tashkent (i.e., the observatory directors) were simpletons who were guilty of inexcusable gullibility.[35]

Gerasimovich never mentioned this article to Menzel. He did, however, describe the problems he had been having with Ambartsumian, Eropkin, and Kozyrev and expressed his wish to be invited to revisit the Harvard observatory. Without explaining the reasons, Gerasimovich canceled a trip to Tashkent that he had invited Menzel to take after the eclipse.[36]

In a second, stronger attack on Pulkovo on 18 July *Leningradskaia pravda* declared that the time had come to uncover the roots of Voronovshchina. To the newspaper Pulkovo's main failing was servility to foreign science. In 1933, the article noted, only three out of seventy-five Pulkovo publications had been printed in Russian.[37] According to the newspaper, such a rush to imitate foreign things had been bound to lead to scandals.

By this time a court had ordered that Kozyrev and Eropkin be reinstated.[38] *Leningradskaia pravda* described this event and asked why Gerasimovich wanted to suppress these young astronomers. It also asked why Ambartsumian had been forced to leave Pulkovo in 1933 and quoted Ambartsumian as stating that "the observatory leadership does not pursue scientific goals, but rather aims at creating a big splash and bang." The article emphasized Gerasimovich's temper in dealing with his graduate students.

This second attack appeared while Menzel was in Moscow, preparing to depart for Europe. He did not see the article himself, but a *New York Times* correspondent told him that his "Russian friend" was having trouble because of alleged inefficiency.[39]

Leningradskaia pravda's second article linked Pulkovo to a general campaign against the Academy of Sciences that had begun in July 1936 with a series of articles in *Pravda* attacking Academician Nikolai N. Luzin for servility to foreign science.[40] *Leningradskaia pravda,* for its part, saw Voronovshchina as a prime example of rampant Luzinism.

In response to the *Pravda* articles, the Academy of Sciences organized a commission to investigate the situation in the various scientific disciplines but the presidium appointed to the commission some of the very people who had been denounced in the press. Gerasimovich was appointed to the subcommission charged with searching for Luzinism in physics. At the same time, the investigating commission sent to Pulkovo the previous November announced conclusions in which, despite noting some "abnormal phenomena," it defended Gerasimovich. This commission found that *Leningradskaia pravda* had given a distorted picture of the situation at the observatory. The academy also gave Gerasimovich and Evgenii Ia. Perepelkin awards for their work in preparing for the 19 June solar eclipse.[41]

35. Gnevyshev, "Sversheniia i trevogi Pulkova," 350. D. Slaventantor, "Lestnitsa slavy," *Leningradskaia pravda,* 4 June 1936, 3; and Kozyrev interview.

36. Struve, "About a Russian Astronomer," 381; and D. H. Menzel, "Material on Eclipse Expedition to USSR and B. Gerasimovich," folder 9, D. H. Menzel papers, Special Collections, Penrose Library, University of Denver. The latter is a transcript of an oral statement made by Menzel in the early 1950s.

37. D. Slaventantor, "Rytsary rabolepiia," *Leningradskaia pravda,* 18 July 1936, 3. Just two years earlier Shapley had complimented Gerasimovich on his efforts to publish Pulkovo publications in English; he noted that this practice was "certainly to the advantage of your observatory." See Shapley to Gerasimovich, 25 July 1934, Shapley papers.

38. Gnevyshev interview.

39. Struve, "About a Russian Astronomer," 381; and Menzel, "Material on Eclipse Expedition to USSR and B. Gerasimovich."

40. *Pravda,* 2 July 1936, 3; 3 July 1936, 3; 9 July 1936, 3; 10 July 1936, 3; 12 July 1936, 3; 14 July 1936, 3; 15 July 1936, 4; and 6 August 1936, 1. See also Aleksey E. Levin, "Anatomy of a Public Campaign: 'Academician Luzin's Case' in Soviet Political History," *Slavic Review* 49 (Spring 1990): 90–108.

41. *VAN* 6, No. 8–9 (1936), 93; "Vyvody Komissii Prezidiuma AN SSSR o polozhenii del v Pulkovskoi observatorii," Arkhiv AN SSSR, f. 703, op. 1 (1936), ed. khr. 8, l. 3, 4, and 10–20, as cited in Eremeeva, "Zhizn' i tvorchestvo Borisa Petrovicha Gerasimovicha," 293; and *VAN* 6, no. 8–9 (1936): 98.

Meanwhile, on 27 August, *Leningradskaia pravda* launched a third attack on Pulkovo.[42] This third article accused Gerasimovich of trying to cover up the Voronov scandal and identified the observatory's assistant director for administrative affairs, B. A. Shigin, as a counterrevolutionary Trotskyite-Zinovievite agent. (In response to this article and against Gerasimovich's wishes, the Academy of Sciences removed Shigin and replaced him with N. I. Favorskii.[43]) The rest of the observatory staff did not fare much better. According to the newspaper, staff members were chosen not on the basis of scientific merit, but on the basis of their willingness "to sing in unison" with the observatory administration. Characterizing Pulkovo as a "stifling academic nest" where even the party group was guilty of doing too little too late, the article concluded by declaring, "it is time, finally, to bring true Bolshevik order to Pulkovo."

While public criticism of Pulkovo increased, a graduate student who had failed a *kandidat* exam in celestial mechanics, administered by Numerov, wrote a denunciation of Numerov in which he cited the astronomer's foreign contacts. The secretary of the Pulkovo party group supported the denunciation.[44]

The NKVD began its investigation by questioning several of Numerov's colleagues, including Kozyrev and the physicist Petr I. Lukirskii (1894–1954), both of whom warned Numerov of his impending arrest. Numerov had paid no heed to these warnings, however, and was arrested at his home on the evening of 20 October 1936. The NKVD conducted a search and took Numerov away for questioning. Numerov assumed his arrest had resulted from simple misunderstanding, and he left assuring his family that he would return soon.[45]

Numerov's hopes for a swift release vanished quickly. After severe beatings he signed a fabricated document in which he confessed to being the organizer of a counterrevolutionary group of astronomers and geophysicists that had cooperated with German fascists and had engaged in wrecking, spying, and terror since 1929 (since, that is, the time of his last trip to Germany).[46] The confession listed Numerov's colleagues—virtually the entire Leningrad astronomy community—as conspirators.

The night of 6–7 November turned out to be the night of long knives for Pulkovo. Six astronomers were arrested: Innokentii A. Balanovskii (1885–?), Iashnov, Kozyrev, Nikolai V. Komendantov (1895–?), Vera F. Gaze (1899–1954), and Idel'son. On 4 December the NKVD arrested both Dneprovskii and Eropkin, and on 10 February 1937 it arrested Pulkovo's scientific secretary, Maksimilian M. Musselius (1884–1938?). Perepelkin was arrested on 11 May 1937.[47]

In Tashkent the NKVD did not lag behind its Leningrad counterpart. In December it arrested Vladimir P. Shcheglov (1904–1985), V. E. Surovtsev (1890–1938), Nikolai I. Ivanov

42. A. Nezhdanov and D. Slaventantor, "Eshche raz o pulkovskikh nravakh," *Leningradskaia pravda,* 27 August 1936, 3.

43. "Perepiska po lichnomu sostavu," Arkhiv AN SSSR, f. 703, op. 1 (1936), ed. khr. 55, l. 41, as cited in Eremeeva, "Zhizn' i tvorchestvo Borisa Petrovicha Gerasimovich," 293.

44. Events leading up to Numerov's arrest are described in the Numerova interview; in Iosif S. Shklovskii, "Nevydumannye rasskazy," *Energiia,* no. 6 (1988): 41–42; and in L. Sidorovskii, "Zvezdy i terni," *Smena,* 31 March 1989, 2. The graduate student is not identified. The secretary of the Pulkovo party group appears to have been Moris S. Eigenson (1906–1962). Recall that *Leningradskaia pravda* had criticized the Pulkovo party group for inaction.

45. Shklovskii, "Nevydumannye rasskazy," 42; Sidorovskii "Zvezdy i terni"; and Numerova interview.

46. B. V. Numerov to the presidium of the Academy of Sciences, 13 July 1937. A. B. Numerova gave me a copy of this letter.

47. Kozyrev interview; Sidorovskii, "Zvezdy i terni"; Shklovskii, "Nevydumannye rasskazy," 41; interview with B. I. and Iu. I. Eropkin, 16 January 1938; F. N. Kozyrev, "K biografiiu Nikolaia Aleksandrovicha Kozyreva," unpublished manuscript (author's collection), 3–4; and V. N. Bleer to V. K. Abalakin, 10 March 1989. (V. N. Bleer is the assistant director of the KGB for the Leningrad province. A copy of this letter was provided to me by Viktor K. Abalakin.) Kozyrev was arrested at a dance celebrating the nineteenth anniversary of the October Revolution. Balanovskii and Iashnov apparently were arrested in their apartments in the main observatory building at Pulkovo.

(1902–1938?), Vladimir I. Kozlov (1904–1940), and Sergei M. Selivanov (1890–?). Following these arrests only three astronomers were left in Tashkent.[48]

As 1937 dawned, Gerasimovich was director of a nearly deserted institution. His correspondence with Shapley gives no clue to the events during the last months of 1936. In response to Gerasimovich's request, Shapley sent a letter inviting Gerasimovich to spend the spring 1937 semester at Harvard. In his reply, written in January 1937, Gerasimovich thanked Shapley for the invitation, but he alluded to "heavy administrative duties . . . and other agreable [*sic*] and disagreable [*sic*] tasks consuming much of my time" and making it difficult to determine whether he would be able to leave Pulkovo.[49]

On 28 January 1937 Favorskii sent a denunciation of Gerasimovich to the vice-president of the Academy of Sciences, G. M. Krzhizhanovskii (1872–1959). Favorskii accused Gerasimovich of "softness" toward the wives of the arrested astronomers. In addition, Favorskii accused Gerasimovich of insufficient zeal, at a meeting held at the observatory that day, in supporting the sentence against Georgii L. Piatakov (1890–1937) and others found guilty in the recently concluded trial of the Anti-Soviet Trotskyite Center.[50]

Research at the observatory soon stopped. Balanovskii had been in charge of Pulkovo's contribution to the international (primarily German) Astronomische Gesellschaft catalog; Dneprovskii and Iashnov were the observatory's two leading astrometrists; and Perepelkin was the driving force behind the solar service. No other astronomers in the Soviet Union could immediately fill these voids. Moreover, Gerasimovich delayed finding replacements for the arrested astronomers in the hope that they would soon be released.[51]

The Academy of Sciences sent several more commissions to investigate the situation at Pulkovo. The sixth and final commission was chaired by Vasilii G. Fesenkov (1889–1972), director of the Shternberg State Astronomical Institute (GAISh) and head of the Astronomy Council of the Academy of Sciences. According to Fesenkov, the only commission member who favored reaching negative conclusions regarding the situation at Pulkovo was Ter-Oganezov.[52] Ter-Oganezov later complained in *Mirovedenie* that:

> To this time we do not know what opinion the Academy of Sciences held concerning the . . . conclusions of the commission investigating the observatory. We know only that . . . some sort of draft resolutions . . . [were prepared and given to] V. G. Fesenkov for editing. [Fesenkov] . . . at his own risk and peril, considerably softened the draft, throwing out the . . . political accusations. But even in this emasculated form the resolutions turned out to be just "wasted paper."[53]

If, as seems apparent, the academy wished to shield Gerasimovich, events were making this more and more difficult. Early in 1937 Stalin launched a campaign against the academy's most prominent member, Nikolai I. Bukharin (1888–1938). The academy's *aktiv* held a general meeting 27–29 March 1937 devoted to the "corrupt wrecking work carried out in the Academy of Sciences by Bukharin," whose influence was said to extend throughout the academy.[54] The meeting took particular notice of the Division of Mathematical and Natural Sciences, where

48. Slonim interview.

49. H. Shapley to B. P. Gerasimovich, 23 November 1936, Shapley papers; and B. P. Gerasimovich to H. Shapley, 4 January 1937, Shapley papers.

50. "Short Biography of B. P. Gerasimovich," Arkhiv AN SSSR, f. 411, op. 6, ed. khr. 721, l. 29–30, as cited in Eremeeva, "Zhizn' i tvorchestvo Borisa Petrovicha Gerasimovicha," 294. As was true with f. 703, I did not have access to f. 411.

51. Eremeeva, "Zhizn' i tvorchestvo Borisa Petrovicha Gerasimovicha," 293–294.

52. Ibid., 294. According to V. A. Bronshten, both N. P. Gorbunov and V. G. Fesenkov tried to reduce Ter-Oganezov's accusations to nothing. Memorandum to Robert McCutcheon from V. A. Bronshten, 28 October 1987.

53. V. T. Ter-Oganezov, "Za iskorenie do kontsa vreditel'stva na astronomicheskom fronte," *Mirovedenie* 26, no. 6 (December 1937): 375.

54. "Fevral'skii plenum TsK VKP (b) i nashi zadachi," *VAN* 7, no. 4–5 (1937): 8.

> One need look only at . . . Pulkovo, where a united counterrevolutionary organization had drawn a significant number of scientific workers into its orbit. . . . The presentation made to the *aktiv* by the director of this observatory, B. P. Gerasimovich, was completely unsatisfactory. Evidently, he has a perverted understanding of the Soviet principle of *edinonachalie,* and to this day he has not drawn all the necessary lessons from the wrecking activities of the former observatory employees.[55]

Just before this meeting Gerasimovich had sent a telegram to Shapley regarding his proposed visit to Harvard. The telegram stated tersely, "Regretting thanking cannot go." [56]

The pressure on Gerasimovich continued to mount, and he offered his resignation for a second time on 20 April 1937. The academy presidium again refused to accept his offer, and on 8 June it asked him for his thoughts on how to improve the situation at Pulkovo. Ter-Oganezov declared angrily that "in response to his [Gerasimovich's] impudent declaration of his desire to resign, the academy passed a resolution asking him to stay on as director. Thus not only was he not punished, he even received moral support, which he used to manifest even further his despotism and wrecking." [57] Ter-Oganezov loudly denounced Gerasimovich for sabotage at the May plenum of the Astronomy Council.[58]

Gerasimovich was arrested on 28 June 1937. No suitable replacement was left in Leningrad, so the Academy of Sciences summoned Sergei I. Beliavskii (1883–1953) from Pulkovo's southern station in Simeis to assume the duties of Pulkovo director.[59]

The Astronomy Council met on 26–29 October 1937 to condemn Gerasimovich, Numerov, and the other purged astronomers as "enemies of the people." According to Ter-Oganezov, who delivered the main speech to this meeting, these enemies had disrupted the solar service, failed to give due attention to the training of new cadres, purposely delayed the construction of a new southern observatory, and prevented the Astronomy Council from carrying out the planning of Soviet astronomy for the Third Five-Year Plan.[60] Furthermore, Ter-Oganezov denounced the Leningrad Astronomical Institute for continuing to publish the works of enemies (that is, Numerov and Idel'son) even after their wrecking activities had been unmasked.

M. S. Eigenson gave a detailed description of wrecking in the solar service:

> [M. S. Eigenson] pointed to the difficult situation that has developed in the solar service as a consequence of the criminal activities of its former directors, who have now been condemned as enemies of the people. The needs of our country's agriculture were not only not satisfied, they were simply ignored. No results were published. No use was made of amateur observations. The entire organization of work was designed to discredit the solar service, as witnessed by the outflow abroad of the majority of observations made at Soviet observatories and by the collapse of the entire solar network.[61]

Ter-Oganezov used *Mirovedenie* to amplify his denunciation of the purged astronomers in an article entitled "Za iskorenie do kontsa vreditel'stva na astronomicheskom fronte." Ter-Oganezov now added philosophical errors to the list of Gerasimovich's alleged crimes and held that Gerasimovich was a former Socialist Revolutionary who, in the 1920s, had made counter-

55. Ibid., 11.

56. B. P. Gerasimovich to H. Shapley, telegram received on 19 March 1937, Shapley papers.

57. Arkhiv AN SSSR, f. 411, op, 6, ed. khr. 721, l. 20, as cited in Eremeeva, "Zhizn' i tvorchestvo Borisa Petrovicha Gerasimovicha," 296. Ter-Oganezov, "Za iskorenie," 375.

58. Ter-Oganezov, "Za iskorenie," 376–377; and V. G. Fesenkov, "O deiatel'nosti Astronomicheskogo Soveta za 1937 g.," *A. zh.* 15, no. 3 (1938): 93.

59. V. N. Bleer to V. K. Abalakin, 10 March 1989; and Dadaev, "Astronom tragicheskoi sud'by," 64. According to Dadaev, Gerasimovich was arrested on the train while returning to Leningrad from Moscow. Information on Beliavskii's appointment is in Gnevyshev, "Sversheniia i trevogi Pulkova," 353.

60. "Rezoliutsii, priniatye na plenume Astronomicheskogo Soveta Akademii Nauk SSSR, 26–29 oktiabria 1937 g.," *A. zh.* 15, no. 1 (1938): 80–81; and "Oktiabr'skaia sessiia Astronomicheskogo Soveta Akademii Nauk," *Mirovedenie* 26, no. 6 (December 1937): 420.

61. Ter-Oganezov, "Rezoliutsii," 81; and Nikolai Floria, "Plenum Astronomicheskogo Soveta Akademii Nauk SSSR, 26–29 oktiabria 1937 g.," *A. zh.* 15, no. 1 (1938): 78.

revolutionary statements at Khar'kov University during a discussion on the use of Marxist-Leninist methodology in the natural sciences.[62]

The Astronomy Council's late entry into the campaign of denunciations did not protect it from reprisals—after all, Gerasimovich and Perepelkin had been on the council presidium. On 15 December 1937 the Academy of Sciences presidium criticized Fesenkov for covering up the wrecking activities of these enemies and removed him from his position as Astronomy Council chairman. (Shortly thereafter he also lost his position as director of the Shternberg Institute.) Moreover, the presidium liquidated the council and replaced it with a less prestigious astronomy group under the chairmanship of Beliavskii.[63]

The Astronomy Council's liquidation in December 1937 marked the end of the purge. Vague rumblings concerning continued wrecking in astronomy echoed through the Soviet press for many months to come, but no more well-known astronomers were arrested.

Between March 1936 and the end of 1937 at least twenty-nine astronomers (and one assistant director for administrative affairs) disappeared (see table). The twenty-nine made up 10 percent to 20 percent of all astronomers in the Soviet Union in 1935. The damage to Soviet astronomy was even higher than this percentage would indicate, however. In a 1938 letter to A. Ia. Vyshinskii, Academician Grigorii A. Shain (1892–1956), director of the Simeis station and, as will be seen, one of the few documented heroes of this sad saga, noted that

> The number of actively working astronomers in our country is small (80–90 people), and therefore the arrest of a large group (about twenty people) is very striking. The matter is made worse by the fact that the most outstanding astronomers were among those who were arrested. It would hardly be an exaggeration to state that Soviet astronomy has lost no less than 30 percent of its effective personnel.[64]

In a few cases we now know something about the trials and sentencing of those arrested. Numerov, Dneprovskii, Balanovskii, Kozyrev, Iashnov, Eropkin, Musselius, and Komendantov were all tried by the Military Collegium of the Supreme Court of the Soviet Union in closed session in Leningrad on 25 May 1937. Numerov wrote afterward that "in the course of several minutes, without calling any witnesses . . . without any defense, without hearing the facts," the court sentenced him to ten years' imprisonment plus five additional years' deprivation of politi-

62. Ter-Oganezov, "Za iskorenie," 374. The exact nature of Gerasimovich's alleged statements is unknown, but it was no secret that Gerasimovich held views, such as his support for the theory of the expanding universe, that did not agree with dialectical materialist philosophy. See, for example, B. P. Gerasimovich, *Vselennaia pri svete teorii otnositel'nosti* (Khar'kov: Ukrainy, 1925).

63. *VAN* 8, no. 1 (1938): 90; "V Akademii Nauk SSSR," *Pravda,* 16 December 1937; "V Prezidiume Akademii Nauk SSSR," *Izvestiia,* 16 December 1937, 6; and G. A. Aristov, "Informatsionnyi biulleten' Gruppy Astronomii Akademii Nauk," *A. zh.* 15, no. 3 (1938): 302. Fesenkov, supposedly, left the Shternberg institute voluntarily (see *A. zh.* 17, no. 3 [1940]: 70). V. A. Bronshten, however, believes that Fesenkov was pressured into resigning (memorandum to Robert McCutcheon from V. A. Bronshten, 28 October 1987).

64. Arkhiv AN SSSR, f. 596, op. 3, ed. khr. 14, l. 2 [as cited in N. V. Uspenskaia, "Vreditel'stvo . . . v dele izucheniia solnechnogo zatmeniia," *Priroda,* no. 8, 1989, 87]. At Pulkovo thirteen (46 percent) of twenty-eight senior scientific specialists and scientific specialists on the staff in 1935 were gone by the end of 1937. The situation at Tashkent was even worse: Of nine astronomers, six (67 percent) were gone by the start of 1937.

The situation in Soviet biology and physics in the late 1930s provides an interesting contrast to that in astronomy. According to partial lists compiled by David Joravsky, approximately twenty-two physicists disappeared in 1936–1938, whereas fifty-nine biologists and agricultural specialists were repressed over the longer interval from 1935 through 1941. According to Joravsky these numbers probably correspond to less than 5 percent of the biology community and more than 2 percent of the physics. The percentage of astronomers repressed appears to be much higher than the percentages of biologists and physicists. See David Joravsky, *The Lysenko Affair* (Cambridge: Harvard University Press, 1976), 116–117, 317–328, and 385–386.

Table. Soviet Astronomers Arrested in 1936–1937

Name	Confidence level*	Institute	Field	Fate
I. A. Balanovskii (1885–?)	4	Pulkovo	Astrometry	Ten-year prison sentence. Subsequent fate unknown.
N. F. Boeva (1890–1956)	3	AI	Celestial mechanics	Later returned to AI.
N. I. Dneprovskii (1887–?)	4	Pulkovo	Astrometry	Ten-year prison sentence. Subsequent fate unknown.
D. I. Eropkin (1908–1939)	4	Pulkovo	Astrophysics (solar service)	Ten-year prison sentence. Executed 20 January 1939.
V. F. Gaze (1899–1954)	3	Pulkovo	Celestial mechanics	Worked with G. A. Shain in Simeis after release in 1940.
B. P. Gerasimovich (1889–1937)	4	Pulkovo	Astrophysics (solar service)	Executed 30 November 1937.
P. I. Iashnov (1874–1940)	4	Pulkovo	Astrometry	Ten-year prison sentence. Died in prison 29 May 1940.
I. N. Iazev (?)	2	Poltava Observatory	Astrometry	Denounced for wrecking. Resumed career in 1940s.
N. I. Idel'son (1885–1951)	3	Pulkovo	Celestial mechanics	Quickly released. On staff at AI in December 1939.
N. I. Ivanov (1902–circa 1938)	3	TAO	Astrophysics	Apparently died while serving sentence.
N. V. Komendantov (1895–?)	4	Pulkovo	Celestial mechanics	Ten-year prison sentence. Subsequent fate unknown.
V. I. Kozlov (1904–1940)	3	TAO	Astrophysics	Apparently died while serving sentence.
B. Iu. Kozlovskii (?)	1	AI	Geodesy	Unknown.
N. A. Kozyrev (1908–1983)	4	Pulkovo	Astrophysics (solar service)	Released from labor camp on 1 January 1947.
I. N. Leman-Balanovskaia (1881–?)	4	Pulkovo	Astrophysics	Five-year camp sentence. Apparently died sometime after 1941.
A. V. Markov (1897–?)	3	AI	Astrophysics	Resumed career in 1940s.
D. O. Mokhnach (1904–1978)	2	AOLGU†	Astrophysics (solar research)	Disappeared in 1937. Apparently survived.
V. S. Moshkova (1889–1956)	3	AI	Celestial mechanics	Later returned to AI.

Table (*continued*)

Name	Confidence level*	Institute	Field	Fate
M. M. Musselius (1884–circa 1938)	4	Pulkovo	Astrometry	Executed while serving ten-year prison sentence.
B. V. Numerov (1891–1941)	4	AI	Celestial mechanics	Apparently executed in prison on 13 September 1941.
E. Ia. Perepelkin (1906–1938)	4	Pulkovo	Astrophysics (solar service)	Executed in prison on 13 January 1938.
A. I. Postoev (1900–1977)	3	TAO	Time service	Emigrated to Brazil.
M. A. Radynskii (?)	1	AI	Celestial mechanics	Unknown.
S. M. Selivanov (1890–after 1936)	3	TAO	Astrophysics	Apparently died while serving sentence.
B. E. Semeikin (?)	2	KAO‡	Astrophysics (solar research)	Disappeared in 1936. Subsequent fate unknown.
V. P. Shcheglov (1904–1985)	3	TAO	Astrometry	Later released. Named TAO director on 22 August 1941.
B. A. Shigin (?)	3	Pulkovo	Administration	Unknown.
V. E. Surovtsev (1890–1938)	3	TAO	Astrometry	Apparently died while serving sentence.
S. M. Varzar (?)	1	AI	Celestial mechanics	Returned to AI in 1940s.
I. D. Zhongolovich (1892–?)	1	AI	Celestial mechanics	Reappeared at AI in 1937.

*Confidence that astronomer was repressed: 4—arrest confirmed by KGB
3—arrest confirmed by numerous sources
2—arrest strongly suspected based on numerous sources
1—arrest suspected

†Astronomical Observatory of the Leningrad State University

‡Khar'kov Astronomical Observatory

cal rights. The remaining astronomers received identical sentences. All were found guilty of crimes against the state under Article 58, sections 6 (espionage), 8 (terror), and 11 (participation in an organization).[65]

Perepelkin did not participate in his own trial, held at the Leningrad Regional Court one month later, on 17 June 1937. The court found him guilty of crimes under Article 58, sections 10

65. Numerova interview; and B. V. Numerov to the presidium of the USSR Academy of Sciences, 13 July 1937. V. N. Bleer to V. K. Abalakin, 10 March 1989. It is possible that even more Leningrad astronomers were tried on this day. The letter cited here gives details only about the astronomers from Pulkovo.

(agitation) and 11 and sentenced him to five years' deprivation of liberty plus three additional years' deprivation of political rights.[66]

The arrested astronomers suffered various fates. A few, such as Idel'son, Gaze, Vera S. Moshkova, Nina F. Boeva, A. V. Markov, S. M. Varzar, and Shcheglov, were released within a few years. Idel'son had two careers, celestial mechanics and law, and it is said that he successfully used his second career to defend himself.[67] He was released and returned to the Leningrad Astronomical Institute in December 1939. Shcheglov returned to Tashkent and became director in 1941, whereas Gaze was released in 1940 and began working for Shain in Simeis. Moshkova, Boeva, and Markov all resumed their careers during the mid-1940s.

Postoev had a most peculiar fate. Imprisoned in Leningrad for one year before being sent to Vorkuta, Postoev was released in 1939 and returned to Poltava, the town of his birth. He wrote to Teplov, who once again had become director of the Tashkent Observatory, and asked for permission to return and resume his career. Teplov responded that if Postoev could obtain the necessary residence permit, permission would be granted. Postoev was still in Poltava when the city came under German occupation early in World War II. In 1943 he went to Germany as a "volunteer laborer" along with his wife and son. At the end of the war Postoev found himself marooned as a displaced person in the American zone of Germany. Shapley attempted to find a position for Postoev in the United States, but the United States ultimately refused to grant him an entry visa. In 1952 Postoev emigrated to Brazil, where he worked at the Astronomical and Geophysical Institute in São Paulo until his death in an automobile accident in 1977.[68]

Kozyrev spent two years in the Dmitrovsk Prison before being sent to the Noril'sk Labor Camp. In June 1941 a fellow inmate denounced Kozyrev for statements in which he had, among other things, supported the theory of the expanding universe and disagreed with Fredrich Engels's statement that Isaac Newton was a "deductive ass." As a result, Kozyrev was given an additional fifteen-year sentence. He appealed this new conviction, and the supreme court of the Russian republic responded by commuting the fifteen-year sentence to a death sentence. Fortunately for Kozyrev, the Supreme Court of the USSR rescinded the death sentence—leaving the fifteen-year sentence in force—before it could be carried out.[69]

Meanwhile, Shain had been petitioning, through the president of the Academy of Sciences, Sergei I. Vavilov (1891–1951), for a review of Kozyrev's case. In March 1945 Kozyrev was transferred from Noril'sk to Lubianka and, on 1 January 1947, was released. He then worked for Shain in the Crimea and later returned to Pulkovo. He devoted the remainder of his life to elaborating his controversial theory of causal mechanics, according to which the flow of time, not nuclear reactions, is the main energy source in stars. In 1958 he became the first person to obtain indisputable observational evidence of volcanic activity on the moon. Kozyrev died in February 1983.[70]

Most astronomers arrested in 1936–1937 never returned. Iashnov died in the Dmitrovka Prison, Orlov province, on 29 May 1940. Eropkin and Musselius both began serving their sen-

66. Bleer to Abalakin, 10 March 1989.

67. Numerova interview.

68. Letter to Robert McCutcheon from V. A. Postoev, 19 March 1986; I. A. Teplov to A. I. Postoev, 2 September 1939. A copy of this letter was provided to the author by V. A. Postoev. "Excerpt of letter received from Prof. Postoiev, January 6, 1946"; H. Shapley to Countess Alexandra Tolstoy, 30 November 1948, Shapley papers; A. I. Postoev to H. Shapley, 21 December 1949, Shapley papers; and A. I. Postoev to H. Shapley, 25 June 1950, Shapley papers. See also O. T. Matsuura, "Alexander Postoiev," *Ciência e Cultura* 29 (September 1977): 1068–1070.

69. Kozyrev's years in prison and labor camps are described in Kozyrev interview; Kozyrev, "K biografiiu N. A. Kozyreva"; and Shklovskii, "Nevydumannye rasskazy." Aleksandr Solzhenitsyn describes Kozyrev's experiences in the Dmitrovsk Prison in *The Gulag Archipelago* (New York: Harper and Row, 1973) 1:484.

70. Kozyrev interview; Kozyrev, "K biografiiu N. A. Kozyreva"; and S. I. Vavilov, G. A. Shain, and A. A. Mikhailov to L. P. Beria, Arkhiv AN SSSR, f. 536, op. 2, ed. khr 17, l. 1–2. This letter is undated but appears to have been sent in 1944.

tences in prisons in Vologda province, but on 17 January 1938 an NKVD troika sentenced them to be shot for "systematic counterrevolutionary Trotskyite fascist agitation among the prisoners." Similarly, on 25 December 1937 a troika at the Marinskii Corrective Labor Camp, Krasnoiarsk province, found Perepelkin guilty under Article 58, paragraphs 2 (armed rebellion), 8, and 11 and sentenced him to be shot. Perepelkin's sentence was carried out on 13 January 1938, whereas Eropkin was executed on 20 January. In the case of Musselius we know only that "the sentence was carried out." The KGB itself acknowledges that the fates of Dneprovskii, Balanovskii, and Komendantov cannot be determined.[71]

Shain also intervened on behalf of Numerov but was unsuccessful. While in prison, Numerov used a stump of a pencil and scraps of paper to continue his scientific research. Through various routes he sent several articles out of prison, and the Leningrad Astronomical Institute published some without his name. On 25 June 1937 Numerov appealed to the supreme court of the Russian republic for pardon, with no result. On 13 July, following his transfer to the Kresty Prison, he sent a plea to the Academy of Sciences, which his wife smuggled out of the prison in a bundle of laundry. This too went without a reply.[72]

Later in 1937 Numerov was moved to Vladimir, but in March or April 1941 he was brought to the Butyrki Prison in Moscow for further interrogation. By this time the fact that German astronomers had named a minor planet for him had caught the interrogators' particular attention. Held in a common cell, Numerov gave his fellow prisoners popular lectures on current astronomy topics. By this time he had managed to write a mathematics textbook and many other new works. Later that spring or summer Numerov was transferred again—this time to Orel.[73]

On 13 September 1941 the Supreme Court of the Soviet Union reconsidered Numerov's case and handed down a new sentence. The details of the court's decision are not known, but Numerov vanished after this date. With invading German forces approaching Orel, Numerov was probably sentenced to death.[74]

Finally on 30 November 1937 the Military Collegium of the Supreme Court of the Soviet Union, meeting in Leningrad, found Gerasimovich guilty "of having been a member of a fascist, terrorist spying and wrecking organization since 1931, of conducting wrecking activities in the area of solar eclipse studies, of having prepared a terrorist act directed against the leaders of the party and government, and of having on two occasions transmitted espionage materials to foreign intelligence services." The court convicted Gerasimovich under Article 58, paragraphs 6, 7 (wrecking), 8, and 11 and sentenced him to be shot. The sentence was carried out that same day.[75] On 28 January 1938 a special conference of the NKVD sentenced Gerasimovich's wife, Ol′ga M. Gerasimovich, to eight years in a labor camp as the wife of a traitor. She served her sentence in the Vorkuta-Pechora Camp, and following her release she worked for Shain as the observatory librarian in Simeis.[76]

The NKVD arrested Numerov's wife, Ekaterina E. Numerova, on 4 September 1937 and

71. V. N. Bleer to V. K. Abalakin, 10 March 1989; and "Svidetel′stvo o smerti" for D. I. Eropkin. Abalakin gave me a copy of the latter.

72. Numerov to the presidium of the USSR Academy of Sciences, 13 July 1937; Ter-Oganezov, "Rezoliutsii," and Ter-Oganezov, "Oktiabr′skaia sessiia"; Numerov to the presidium of the USSR Academy of Sciences, 13 July 1937; and Sidorovskii, "Zvezdy i terni."

73. A. N. Naidenov, "Vospominaniia o vstreche s akademikom Numerovym B. V.," 1 January 1951. A. B. Numerova gave me a copy of these reminiscences.

74. "Spravka," Voennaia Kollegiia Verkhovnogo suda SSSR 14 maia 1957 g., No. 4H-019420/56, g. Moskva; and Numerova interview. A copy of the "spravka" was provided to me by A. B. Numerova.

75. V. N. Bleer to V. K. Abalakin, 10 March 1989; and V. Kondratov to T. B. Gerasimovich, 30 January 1989. Kondratov is a senior military prosecutor in the office of the chief military procurator; T. B. Gerasimovich is the daughter of B. P. Gerasimovich. Viktor Abalakin provided me with a copy of this letter.

76. V. N. Bleer to V. K. Abalakin, 10 March 1989; H. Shapley to V. Gerasimovich, 10 February 1947. Shapley papers; and G. Shain to H. Shapley, 28 August 1947, Shapley papers. V. Gerasimovich was B. P. Gerasimovich's brother; he was a doctor is Yugoslavia.

sentenced her to five years in a labor camp. She also survived her sentence and eventually returned to Leningrad.[77]

Inna N. Leman-Balanovskaia (1881–?), herself a senior astronomer at Pulkovo, was not as lucky. On 9 October 1937 she was sentenced to five years in a labor camp as the wife of a traitor; she never returned. Neither did the wives of Komendantov, Dneprovskii, Musselius, Iashnov, Kozyrev, and Perepelkin. Kozyrev's younger brother, Aleksei A. Kozyrev, spent fifteen years in a labor camp.[78]

The purges marked the beginning of the end of Ter-Oganezov's powerful role in Soviet astronomy. *Mirovedenie* ceased publication with the issue containing his denunciation of Gerasimovich. Although the reasons for *Mirovedenie*'s folding are not clear, Ter-Oganezov's removal from his post as director of the Moscow division of the All-Union Astronomical-Geodesical Society in March 1938 was the result of discontent among both amateurs and professionals in the society.[79] Unlike Lysenko, Ter-Oganezov had not built up a durable power base. His role in the 1930s had made him such an odious figure that when he died in 1963 no obituary appeared in any astronomy journal, professional or amateur.

The astronomers arrested in 1936–1937 each belonged to one or more of the following four groups: They were either staff members of the Tashkent Astronomical Observatory, celestial mechanicians, astrometrists (particularly those associated with the Catalog of Faint Stars), or solar researchers.

Simple association with the Tashkent Observatory, where Voronov had begun his rise to fame, was apparently sufficiently incriminating to bring about arrest and imprisonment. In his "confession" Numerov incriminated his Leningrad colleagues, most of whom were celestial mechanicians or astrometrists. (Voronov's association with the Catalog of Faint Stars also may have played a role in their arrests.) Finally, the acrimonious relations between the leaders of the Commission for the Study of the Sun (Gerasimovich, Kozyrev, Eropkin, and Ambartsumian) appear to have led to accusations and counteraccusations that incriminated all solar researchers.[80]

The purged astronomers were rehabilitated in 1956–1957, and rehabilitation documents indicate that all the Pulkovo astronomers had been arrested for their involvement in the Numerov affair.[81] The purge of astronomers was also limited almost exclusively to Pulkovo, Tashkent, and the Leningrad Astronomical Institute. Most other observatories, such as the Shternberg Institute, that were far removed from the Voronov scandal, Numerov and the Catalog of Faint Stars, and the solar service did not lose a single astronomer.[82]

Fraud and poor professional relations—once described by Gerasimovich as an "astro-squabble"[83]—do not seem likely causes of the purge. These factors were the excuse for a purge.

77. Numerova interview.

78. V. N. Bleer to V. K. Abalakin, 10 March 1989; Sidorovskii, "Zvezdy i terni"; Kozyrev interview.

79. Memorandum from V. A. Bronshten, 28 October 1987.

80. V. A. Ambartsumian was the only important member of the sun commission who was not arrested. According to G. A. Shain, Ambartsumian was not arrested because he was at Simeis when the arrests took place. O. Struve to H. Shapley, 28 August 1947, Shapley papers; and private communication from S. Chandrasekhar, 6 August 1986.

81. Interview with M. S. Zverev, Pulkovo, December 1987 (a transcript of this interview is on file at the American Institute of Physics, New York). A. A. Kozyrev and A. B. Numerova, among others, believe the arrests of the physicists Viktor R. Bursiian (1886–1945), Vsevolod K. Frederiks (1885–1944), Iurii A. Krutkov (1890–1952), and Petr I. Lukirskii (1895–1954) were connected to the Numerov affair. Indeed, the KGB indicates that the arrests that included the Pulkovo astronomers involved more than 100 scientists from various organizations.

82. A purge was, apparently, attempted at Shternberg, but it did not lead to any arrests. See Shklovskii, "Nevydumennye rasakazy," 42. In May 1937 Vladimir P. Tsesevich (b. 1907) was fired from his position as director of the Stalinabad Observatory where for a brief time, following his departure from Pulkovo, Voronov did calculations (see *Kratkii otchet Tadzhikskoi Astronomicheskoi Observatorii za 1937 god*, 7).

83. B. P. Gerasimovich, "O razvitii astronomicheskikh rabot v SSSR," in "Materialy," 704–705.

An isolated institution with deep-seated prerevolutionary traditions of international cooperation (in particular with Germany), Pulkovo had, by the mid-1930s, become an anachronism within the surrounding Soviet reality. It was ripe for a purge.

Nevertheless, Soviet conditions facilitated the Voronov scandal and the enmity between Gerasimovich and his junior staff. The cultural revolution certainly made it easier for Voronov to move up in the Soviet astronomy establishment without being detected. Similarly, the imposition of Drozd as Pulkovo director in 1930 led directly to the deterioration of relations at Pulkovo. Thus, the cultural revolution felt its full effect on Soviet astronomy not in 1928–1931, but in 1936–1937.

The events of 1936–1937 cut Soviet astronomy off irrevocably from its prerevolutionary traditions. Having lost its most senior and talented personnel, Pulkovo was forced to abandon or severely curtail many research projects. The Catalog of Faint Stars, for example, languished for decades. Moreover, the choice of Beliavskii to replace Gerasimovich as director proved to be most unfortunate. Beliavskii suffered from a thyroid disease and exhibited strong signs of paranoia. Fearing an attempt on his life, he spent much of his time locked in his office. Beliavskii's paranoia subsequently led to disastrous delays in evacuating Pulkovo equipment and personnel as German troops approached the outskirts of Leningrad in the early days of World War II.[84]

Pulkovo's reputation as a leading international center for astronomy, already in decline, had been lost completely. An era had ended, and now only a few astronomers were left who could remember the distant days when Pulkovo had been known as the "astronomical capital of the world."

84. Gnevyshev, "Sversheniia i trevogi Pulkova," 352–357.